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USER FEE AND CAMPER REGISTRATION INFORMATION
FROM A U.S. ARMY CORPS OF ENGINEERS
RESERVOIR PROJECT IN CENTRAL ILLINOIS:
TOWARD A MORE COMPLETE UTILIZATION OF DATA

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USER FEE AND CAMPER REGISTRATION INFORMATION FROM A U.S. ARMY CORPS OF ENGINEERS RESERVOIR PROJECT IN CENTRAL ILLINOIS: TOWARD A MORE COMPLETE UTILIZATION OF DATA

By

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ABSTRACT

USER FEE AND CAMPER REGISTRATION INFORMATION
FROM A U.S. ARMY CORPS OF ENGINEERS
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TOWARD A MORE COMPLETE UTILIZATION OF DATA

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This study analyzes untapped data sources at Lake Shelbyville, Illinois, a U.S. Army Corps of Engineers multiple purpose reservoir project and encourages the use of other such sources in the Corps and other agencies. Camping and user fee records form the basis for investigation.

From these records, a method of determining camping visitation is developed and camping use by senior citizens is compared to that of other visitors. In addition, the study derives camping demand curves utilizing the travel cost method. Costs of camping trips are discussed in detail and possible sources of such information listed. The effects of trip cost reduction on camping demand are also investigated.

Revisions of the fee collection forms utilized by the Corps of Engineers are suggested incorporating a form readily adaptable to direct analysis by computer. Further research possibilities using existing records as a base are also described.

This study is dedicated to my wife Susan and my daughter Alexis - they have allowed me my place in the sun, sometimes at expense of theirs.

ACKNOWLEDGEMENTS

I wish to thank my advisor, Dr. Lewis Moncrief, and the members of my graduate committee, Dr. Daniel Stynes and Dr. Robert Marty, for their assistance. The suggestions provided by Dr. Donald Holecek have also been much appreciated.

Special recognition is due the U.S. Army Corps of Engineers for selecting me to participate in their Advanced Study Program and to employees of both the St. Louis Corps of Engineers District Office and the Lake Shelbyville Management Office for providing me much of the information and support necessary for completion of this study.

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Finally, I wish to thank my wife Susan for her help and encouragement.

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CHAPTER I

INTRODUCTION

Frequently, public agencies are criticized for gathering extensive amounts of data, often at great expense, for no apparent reason other than satisfying some vague "requirement." In addition, even when a primary collection purpose is obvious, secondary or more far-reaching uses of the data are commonly overlooked or not considered for a variety of reasons. As a result, the full value of these vast amounts of data is, in many cases, not realized.

User fee and campground registration data collected by the U. S. Army Corps of Engineers at Lake Shelbyville, Illinois, is a case in point. Campground registration information is utilized only to establish a record of who has camped in a given campground at any point in time. Detailed user fee records only indicate how much money has been collected at each campground at the lake. The purposes of these detailed user fee records are two-fold:

1. To safe-guard these public funds as they pass through the collection system.
2. To determine what portion of the total funds collected nation-wide shall be reallocated to the lake project for park operations in the future.

While the current uses of the data are certainly worthwhile, full value is not being obtained. The basic questions are these:

- What additional information can be obtained from user fee and campground registration records?
- How can it be obtained?
- How can it be used?

Answering these questions can contribute to more effective recreation management and increased credibility of the activities performed at Lake Shelbyville. It may also demonstrate more far-reaching value to the Corps of Engineers.

Investigations into Potential Uses of Corps of Engineers Data

With one exception, no document was discovered that suggested obtaining information other than financial from Corps of Engineers User Permits. No reference was found that discussed gathering data from Camping Registration Cards beyond limited camping visitation information. There appears, then, to be little prior research to guide study in this area.

The exception mentioned above is the Recreation Use Survey Manual utilized by the U.S. Army Corps of Engineers, St. Louis District.[1] Published in 1976, the manual describes a method of computing visitation from fee collection records and Camping Registration Cards. While this manual does provide a basic framework for expanding the value of User Permit and Camping Registration Card information, it does not by any means describe all possible uses and is limited in its

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[1] U.S. , Department of the Army, Corps of Engineers, St. Louis District, Recreation Use Survey Manual. 1976.

methodology.

For example, the manual recommends a 100% sample of User Permits.[1] While this would not be an insurmountable task, based on the author's six years of experience with the Lake Shelbyville fee collection program, it would be extremely time consuming. A much smaller sample would certainly suffice.

In addition, the manual does not attempt to define the boundaries of each month's data, i.e. in terms of performing calculations for a given month, which permits should and should not be included in that month. The manual also asserts that information obtained during any one year may be descriptive of subsequent years. This needs to be tested using a longitudinal analysis method as will be proposed here.

The concepts described in the manual provide the rudimentary beginning point of this study. The manual dealt with only one possible use of the user fee and camping registration data - camping visitation. This study will refine this measurement method and explore other possible uses of this data.

Uses of Permit Information in Other Federal Agencies

As indicated above, the Corps of Engineers has made only limited use of visitor permit data. What of other federal land-managing agencies? While all of these agencies issue permits for certain recreation activities, the extent of permit utilization varies considerably.

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[1] Ibid. , p. 22.

The Bureau of Land Management issues user permits to individual recreationists only at high intensity recreation sites. On Bureau-managed lands, these sites are few and far between. Calculations of visitor use are made from these permits. The permits are also used to reduce visitor concentrations on some western rivers and in ecologically fragile environments.[1]

Commercial operation permits are also issued by the Bureau of Land Management for off-road vehicle and river rafting enterprises. Annual visitor use information provided by permittees enables desisions regarding future commercial potential to be made.[2]

The U. S. Fish and Wildlife Service experiences use patterns similar to those of the Bureau of Land Management, i.e. large areas supporting extremely low density use with a few pockets of high density use. User permits are, for the most part, issued only in high density areas. Permit information is utilized for visitation estimates.[3]

Entry permits are issued to visitors at National Park Service areas. Additional permits are issued for certain types of recreational activities within the areas. Visitation calculations are made from permit information.[4]

The U. S. Forest Service makes the greatest use of information from user permits. The source of this information is the Wilderness

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[1]Telephone interview on November 15, 1979 with David B. Hunsaker, Outdoor Recreation Planner, Bureau of Land Management, Baker, Oregon.

[2]Ibid.

[3]Telephone interview on October 22, 1979 with James F. Gore, Wildlife Biologist, U. S. Fish and Wildlife Service, Boise, Idaho.

[4]Telephone interview on November 15, 1979 with Robert Saddler, Park Ranger, National Park Service, Everglades National Park, Key Largo, Florida.

Permit Program begun in 1966. Initially, the program's purpose was two-fold: to provide visitor regulations to wilderness users and to gather management information. A third program purpose was added in 1976. This was the determination of visitor distribution within a wilderness area and an estimation of the area's carrying capacity. Specific management information obtained from the permits includes total visitation by travel zone within each wilderness area, method of travel by visitors within each travel zone and the number of nights spent by visitors within each travel zone. High levels of visitation in any one zone serve as indicators of potential environmental damage. Decisions to perform repairs at a particular site are, however, based on work crew observations.[1]

Objectives

It is clear that only limited use is being made of user permit information in all federal land management agencies. It is felt that full value is not being obtained from this information. Utilizing user fee and camping registration records generated at Lake Shelbyville, the following objectives will be attained. These are:

1. To document data collected by the Corps of Engineers from User Permits and Camping Registration Cards.
2. To document current uses of this data.
3. To demonstrate additional uses of this data such as camping visitation measurement, determination of trends in camping use and estimation of camping benefits using the travel

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[1]Telephone interview on October 17, 1979 with Toivo Sober, Forest Planner, Superior National Forest, Duluth, Minnesota.

cost method.

4. To propose other potential uses of the data.
5. To recommend revised data collection forms, procedures and analyses.

Structure

To achieve these objectives, this paper will be structured in the following manner:

1. Introduction
2. Existing Collection Methods and Uses of the Data
3. Estimating Visitor Use and Trends in Use from User Permit Data
4. Estimating Camping Benefits from Camping Registration Cards Using the Travel Cost Method
5. General Conclusions, Other Potential Data Uses and Recommendations.

CHAPTER II

EXISTING COLLECTION METHODS AND USES OF THE DATA

As previously mentioned, the project to be studied is Lake Shelbyville, a U.S. Army Corps of Engineers multiple purpose reservoir located near the City of Shelbyville in Central Illinois. The project's operation is under the jurisdiction of the Corps of Engineers District Office located in St. Louis, Missouri. The District Office is, in turn, under the jurisdiction of the Corps of Engineers Lower Mississippi Valley Division Office in Vicksburg, Mississippi. At the top of the pyramid is the Chief of Engineers located in Washington, D.C. Figure 1 shows this jurisdictional relationship.

Construction of the project was authorized in 1968.[1] Lands for the reservoir were purchased by the federal government in fee simple in both Shelby and Moultrie Counties, Illinois with flowage easement lands stretching into adjacent Coles and Douglas Counties, Illinois. At recreation pool (599.7 msl[2]), the project area consists of 11,100 acres of water, 23,308 acres of unsubmerged fee-owned lands and 6,098

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[1] U.S. , Congress, Senate, The Flood Control Act of 1958, Pub. L. 85-500, 85th Congress, 2d session, 1958, S. 3910, cited by U.S. , Department of the Army, Corps of Engineers, St. Louis District, Environmental Impact Statement of Operation and Maintenance, Lake Shelbyville, Illinois, Volume I. 1975, pp. I-1 - I-2.

[2] The abbreviation "msl" stands for "feet above mean sea level".

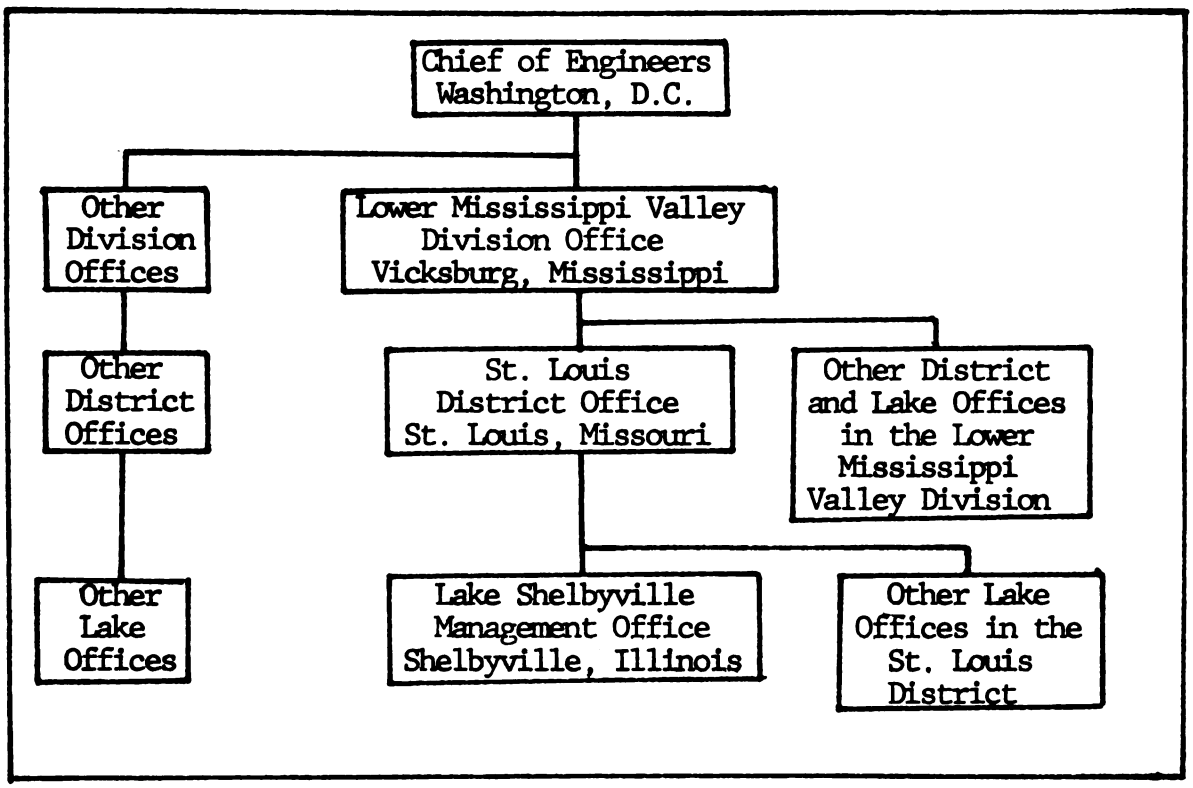

Figure 1

U.S. Army Corps of Engineers
Basic Civil Works Structure

acres of flowage easement lands.[1]

Five authorized purposes were delineated for the project.[2] These were:

1. Flood Control
2. Water Supply
3. Navigation
4. Fish and wildlife management
5. Recreation.

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[1]U.S. , Department of the Army, Corps of Engineers, St. Louis District, Basic Data Book for Lake Shelbyville, Shelbyville, Illinois, Revised March 1979. 1979, p. 6.

[2]Lake Shelbyville Environmental Impact Statement, Volume I. p. I-1.

Although flood control was the primary purpose of the reservoir, recreation at Lake Shelbyville, as with many water resource areas, is becoming increasingly important.[1] Construction and land acquisition began in 1963; the project became operational in 1970.[2]

Recreation at Lake Shelbyville

The Corps of Engineers operates eleven recreation areas at Lake Shelbyville. Their names and the facilities offered at each as of March 1979 are listed in Appendix I. In addition to the Corps areas, both the State of Illinois and private concerns operate recreation facilities and services on federally-owned lands leased to them by the Corps. The State of Illinois operates two large day/overnight (camping) use areas as well as three wildlife management areas at which day use is permitted. All three of the private operations are marinas of which one, Fox Harbor Marina, operates a campground that at one time was a Kampgrounds of America (KOA) franchise.

Lake Shelbyville lies in an area dominated by agriculture and relatively level terrain nearly devoid of trees. Thus the lake, lying in its wooded valley, is an unusual environmental phenomenon in this part of the state - an oasis in a "desert" of cropland. As a result, there are few water-based recreation alternatives and the project attracts large numbers of recreational users from much of the State of Illinois as well as portions of adjacent Indiana and Missouri.

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[1] John F. Dwyer and Robert D. Espeseth. "Planning for Recreation: Lake Shelbyville." Community Resource Development Pamphlet Number CRD-12, University of Illinois, Urbana. 1977, p. 1.

[2] U.S., Department of the Army, Corps of Engineers, St. Louis District, The Master Plan, Lake Shelbyville, Illinois (Revised 1974). 1974, p. 21

Visitation at the entire lake has averaged 3.1 million recreation days annually from 1971 through 1978.[1] As indicated, visitation at Lake Shelbyville, as at all Corps of Engineers projects, is measured in units called "recreation days." A "recreation day" is defined as:

> " ' . . . 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.' " [2,3]

This definition may be readily applied to day-use recreation activities. As will be shown later, however, some complications arise when applying the definition to overnight-use activities, i.e. camping.

Visitors to the lake participate in a number of recreational activities. Among the most popular are picnicking, fishing, boating, swimming, hunting, sightseeing, waterskiing and camping. Camping records are the subject of this study.

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[1] Lake Shelbyville Basic Data Book, March 1979, p. 2.

[2] U.S. , President, Water Resources Council, Evaluation Standards for Primary Outdoor Recreation Benefits. Supplement Number 1 to Senate Document 97 (Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources. 87th Congress, 2d session, May 29, 1962), June 4, 1964 as quoted in U.S. , Department of the Army, Corps of Engineers, Civil Works Directorate, 1975-1976 Recreation Statistics, Engineering Pamphlet 1130-2-401. 1978, p. 5.

[3] Supplement Number 1 to Senate Document 97 forms the basis for economic valuation of outdoor recreation as a primary, or secondary, benefit for benefit/cost analysis. Since recreation value, both monetary and intangible, is to be measured in units of recreation days, this definition becomes extremely important when attempting to justify the construction of a water resource project using recreation value as part of a benefit/cost analysis.

Fee Collection History of the Lake

The Corps of Engineers was authorized to collect user fees at public recreation areas beginning in 1973.[1] This law was amended in 1974[2] and, in this form, is applicable presently. Pursuant to this amendment, the Corps of Engineers has established camping use fees based on the type of facilities provided[3] ranging from $1.00 to $4.00 per night for each individual family campsite plus an additional nightly charge of 50¢ for electricity if available at the campsite.[4] Group rates ranging from $3.00 to $25.00 per night were also established. An additional requirement of this amendment is that

> "At each lake or reservoir under the jurisdiction of the Corps of Engineers, United States Army, where camping is permitted, such agency shall provide at least one primitive campground, containing designated campsites, sanitary facilities, and vehicular access, where no charge shall be imposed."[5]

Following the guidance provided by both Congress and the Chief of Engineers office, a fee collection program was established at Lake Shelbyville beginning in 1973. This program has continued to the

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[1]U.S. , Congress, House, Land and Water Conservation Fund Act of 1965, Pub. L. 88-578, 88th Congress, 2d session, 1964, H. R. 3846.

[2]U.S. , Congress, Senate, An Act to Amend the Land and Water Conservation Fund Act of 1965, Pub. L. 93-303, 93rd Congress, 2d session, 1974, S. 2844. The portions of this act most applicable to the Corps of Engineers projects are described in detail in U.S. , General Services Administration, National Archives and Records Service, Office of the Federal Register, Federal Register, Volume 39, Number 173, September 5, 1974, p. 32111A.

[3]U.S. , Department of the Army, Corps of Engineers, Office of the Chief of Engineers, Project Operations: Recreation Use Fees (PL 88-578, As Amended), Engineering Regulation 1130-2-404. 1976, Appendix A, p. A-1.

[4]Ibid. , p. 2.

[5]Public Law 93-303, Section (f).

present and applies only to camping use. It is not permitted to charge either entrance or admission fees at Corps of Engineers projects.[1]

An additional feature of the Corps of Engineers user fee collection system, and, indeed, all such federally-operated systems, is the Golden Age Passport program. Established in 1974,[2] the program allows the issuance, without charge, of a lifetime Golden Age Passport card to persons age 62 or older currently either citizens of or living in the United States. The Passport allows the bearer and his party both a 50% reduction in user fees at and free admission to federally-operated recreation areas where such fees are charged.[3] The Golden Age Passport is applicable to user fees at Lake Shelbyville.

Since 1973, user fees have been collected for camping at Lake Shelbyville federally-operated campgroungs. These are Lithia Springs, Coon Creek, Lone Point, Whitley Creek, Forrest W. "Bo" Wood[4] and Opossum Creek Recreation Areas. Due to the legislative changes listed above, fees were collected only intermittently during 1973. With the establishment of the 1974 guidelines, Opossum Creek and Lone Point

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[1]U.S. , Congress, Senate, The Flood Control Act of 1968, Pub. L. 90-483, 90th Congress, 2d session, Section 210, 1968, S. 3710.

[2]Public Law 93-303, Sections (e) and (f).

[3]This is often confused with the Golden Eagle Passport program which was established on July 11, 1972 by Public Law 92-347 (Senate Bill 1893). The Golden Eagle Passport is an annual permit available to anyone, regardless of age, for a set fee (not to exceed $10.00) entitling the bearer and his party free entry into federally-operated recreation areas where entrance fees are charged, It must be renewed annually and does not apply in any way to user fees. As only user fees, not entrance fees, are charged at Lake Shelbyville, the Golden Eagle Passport is not valid at Lake Shelbyville or any other Corps of Engineers project.

[4]Forrest W. "Bo" Wood Recreation Area, now comminly referred to as simply "Bo Wood," was named "Sullivan Access Area" prior to 1976.

were designated the "free" primitive campgrounds in 1974. In 1976, user fees were again charged at Lone Point following the upgrading of facilities there. Fees have been charged in the other four campgrounds, i.e. Lithia Springs, Coon Creek, Whitley Creek and Bo Wood, during each camping season from 1973 to present. Group camps were established in both Lone Point and Wilborn Creek during 1977. Appendix II shows the opening and closing dates of each campground as well as the fee charged in each campground during each year from 1973 to 1979.

The Fee Collection Process at Lake Shelbyville

Now that the groundwork has been laid, how are the individual user fees collected at Lake Shelbyville? By a directive from the Office of the Chief of Engineers, all user fees must be collected by either the controlled gate, roving ranger or contract gate attendant method; use of the honor system is not permitted at Corps projects.[1] Prior to 1977, fees were collected by Corps of Engineers employees at Lake Shelbyville using the controlled gate method during the peak camping season (approximately mid-May through mid-September) and the roving ranger method before and after the peak season. In 1977, the contract gate attendant method was utilized experimentally in one campground (Whitley Creek) while the other two methods continued in the other

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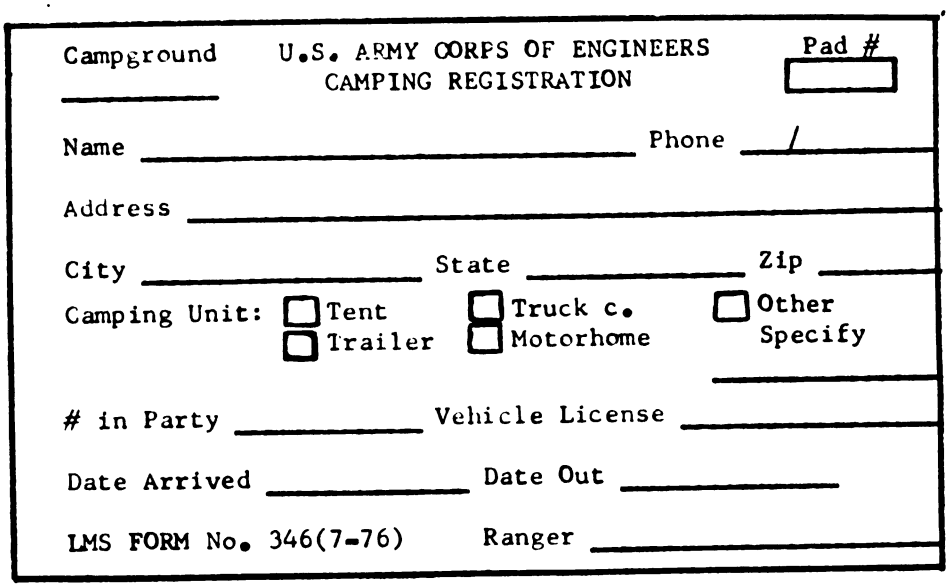
[1]Engineering Regulation 1130-2-404, pp. 10-11. The controlled gate and roving ranger methods both utilize Corps employees to collect fees either at a control station at the campground entrance or by visiting each campsite in person. The contract gate attendant method is identical to the controlled gate method except that contracts are let to perform collection services rather than utilizing Corps employees. There are a number of advantages to this method including increased coverage periods and reduced costs. Under the honor system, individual campers fill out their own user permit forms and pay their fees in a central depository without contact with any type of federal employee.

campgrounds at the lake. The success of the 1977 experiment led to the expansion of the contract gate attendant method to all Lake Shelbyville campgrounds in 1978. This collection method is still presently used at all Lake Shelbyville campgrounds operated by the Corps.

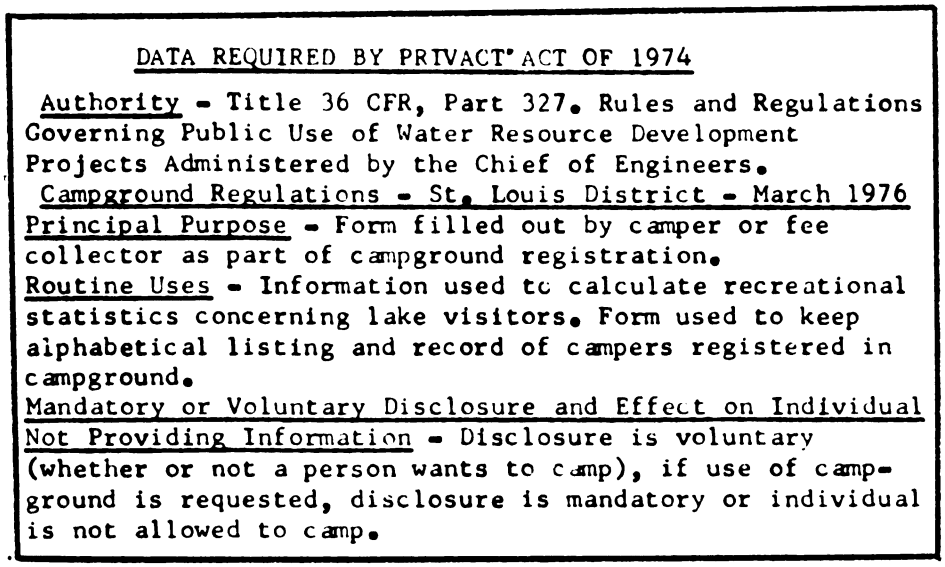
Four forms are utilized in the fee collection process at Lake Shelbyville. These are the Camping Registration Card (LMS form 346; 7-76), the User Permit (ENG form 4457), the Remittance Register (ENG form 3313) and the Refund Form (DA form 2496 modified for refund use). Sample copies of each form are attached as Figures 2 through 5 respectively. The use of these forms will be described below.

It will be useful here to describe a typical camping registration at Lake Shelbyville. Upon arrival at the campground, the camper is given a Camping Registration Card and instructed to enter the camping area to select a campsite. Upon selecting the site, the camper is instructed to complete all portions of the card with the exception of the space labeled "Date Out" and return to the gate attendant booth at the campground entrance. Regardless of the duration of that camper's particular visit, only one Camping Registration Card is issued per visit.

When the camper returns to the booth, the gate attendant issues the camper a User Permit, recording the appropriate data on the permit including the fee paid by the camper. The User Permit is issued in triplicate. The original (Fiscal Copy) is sent to the St. Louis District Office following a procedure which will be described below. The first duplicate (Ranger Copy) is retained by the lake management office. The third copy (Camper Copy) is given to the camper and serves as his receipt. The size of the camper's party has no bearing on the



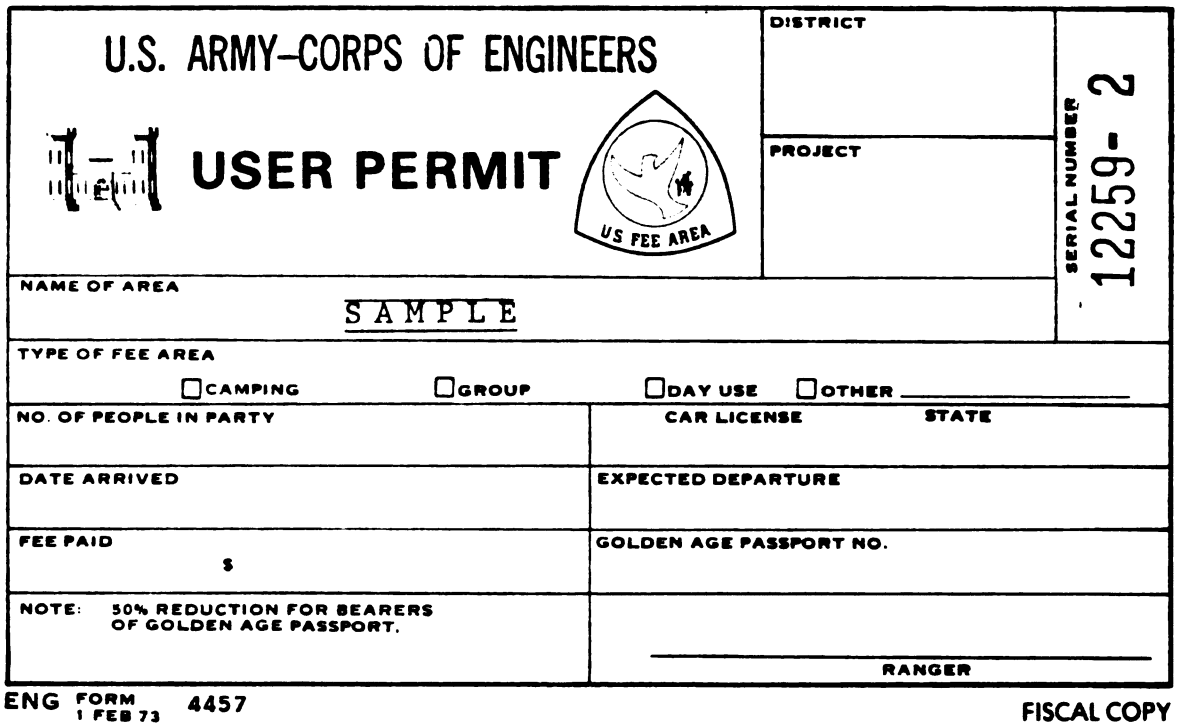
Front



Back

Figure 2

Camping Registration Card (LMS form 346; 7-76)



U.S. ARMY–CORPS OF ENGINEERS

USER PERMIT

US FEE AREA

DISTRICT

PROJECT

SERIAL NUMBER 12259- 2

NAME OF AREA

SAMPLE

TYPE OF FEE AREA

☐ CAMPING ☐ GROUP ☐ DAY USE ☐ OTHER _____

NO. OF PEOPLE IN PARTY

CAR LICENSE STATE

DATE ARRIVED

EXPECTED DEPARTURE

FEE PAID

$

GOLDEN AGE PASSPORT NO.

NOTE: 50% REDUCTION FOR BEARERS OF GOLDEN AGE PASSPORT.

RANGER

ENG FORM 4457
1 FEB 73

FISCAL COPY

Figure 3

User Permit (ENG form 4457)

REMITTANCE REGISTER (ER 37-2-10)	DATE PREPARED: 10 May 1979	CONTROL NO. (Number consecutively): OD-RS 79-6
	PREPARING ELEMENT: Lake Shelbyville	INVITATION NO. (Where applicable):

ITEM OR BID NO.	RECEIVED FROM (Name of Remittor or Bidder)	TYPE OF REMITTANCE (Check applicable col.) CH	MO	DFT	CASH	REMITTANCE NO.	AMOUNT
				X		XXXXXXXX	XXXXXXXXX
	Coon Creek						
	User Permits						
	No. 12259 (1-25) $110.50						
	12259 (26-50) 75.00						
	12373 (3-25) 80.00						
	12468 (1-11) 35.00					SAMPLE	
	$300.50						
	Lithia Springs						
	Bo Wood ..... etc.						

Figure 4

Remittance Register (ENG form 3313)

1. The individual indicated below is entitled to a refund of User Fees in the amount of _____; User Fee Permit Serial Number _____.

Camper's Name_____

Street Address_____

City, State, Zip_____

2. Authorized refunds shall be issued by mail from the Corps of Engineers, St. Louis District Office.

Fee Collector's Signature_____

Date_____

Lake Name_____

Access Area_____

3. The above refund indicated is approved.

Lake Manager's Signature_____

Date_____

Figure 5

Refund Form (DA form 2496 modified for Refund Use)

amount of fee paid. The fee is based solely upon the number of nights the camping party decides to stay in the campground. When the party completes its stay, the "Date Out" portion of the Camping Registration Card is completed by the gate attendant. A maximum of eight persons is permitted to camp at each individual site at any particular time.

It is important to note here that a camper is not required to pay for his total length of stay at one time as indicated by the block on the User Permit entitled "Expected Departure" - with emphasis on the word "expected." If the camper has elected to stay 14 nights, the maximum permitted consecutively in one campground, or any number in between, he may elect to pay his fee one night at a time or in larger portions if he so desires. Each time his stay is extended, a new User Permit is issued. The significance of this distinction will become apparent later when determining the length of an individual camping visit from User Permit data.

Completion of the fee collection cycle is accomplished with the Remittance Register. This form is completed by Corps of Engineers personnel at the lake management office upon the receipt of the fees collected and the corresponding Fiscal Copies of the User Permits issued at each campground. The fees are counted and correlated with the amounts shown on each User Permit. The User Permits issued and the corresponding amounts collected are tabulated and recorded on the Remittance Register. The fees are then converted into a bank draft and the draft, along with the Fiscal Copies of the User Permits and the Remittance Register, are forwarded to the St. Louis District Office. It is a requirement of the St. Louis District Office that lakes within the District submit Remittance Registers not less frequently than once

a week or when collections total $500.00 or more. During the peak camping season at Lake Shelbyville, they are often submitted twice per week.

Refunds and Voided User Permits

Refunds may be issued to camping parties who elect, for whatever reason, to vacate the campground prior to the expiration of their User Permit. The process is initiated by the camper who relinquishes his unexpired User Permit to the gate attendant who, in turn, prepares a Refund Form in the amount indicated by the number of unexpired nights on the User Permit. The Refund Form is then, if approved at the lake management office, forwarded to the St. Louis District Office where a check is issued in the amount of the refund and mailed directly to the camper. Cash refunds cannot be made nor can refunds be issued for nights actually camped in a campground.

Incorrectly prepared User Permits are voided by the gate attendant. All three portions of the User Permit are voided and submitted to the lake management office with collected fees and valid User Permits.

The Fee Collection Cycle

To more fully understand what has been described verbally above, Figure 6 has been prepared showing the fee collection cycle for Lake Shelbyville. Steps 1 through 4 represent the collection process; steps 5 through 10 represent the redistribution process. It must be pointed out that at any step in the redistribution process the fee monies can be directed to any Corps element regardless of the lake at which it was collected. The practice, generally, is to direct the money to the element which has the greatest need of funds or, in lieu of this, to

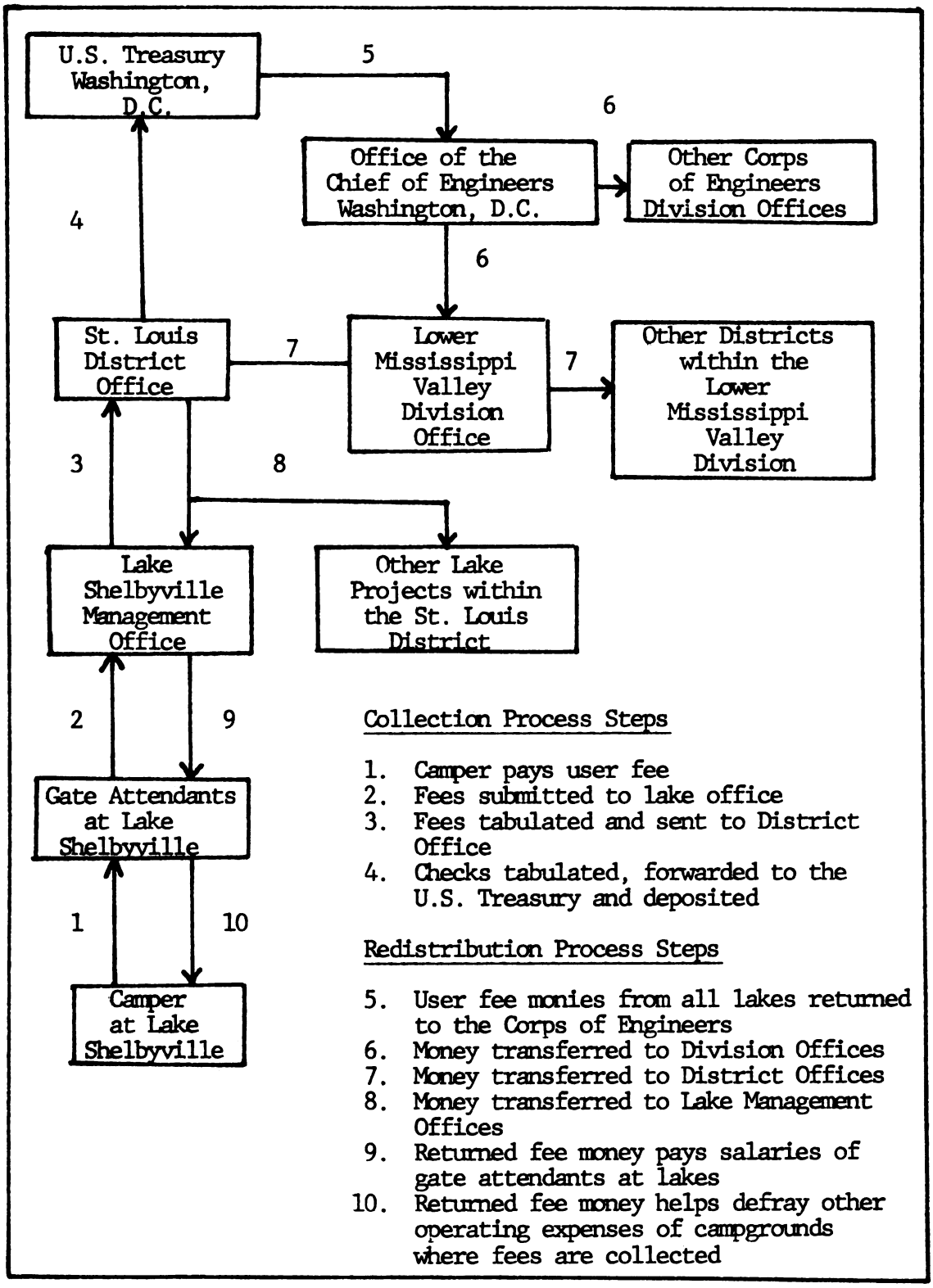


Figure 6
The Fee Collection Cycle at Lake Shelbyville

the lake project at which it was collected. Historically, all, or nearly all, fee monies collected at Lake Shelbyville have been returned to the lake for operation of recreation areas in which fees are collected.

Current Uses of Information on the Forms

The following summarizes the current uses of the four forms utilized in the fee collection process at Lake Shelbyville. The Remittance Register serves only as an accounting record of both the amount of money collected by campground and the serial numbers of the User Permits issued in that campground.

Rather limited use has also been made of User Permit information. Permits are simply used as receipts for monetary transactions. The same is true of the Refund Form. Fees for camping at Lake Shelbyville may be paid with either cash or Travelers Checks; personal checks are not accepted.

The Camping Registration Card serves primarily as a record of who has camped in a campground at any particular time. When used in this way, they act as a deterrent to both vandalism and littering, facilitate the return of lost-and-found items left behind at campsites and allow mailing of violation notices to campers who leave their campsites littered.

Potential Uses of Information on the Forms

All items of information on the forms currently receive use. These uses are, however, primarily related to day-to-day operation of the campgrounds and keeping an accounting record rather than for planning or research; the full value of information on these forms, particularly User Permits and Camping Registration Cards, is not being

realized. Some potential additional uses are:

1. Calculation of and changes in camping visitation data over time.
2. Determining trends in senior citizen camping use and its value in facilities planning and effect on future revenues.
3. Calculation of the demand for and benefits derived from camping at Lake Shelbyville campgrounds operated by the Corps of Engineers.

It is these items that will receive particular emphasis in this study. Other potential values, although not investigated in detail here, include planning future campground needs and campground design as well as marketing studies.

CHAPTER III

ESTIMATING VISITOR USE AND TRENDS IN USE FROM USER PERMIT DATA

Procedures

As previously indicated, User Permits currently serve only as records of cash transactions. An examination of the form shows a number of other pieces of information that could prove useful for improving the management of the reservoir. For this study, the following information will be recorded from each sampled User Permit.

1. Name of the individual campground, month and year of permit issue.
2. Party Size
3. Amount of fee paid
4. Whether or not the permit was issued to a Golden Age Passport bearer
5. The number of days the party stayed in the campground, i.e. the length of stay as indicated by that particular permit
6. Whether the permit was an initially issued permit or a renewal.

This information will be recorded from samples of User Permits drawn for each month and each park over a three year period; 1974, 1976 and

1978. Although records are also available from both 1975 and 1977, the above three years were chosen to facilitate sampling and still allow a description of trends over time. The actual sampling technique and some potential data collection problems will be discussed below.

Uses of the User Permit Data

The equations and methodology to be presented here appear rather complex. The majority of the calculations are necessary only for calibration. Once this is accomplished, the calculation of camping visitor use, the major thrust of the User Permit data, is quite simple. This computation involves the multiplication of only two figures - the amount of fees collected and the appropriate conversion factor.

The logical question is for what will this information be used? It will be used to determine a number of relationships thereby demonstrating the increased value of User Permit information. The relationships to be determined are as follows.

1. The relationship between user fees collected by park by month and recreation days spent camping during that period.

This relationship will be useful in calculating camping visitation and can be expressed algebraically in the following manner. Let

R = the total camper days (recreation days spent camping)

P = the average party size per User Permit

L = the average length of stay in days per User Permit

F = the average fee paid in dollars per User Permit

N = the number of User Permits in the population

D = the total amount of fees collected in dollars

Then

$$D = F \times N \quad , \quad N = \frac{D}{F}$$

and $R = P \times L \times N$

$$= P \times L \times \frac{D}{F}$$

$$= \left(\frac{P \times L}{F}\right) D$$

The resulting equation can be used in converting total fees collected to an estimate of camping visitation.

2. What portion of user fees and visitation is contributed by senior citizens (i.e. Golden Age Passport bearers) and how has this changed over time?

These can be determined by modifying and expanding the above equation.

$$R = R_f + R_g = \left(\frac{P_f L_f}{F_f}\right) D_f + \left(\frac{P_g L_g}{F_g}\right) D_g$$

where R, P, L, F and D are defined as above, subscript f refers to full-price campers and subscript g refers to Golden Age Passport campers. By observing changes in this information over time, trends regarding revenue and camping use by senior citizens can be seen.

3. Plotting average party size and average length of stay over time by park could indicate changes in camping patterns and aid in predicting future impacts on campsites at Lake Shelbyville.

This is yet another value of the currently unutilized information

contained on User Permits.

Sampling Procedures for User Permits

The previously described Remittance Registers will form the sampling frame for a systematic sample, stratified by month with a random start, of the population, i.e. all User Permits generated at Lake Shelbyville during 1974, 1976 and 1978. Since part of the expected results includes the calculation of visitation statistics which are reported on a calendar month basis, difficulty arises when trying to determine the beginning and end of a month based solely upon the dates Remittance Registers were submitted to the District Office. This is due to the lag between the time a User Permit is issued at a campground and the time the Remittance Register containing that User Permit is compiled and dated. For example, a User Permit issued on May 29th might appear on a Remittance Register dated sometime in June even though the camper days (visitation) represented by that permit occurred in May. This is a problem that must be controlled in the sample design and will be accomplished in the following manner.

Based on the author's experience in fee collection at Lake Shelbyville (6 years), there is approximately a five day lag between issuance of a User Permit and compilation of the Remittance Register containing that permit. For this reason, it will be assumed that Remittance Registers dated on or after the fifth day of a given month will be considered as being within that month. Remittance Registers dated before the fifth of a given month will be considered as being within the previous month. For example, a Remittance Register dated 5 August 1976 will be considered to be within August 1976; one dated 4 August 1976 will be considered to be within July 1976. The first

step, then, will be to categorize the Remittance Registers by month and year.

On each Remittance Register, User Permits are grouped according to the campground in which they were issued. Since visitation is calculated not only by month but also by campground, samples must be drawn from groups of User Permits issued in each campground during each month. The second step, then, is to calculate the total number of User Permits issued in each campground during each month, i.e. determining the sub-population size of each stratum.

It is recognized that some inaccuracy will occur when transposing directly from the Remittance Registers to the total number of User Permits issued in a given campground during a given month. Using an example given above, a User Permit issued on May 29th might have been paid in full in advance and issued for 14 days. In this case, the majority of the camper days represented by this permit would fall in the month of June; the permit would, however, appear on a Remittance Register slated to fall into May. At best, the above method can be expected to only approximate the exact number of User Permits issued in a given campground in a given month. The Registers will, however, certainly yield the total number of permits issued in a given campground in a given year. This problem should not affect the accuracy of the study.

Calculating Sample Size - User Permits

Next, the sample size of each stratum must be determined. This will be done in the following manner.

$$n = \left(\frac{2\sigma}{a}\right)^2$$ for a 95% confidence level.

where

n = sample size

a = the degree of accuracy desired[1]

σ = the standard deviation.

The standard deviation associated with each variable, i.e. P, L and F, will be estimated utilizing an estimate of the interquartile deviation. The following procedure will give this estimate.[2]

$$\sigma = 1.25\ Q$$

where

$$Q = \frac{Q_3 - Q_1}{2}$$

and

Q_3 = the third quartile; ¼ of the cases are above this value

Q_1 = the first quartile; ¼ of the cases are below this value.

The quartiles will be estimated by taking a small sample consisting of twenty-five User Permits from each campground and month of 1978.[3] Values of the three variables, i.e. P, L and F, will then be calculated. The variable with which is associated the largest standard deviation, as determined by the quartile estimation, will ultimately determine the sample size for each particular group of User Permits. The starting point of each sample will then be selected using a random number

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[1]Accuracy is acceptable to within $\pm$ 0.400 of the true values.

[2]Dennis J. Palumbo, Statistics in Political and Behavioral Sciences (New York: Columbia University Press, 1977), p. 68.

[3]1978 was selected because fees were collected in all five campgrounds during that year. The standard deviations calculated from that year's data will be assumed to be representative of both 1974 and 1976 and will therefore be used to calculate sample size for those years also.

table.[1] Should the total number of User Permits for a particular month fall below the calculated sample size, no data will be collected for that month. This is not expected to occur except at either the beginning or end of a recreation season.

Data Collection Problems - User Permits

Most of the data will be easily extracted from User Permits. A problem does arise, however, when determining the length of stay from the individual User Permits. This is due to the unit of visitation measurement used by the Corps of Engineers. This is the "recreation day," and has been defined previously.

According to this definition, a person arriving on one day and leaving the next represents two recreation days (1 person x 2 days = 2 recreation days). To accomodate this definition, the number of days spent at the campground as indicated by a User Permit issued to a party when it begins its stay will be recorded as the departure date minus the arrival date plus one. For example, if a party arrives on the 17th of July and plans to leave on the 25th of July, the number of recreation days spent in the campground by that party = 25 - 17 + 1 = 9.[2] Multiplying this figure by the number of people in the party will give the total number of recreation days represented by that User Permit. If the party in the above example consisted of 4 persons, this User permit would represent 9 x 4 = 36 recreation days.

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[1]The random number table used in this study will be found in George W. Snedecor, Statistical Methods, Fifth Edition (Ames, Iowa: The Iowa State University Press, 1956), pp. 11-15.

[2]It is instructive to note that the number of nights spent in the campground is one less than the number of days. It is the number of nights upon which is based the amount of user fee charged.

This formula works well for initially issued permits. The situation is complicated, however, when obtaining this information from User Permits of parties who have elected to stay longer than originally planned, i.e. they have renewed their User Permit. As stated previously, in such cases a new User Permit is issued to the party reflecting the current date and the new expected departure date. In most cases, a renewal permit can be easily identified by notations made by the gate attendant at the time of issue.[1]

To avoid inaccurate calculation of visitor use through "double-counting," which would occur if the above formula were also used for renewals, the number of recreation days spent in the campground by a renewing party must be calculated differently. For renewal User Permits, then, the number of days is equal to simply the new expected departure date minus the "arrival," actually renewal, date. For example, if a party elects to renew their permit on the 17th of July and now depart on the 25th of July, the number of days spent = 25 - 17 = 8.[2] Multiplying this figure by the number of people in the party will give the number of recreation days represented by that permit. If the party in the above example consisted of 4 persons,

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[1]The renewal rate for each sample can then be determined based on these notations. Should renewals not be detectable during any particular year, it will be assumed that the renewal rates from other years can be assigned to these samples. Based on the author's experience, and human nature, it is unrealistic to assume that no renewals will occur during an entire recreation season.

[2]In this case, the number of nights spent in the campground is equal to the number of days. The "missing day" is contained on some other permit issued when the party first arrived at the campground. Unfortunately, there is no way to correlate the renewal permit with the previously issued permit(s) to determine the total length of stay for that party's particular visit.

this User Permit would represent 8 x 4 = 32 recreation days.

Another potential difficulty occurs when a party vacates their campsite prior to the expiration of their User Permit. Pursuant to a procedure previously described, they may choose to apply for a refund of the unused portion of their User Permit with the gate attendant upon exiting the campground. No data is available regarding parties departing early who do not request a refund. A high frequency of early departures would lead to an overestimation of camping visitation since it is not possible to identify the number of recreation days for which refunds were issued. A preliminary examination of refund data from 1976 at Lake Shelbyville indicates that refundw represent less than 1% of both the total number of User Permits issued and the total amount of fees collected during that year. In this author's opinion, this is insignificant and will not appreciably affect the resukts. It is highly likely that this is true for all years to be investigated in this study and will be so assumed.

A third problem arises when considering User Permits which are voided. As stated above, a gate attendant may void a User Permit whenever an error is made while filling it out. voided User Permit is turned in along with other permits completed that day. Voided permits do not contribute to either the total fees collected or other camping visitation data. They are, however, included in the population of User Permits from which samples will be drawn. Based on the author's experience, although not verified with data, it is estimated that voided User Permits occur infrequently. When encountered in sampling, voided User Permits will be ignored.

Results and Conclusions from User Permit Data

User Permits were sampled pursuant to the procedure described above. It was discovered that there is often little correlation between the actual number of User Permits per campground per month and the number for that campground and month as shown on the Remittance Registers. That is, actual monthly campground User Permit subpopulations often differed substantially from those predicted by the Remittance Registers; the totals for a campground over an entire year are, however, correct. For this reason, and due to time constraints, monthly data, although properly generated, was not analyzed. Analyses of User Permit data were instead done on an annual basis. The number of User Permits sampled in each population, the size of the total population and the percentage sampled are indicated in Table 1.

Following the method described previously, the accuracy of the User Permit data was determined. Based on a sample size of 100 User Permits per campground per month, the values of average party size (P_t) are accurate to within $\pm$ 0.353 with a 95% confidence level for each sample. The values of average length of stay for each user fee dollar spent ($\frac{L_t}{F_t}$) are more accurate - to within $\pm$ 0.100 with a 95% confidence level for each sample of 100 permits. These accuracies are adequate to allow meaningful analyses.

Golden Age Passport Visitors

One purpose of this study is to analyze the portion of camping visitors at Lake Shelbyville that utilize Golden Age Passports. The number of User Permits in the sample that were issued to Golden Age Passport and full-price visitors is shown in Table 2. The corresponding percentages for each type of visitor are summarized for each campground

Table 1

Number of User Permits Sampled in Each Population

Campground	1974	1976	1978	Total
Bo Wood				
Number Sampled	700	700	600	2,000
Total Population	5,148	4,607	5,821	14,821
Percent of Total	13.6%	15.2%	11.8%	13.5%
Coon Creek				
Number Sampled	600	700	600	1,900
Total Population	7,131	7,807	8,116	23,054
Percent of Total	8.4%	9.0%	7.4%	8.2%
Lithia Springs				
Number Sampled	600	700	600	1,900
Total Population	5,363	4,434	4,411	14,208
Percent of Total	11.2%	15.8%	13.6%	13.4%
Whitley Creek				
Number Sampled	600	500	500	1,600
Total Population	2,608	1,734	1,874	6,414
Percent of Total	21.4%	28.8%	26.7%	24.9%
Lone Point				
Number Sampled	NO	500	500	1,000
Total Population	DATA FOR	1,308	1,228	2,536
Percent of Total	1974	38.2%	40.7%	39.4%
Total - All Campgrounds				
Number Sampled	2,500	3,100	2,800	8,400
Total Population	20,448	19,890	20,695	61,033
Percent of Total	12.2%	15.6%	13.5%	13.8%

Table 2

Number of Golden Age and Full-Price User Permits Sampled

Campground	1974	1976	1978	Total
Bo Wood				
Golden Age	122	123	122	355
Full-Price	578	577	490	1,645
Total	700	700	600	2,000
Coon Creek				
Golden Age	58	82	53	193
Full-Price	542	618	547	1,707
Total	600	700	600	1,900
Lithia Springs				
Golden Age	30	31	18	79
Full-Price	570	669	582	1,821
Total	600	700	600	1,900
Whitley Creek				
Golden Age	28	16	17	61
Full-Price	572	484	483	1,539
Total	600	500	500	1,600
Lone Point				
Golden Age	NO	11	7	18
Full-Price	DATA FOR	489	493	982
Total	1974	500	500	1,000
Total - All Campgrounds				
Golden Age	238	263	205	706
Full-Price	2,262	2,837	2,595	7,694
Total	2,500	3,100	2,800	8,400

and all years in Table 3.

It is interesting to note in Table 3 that the highest proportion of User Permits issued to Golden Age visitors occurred in Bo Wood and Coon Creek. These are the only two Corps-operated campgrounds at Lake Shelbyville with electrical hook-ups at some or all of the campsites during the 1974, 1976 and 1978 camping seasons. Although the data as gathered in its present format does not permit comparisons, it is conjectured that senior citizens (Golden Age Passport visitors) predominantly utilize electrical sites. It is further conjectured that this accounts for the higher portion of senior citizens utilizing Bo Wood and Coon Creek.

This could be tested during the 1979 camping season at Lithia Springs. This campground had electrical facilities installed at all its campsites during 1978 to become available for the 1979 camping season. An increase in use by senior citizens, if observed in this campground during 1979, could, quite possibly, be attributed to the electrical installation. If this is true, such an increase in senior citizen use might be expected at other Corps of Engineers campgrounds at other projects if electrical facilities are added or expanded.

Table 4 allows comparison between use patterns of Golden Age Passport bearers and full-price visitors. The average party size per User Permit for Golden Age Passport bearers (P_g) is consistantly lower than that of full-price visitors (P_f). This could indicate that those camping with Golden Age Passports are predominantly retired couples camping alone while full-price visitors are family groups camping with children and/or friends.

The reverse is true for length of stay per User Permit (L_g and

Table 3

Proportion of Golden Age and Full-Price User Permits Sampled

Campground	1974	1976	1978	Average
Bo Wood				
Golden Age	17%	18%	18%	18%
Full-Price	83%	82%	82%	82%
Total	100%	100%	100%	100%
Coon Creek				
Golden Age	10%	12%	9%	10%
Full-Price	90%	88%	91%	90%
Total	100%	100%	100%	100%
Lithia Springs				
Golden Age	5%	4%	3%	4%
Full-Price	95%	96%	97%	96%
Total	100%	100%	100%	100%
Whitley Creek				
Golden Age	5%	3%	3%	4%
Full-Price	95%	97%	97%	96%
Total	100%	100%	100%	100%
Lone Point				
Golden Age	NO	2%	1%	2%
Full-Price	DATA FOR	98%	99%	98%
Total	1974	100%	100%	100%
Total - All Campgrounds				
Golden Age	10%	8%	7%	8%
Full-Price	90%	92%	93%	92%
Total	100%	100%	100%	100%

Table 4

Comparison of Average Party Size, Length of Stay and Fee Paid Between Golden Age Passport and Full-Price Campers[1]

	1974	1976	1978	Average
P_g	2.65	2.75	2.80	2.73
P_f	3.77	3.67	3.72	3.72
L_g	3.60	3.63	3.76	3.66
L_f	2.71	2.80	2.79	2.77
P_gL_g	9.79	10.18	11.04	10.34
P_fL_f	10.26	10.56	10.61	10.48
F_g	4.80	5.58	5.87	5.42
F_f	8.57	7.31	7.26	7.71
$\frac{P_gL_g}{F_g}$	2.04	1.82	1.88	1.91
$\frac{P_fL_f}{F_f}$	1.20	1.44	1.46	1.37

[1] P = average party size per User Permit

L = average length of stay in days per User Permit

F = average fee paid in dollars per User Permit

PL = average camping recreation days per User Permit

$\frac{P\ L}{F}$ = average camping recreation days per dollar per User Permit

Subscript g refers to Golden Age Passport campers

Subscript f refers to full-price campers

L_f). Golden Age Passport bearers consistantly stayed longer than full-price visitors. Since Golden Age Passport bearers are, by necessity, age 62 or older, it is highly likely that a majority of them are retired and have a greater amount of leisure time than full-price visitors. The length of stay by full-price visitors could, due to its short duration, also indicate that few parties elect to spend a protracted vacation at Lake Shelbyville. It is possible that people within the lake's service area are beginning to shift from taking a single long-distance annual camping vacation away from Illinois to taking numerous shorter trips throughout the year using "car pooling" to help reduce costs. As the lake becomes more well known and popular, there could be a trend toward taking trips to the lake of slightly longer duration. The predominant length of stay for full-price visitors is approximately three days - the amount of time required to spend a weekend of camping at Lake Shelbyville.

Although there is a difference in length of stay and party size, the number of recreation days per User Permit for Golden Age and full-price visitors, P_gL_g and P_fL_f respectively are quite similar. While both have increased over time, that for senior citizens has increased at a faster rate.

P_gL_g and P_fL_f are also useful in camping visitation calculation, Multiplying these figures by the number of User Permits issued to each type of visitor in each campground and each month would yield the total number of recreation days experienced in that campground during that month. While this calculation does not depend on the nightly user fee charged in each campground, it is dependent upon the number of User Permits issued in each campground and month. It is difficult to

determine the number of User Permits issued in each campground and month from Remittance Registers as indicated above. In addition, voided User Permits cannot be distinguished from valid ones when aggregated on Remittance Registers. Including voided User Permits in the total issued could, if they occurred in sufficient numbers, lead to an overestimation of camping visitation.

The fee paid in dollars per User Permit, F_g and F_f, for each type of user is also shown in Table 4. As might be expected, the fee per User Permit paid by Golden Age visitors is approximately half of that paid by full-price visitors. Variations over time may be explained by increases in user fees charged per night and, as a corollary to this, a possible increase in the use of electrical facilities by all types of visitors; an additional 50¢ is charged per night for electrical use.

The final two items in Table 4, $\frac{P_g L_g}{F_g}$ and $\frac{P_f L_f}{F_f}$, are of the greatest significance. These represent the number of recreation days experienced per dollar of user fee paid by senior citizens and full-price visitors respectively. Multiplying these figures by the total amount of fees collected from each type of visitor yields the total number of recreation days experienced by each type of visitor, R_g and R_f. This has been done in Table 5. The portion of user fees paid by each visitor type was obtained from the sampled User Permits. The total fees collected was obtained from Corps of Engineers records at Lake Shelbyville.

As can be seen from Table 5, the portion of user fees contributed by Golden Age visitors has increased over time. While the extent of the trend cannot be determined, it appears that it will continue. The net effect is that the rate of total revenue increase from user fees

Table 5

Comparison of Recreation Days Between Golden Age and Full-Price Campers[1]

	1974	1976	1978
Total User Fees Collected (Dollars)	$128,158	$145,408	$151,468
User Fees Paid by Golden Age Visitors (% of Total)	10.2%	10.4%	10.7%
User Fees Paid by Full-Price Visitors (% of Total)	89.8%	89.6%	89.3%
User Fees Paid by Golden Age Visitors (Dollars)	$13,072	$15,122	$16,207
User Fees Paid by Full-Price Visitors (Dollars)	$115,086	$130,286	$135,261
$\frac{P_g L_g}{F_g}$	2.04	1.82	1.88
$\frac{P_f L_f}{F_f}$	1.20	1.44	1.46
R_g	26,667	27,522	30,469
R_f	138,103	187,612	197,481
$\frac{R_f}{R_g}$	5.2 : 1	6.8 : 1	6.5 : 1

[1] $\frac{P L}{F}$ = average camping recreation days per dollar per User Permit

R = total number of camping recreation days per year, all areas

Subscript g refers to Golden Age Passport visitors

Subscript f refers to full-price visitors

collected at Lake Shelbyville can be expected to slow down.

As can be seen from Table 5, the number of recreation days, i.e. camping consumption as opposed to camping demand, for each type of visitor (R_g and R_f) have both increased over time. Further analysis of this information could prove useful for one aspect of managerial decision-making at the lake. The decision in question is whether or not to change the mix of recreation facilities at lake campgrounds by increasing facilities and services desired by senior citizens. Basing such a decision simply on the observed increase in senior citizen use may be limited in scope. Comparison must instead be made between the increases in use observed in both types of visitors to ensure an equitable distribution of facilities and services. How, then, can the necessary comparison be made?

This can be done by calculating the ratio of full-price recreation days to senior citizen recreation days, i.e. $\frac{R_f}{R_g}$, for each year. A decrease in this ratio over time would indicate a proportional increase in senior citizen camping use and, hence, indicate a need for additional facilities and services desired by senior citizens. The ratios are shown in Table 5.

Unfortunately, no clear-cut trend is evident. After an initial increase in the ratio, indicating a need to increase facilities and services for full-price visitors, the ratio decreased between 1976 and 1978. Perhaps information from intervening or succeeding years could indicate a more definite trend.

Data from Both Camping Types Combined

The main value of the User Permit data lies in information gathered regarding the Lake Shelbyville camping population as a whole,

i.e., average party size per User Permit (P_t), average length of stay per User Permit (L_t) and average fee paid per User Permit (F_t). These in various combinations will be utilized to determine a number of items. The more significant will be presented here; a detailed summary of many of the relationships for each campground and year is included in Appendix III.

The first of these are shown in Tables 6 and 7. Table 6 indicates the values of P_t, L_t and F_t determined for each campground for all years combined. While L_t does not exactly represent the total length of stay per trip for all camping parties due to User Permit renewals, it does, nonetheless, represent a reasonable approximation. With this in mind, the table can be read in the following manner using Bo Wood as an example:

> The average camping party at Bo Wood consists of 3.20 persons who stay a total of 3.26 days per trip and spend a total of $7.57 in user fees.

Information in this table could be of value in predicting use patterns at other similar Corps of Engineers campgrounds.

It is interesting to note that the smallest average party size value and largest average length of stay value were both observed at Bo Wood campground. This is undoubtedly due to the effect of Golden Age Passport visitors as discussed earlier. In terms of future campground design, it would be of value to investigate the causes of the attraction of senior citizens to this type of campground.

Table 7 shows the item of particular value for calculating camping visitation. This is the recreation days per dollar figure, i.e. $\frac{P_t L_t}{F_t}$. It is shown for all campgrounds. Multiplying the appropriate value by the total user fees collected during a particular month

Table 6

Three-year Range and Over-all Average of P_t, L_t and F_t at All Lake Shelbyville Campgrounds[1]

Campground	P_t		L_t		F_t	
	Range	Average	Range	Average	Range	Average
Bo Wood	2.07-4.03	3.20	2.66-4.26	3.26	5.21-9.40	7.57
Coon Creek	2.48-4.15	3.67	2.54-3.23	2.97	5.58-9.41	7.69
Lithia Springs	3.04-4.18	3.71	2.32-3.13	2.71	4.94-7.46	6.13
Whitley Creek	3.43-4.45	3.97	2.33-3.06	2.59	4.62-7.70	5.77
Lone Point[1]	3.59-4.27	3.86	2.45-2.96	2.71	5.64-7.18	6.53
All Campgrounds Combined	2.07-4.45	3.68	2.32-4.26	2.85	4.94-9.41	6.74

[1]P = average party size per User Permit; L = average length of stay in days per User Permit; F = average fee paid in dollars per User Permit; Subscript t refers to all types of campers combined.

[2]Only a two-year average for Lone Point; no fees were collected there during 1974.

Table 7

Three-year Range and Over-all Average of $\frac{P_t L_t}{F_t}$ and $\frac{L_t}{F_t}$ at All Lake Shelbyville Campgrounds[1]

Campground	$\frac{P_t L_t}{F_t}$ Range	$\frac{P_t L_t}{F_t}$ Average	$\frac{L_t}{F_t}$ Range	$\frac{L_t}{F_t}$ Average
Bo Wood	1.06-1.86	1.38	0.35-0.50	0.43
Coon Creek	1.18-1.69	1.42	0.34-0.47	0.39
Lithia Springs	1.24-2.16	1.64	0.34-0.53	0.44
Whitley Creek	1.56-2.25	1.78	0.40-0.55	0.45
Lone Point[2]	1.50-1.76	1.60	0.40-0.43	0.42
All Campgrounds Combined	1.06-2.25	1.56	0.34-0.55	0.43

[1] $\frac{P L}{F}$ = average number of recreation days per User Permit per dollar spent for user fees; $\frac{L}{F}$ = average length of stay per User Permit per dollar spent for user fees; Subscript t refers to all types of campers combined.

[2] Only a two-year average for Lone Point; no fees were collected there during 1974.

in a particular campground will yield the number of recreation days spent camping in that campground in that month.

The range of these values is dependent upon the average camping party size (P_t), the average length of stay and the average amount of fees paid (F_t) per User Permit. Clearly, P_t varies independently from both L_t and F_t; F_t is dependent upon L_t as well as the price charged per night of camping. It is the amount charged per night which could limit the application of $\frac{P_tL_t}{F_t}$ values during years in which different per night fees were charged. By comparing values of $\frac{L_t}{F_t}$, i.e. the length of stay per dollar of fee paid, as is done in Table 7, it can be seen that these values are surprisingly similar; their range is quite narrow. It appears, then, that the effects of different prices charged per night are minimal on values of $\frac{P_tL_t}{F_t}$, at least within the range of prices that have been charged at Lake Shelbyville from 1974 through 1978.

The values of $\frac{P_tL_t}{F_t}$ appear, then, to be primarily dependent upon P_t, i.e. the average party size per User Permit. Determining changes in P_t in each campground should, then, provide the appropriate adjustment to $\frac{P_tL_t}{F_t}$ values for use in future years. The effects of price changes on values of $\frac{L_t}{F_t}$ should also be checked as price changes occur. In summary of Table 7, the product of $\frac{P_tL_t}{F_t}$ for each campground and the total amount of user fees collected in the corresponding campground will yield the number of recreation days spent camping in that campground during that month.

Table 8 summarizes per capita user fees paid at Lake Shelbyville campgrounds. The first item, $\frac{F_t}{P_t}$, represents the average amount of user fees paid per person per camping trip. The second item, $\frac{F_t}{L_t}$,

Table 8

$\frac{F_t}{P_t}$, $\frac{F_t}{L_t}$ and $\frac{F_t}{P_t L_t}$ at All Campgrounds[1]

Campground	1974	1976	1978	3-Year Average
Bo Wood				
F_t / P_t	2.20	2.40	2.49	2.36
F_t / L_t	2.19	2.43	2.33	2.32
$F_t / (P_t L_t)$	0.77	0.72	0.77	0.73
Coon Creek				
F_t / P_t	1.98	2.22	2.09	2.10
F_t / L_t	2.47	2.65	2.63	2.58
$F_t / (P_t L_t)$	0.70	0.72	0.69	0.70
Lithia Springs				
F_t / P_t	1.40	1.83	1.74	1.66
F_t / L_t	1.97	2.40	2.42	2.26
$F_t / (P_t L_t)$	0.52	0.65	0.66	0.61
Whitley Creek				
F_t / P_t	1.28	1.51	1.57	1.45
F_t / L_t	2.03	2.28	2.36	2.22
$F_t / (P_t L_t)$	0.51	0.58	0.59	0.56
Lone Point				
F_t / P_t	NO	1.67	1.72	1.70
F_t / L_t	DATA FOR	2.42	2.40	2.41
$F_t / (P_t L_t)$	1974	0.62	0.63	0.62

Table 8 (cont'd)

Campground	1974	1976	1978	3-Year Average
All Campgrounds Combined				
F_t / P_t	1.72	1.93	1.92	1.85
F_t / L_t	2.17	2.44	2.43	2.36
F_t / ($P_t L_t$)	0.61	0.66	0.66	0.64

[1] F_t / P_t = average amount of user fee paid per person per trip

F_t / L_t = average amount of user fee paid per party per day

F_t / ($P_t L_t$) = average amount of user fees paid per person per day.

represents the average amount of user fee paid per camping party per day. The final item, $\frac{F_t}{P_t L_t}$, represents the average amount of fee paid per person per day (per recreation day of camping). These values can aid in predicting the amount of revenue that might be generated at similar campgrounds charging similar prices. The second item, $\frac{F_t}{L_t}$, will be utilized in developing demand curves for the camping resource using the travel cost method in a subsequent chapter of this study.

Renewals

As previously stated, renewal User Permits pose a particular problem when attempting to accurately determine P_t, L_t and F_t - the items that form the basis for much of this chapter. Table 9 summarizes the renewals observed in the samples for both Golden Age and full-price visitors. In all campgrounds in all years, renewals represent approximately 16% of the total number of User Permits issued during any given year. To express this another way, 16% of the camping parties visiting Lake Shelbyville elected, for one reason or another,

Table 9

Number of User Permit Renewals - 1974 and 1976

Campground	1974	1976	Total	Average	Number of Renewals Per 100 User Permits
Bo Wood					
Golden Age	11	18	29	14.5	2.07
Full Price	99	112	211	105.5	15.07
Total	110	130	240	120.0	17.14
Coon Creek					
Golden Age	10	13	23	11.5	1.77
Full Price	89	114	203	101.5	15.62
Total	99	127	226	113.0	17.39
Lithia Springs					
Golden Age	4	4	8	4.0	0.62
Full Price	71	106	177	88.5	13.62
Total	75	110	185	92.5	14.24
Whitley Creek					
Golden Age	3	2	5	2.5	0.45
Full Price	69	59	128	64.0	11.64
Total	72	61	133	66.5	12.09
Lone Point					
Golden Age	NO	0	0	0.0	0.00
Full Price	DATA FOR	87	87	43.5	17.40
Total	1974	87	87	43.5	17.40
All Campgrounds Combined					
Golden Age	28	37	65	32.5	1.16
Full Price	328	478	806	403.0	14.39
Total	356	515	871	435.5	15.55

to extend their camping trip by one night or more after arriving at the lake. Although analysis of the reasons for this cannot be performed with the existing data, it might be useful, from a socio-economic standpoint, to determine why campers choose to extend their trips.

A Word on Applicability of the Results

Clearly, the information generated from the User Permit data is directly applicable only to Lake Shelbyville or projects that are extremely similar. The detailed tables inculded here could seem to some to be only exercises in mathematical gymnastics. Except for their value to Lake Shelbyville, the information standing by itself does not have far-reaching significance. That has not, however, been the purpose of this study.

It has been this study's purpose to demonstrate what can be done additionally with existing data sources. Gathering this information at one lake within the Corps of Engineers is of limited value; gathering and combining similar information from many Corps lakes has wide-ranging value. Observing what can be done with one currently untapped data source may encourage investigation of other sources. It is felt that in the case of User Permits, the over-all purpose of this study has been met.

CHAPTER IV

ESTIMATING CAMPING BENEFITS FROM CAMPING REGISTRATION CARDS USING THE TRAVEL COST METHOD

Procedures

The travel cost method, first described by Clawson and Knetsch in 1966[1] and refined in later years,[2] is based on the development of two items - the demand curve for the total recreation experience and the demand curve for the recreation resource.[3] The area under the latter curve, expressed in terms of consumer surplus,[4] represents the net user benefits generated by the recreation resource.

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[1]Marion Clawson and Jack L. Knetsch, Economics of Outdoor Recreation (Baltimore: Johns Hopkins Press, 1966).

[2]For an in-depth discussion of the method and its refinements, see John F. Dwyer, John R. Kelly and Michael D. Bowes, "Improved Procedures for Valuation of the Contribution of Recreation to National Economic Development," Water Research Council Research Report Number 128, (Urbana, Illinois: University of Illinois Water Resources Center, 1977). An excellent summary of many of the method's criticisms can be found in Nicholas H. Coomber and Asit K. Biswas, Evaluation of Environmental Intangibles (New York: Genera Press, 1973), pp. 18-27.

[3]The importance of and measurement difficulties associated with recreation demand will be discussed in Appendix IV.

[4]For a discussion of consumer surplus, see E. J. Mishan, Cost Benefit Analysis - New and Expanded Edition (New York: Praeger Publishers, 1976), pp. 24-54 and Paul A. Samuelson, Economics (Sixth Edition), (New York: McGraw-Hill Book Company, 1964), pp. 434-437.

The Corps of Engineers has frequently used the "unit day value" approach to measure recreation benefits.[1] It has been argued that this, and other measurement methods, should be abandoned in favor of the travel cost method.[2] As will become evident, the travel cost method can be applied to estimate camping benefits at Corps lakes easily.

This section will develop a methodology for applying the travel cost method to camping data generated at Lake Shelbyville. Two problems arise when applying the method to this data.

The first occurs when considering travel distances from linear, or non-point, resources such as rivers and long, narrow reservoirs. This poses a problem in the determination of "close-in" travel zones. A solution to this problem is not specifically addressed in the travel cost method.

The second problem lies in the calculation of on-site cost per visit in the form of entrance and/or user fees for overnight use, usually camping, in an area. When considering these types of on-site costs per visit for day use only, as reflected in previous researchers' applications of the method, these costs occur during one day only - only once per visit. In addition, a day use visit consists of all or a portion of a day and does not begin in or carry over into another day.

This is not so with camping. The difficulty arises when calculating the on-site charges per camping visit and is tied specifically to answering the question, "What is a visit?" A visit may, for one

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[1]Dwyer, Kelly and Bowes, "Improved Procedures for Valuation of the Contribution of Recreation to National Economic Development," p. 168.

[2]Ibid. , p. 149.

camping group, consist of only one night but may be ten nights for another. Assuming that a fee is assessed for each night of camping and does not depend on party size, the on-site cost per visit for the "one night group" will be considerably less than the on-site cost per visit for the group camping longer than one night. If the average length of stay is the same for all travel zones,[1] the problem is resolved.[2] The on-site cost per trip with respect to camping fees alone would then simply be the average length of stay multiplied by the user fee cost per night.

What if the average length of stay is not the same for all zones? This must be dealt with in a different manner. If this is the case, the on-site user fee cost per visit will be calculated by multiplying the user fee cost per night by the average length of stay for all zones combined. This will give an estimate of the average user fee cost per visit for camping.[3] The importance of the above

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[1]In applying the travel cost method to a recreation resource, the area surrounding the resource is divided into zones of ever-increasing distance from the resource. A recreationist from within any zone must travel approximately the same distance as any other recreationist from within that zone to reach the resource. The number of visits per thousand population is then determined for each zone and used in conjunction with cost per visit to develop demand curves.

[2]This is true because the on-site cost per visit will then be constant and travel cost per visit will be isolated as the only cost factor causing changes in visits per thousand from all zones. The travel cost method assumes that all non-travel costs per visit are held constant for each visit regardless of the zone in which the visit originates. If this is not the case, the relationship between distance (travel cost) and number of visits per thousand population will, at best, be less distinct and, at worst, not be evident at all.

[3]If length of stay varies between zones, but is averaged in this manner, a bias will result and be reflected in the shape of the demand curves. Averaging will either flatten or steepen the curves dependent upon the relationship between length of stay and distance from the resource. The variation of length of stay between zones also

discussion will become apparent below.

Camping Registration Card Data

The travel cost method will now be applied to data contained on Camping Registration Cards to calculate the demand for camping at campgrounds operated by the Corps of Engineers at Lake Shelbyville. To reach this end, the following information will be extrected from each sampled card for each year:

1. The address of the camper's residence
2. The type of camping unit used
3. The size of the camping party
4. The length of stay.

The card has been in use at Lake Shelbyville during part of 1976 and all of both 1977 and 1978. Samples will, therefore, be drawn from 1977 and 1978 cards only.

There are two items of information required to construct the demand curve for the total recreation experience, the first component of the travel cost method. These are the number of visits per thousand population and the average cost per visit. The number of visits per thousand population will be considered first.

Visits Per Thousand Population

Following the format of the travel cost method, travel zones must first be established. The zones will be delineated using counties as basic units. Population data is readily avaliable for counties.

Lake Shelbyville is a long, narrow lake approximately 26 miles

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indicates the existance of some factor other than travel cost contributing to demand estimation. Averaging ignores the existance of this factor.

long and divided nearly equally between two Illinois counties - Shelby and Moultrie. It is clearly a linear, or non-point, resource and thus presents the problem described above. The travel cost method requires, however, that the area under study be a point resource. To achieve this in the case of Lake Shelbyville, Shelby and Moultrie Counties combined will form Zone 1. It will be assumed that the use rate for campgrounds in each county is equal for all campers originating in each Zone 1 county. The remaining zones will then be established based on travel time and the total population of each zone determined.

A map showing the counties in the area surrounding Lake Shelbyville is attached as Figure 7. Also attached is a map with the travel zones indicated as Figure 8. Appendix V has been added at the end of this study listing the counties and population included in each zone.

The use rate per thousand will then be calculated for each zone. This will be initiated by taking a systematic sample with a random start of the aggregate of all Camping Registration Cards for each year, i.e. the sample population. Sample size must first be determined. The distribution of cards within the population can be considered that of a binomial. Pursuant to the method described by Babbie,[1] a sample of 600 cards from each year was deemed adequate to describe this didtribution to within $\pm$ 2.4% at the 95% confidence level.

Following sample selection, the cards will be sorted by zone.

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[1]Earl R. Babbie, Survey Research Methods, (Belmont, California: Wadsworth Publishing Company, 1973), p. 377.

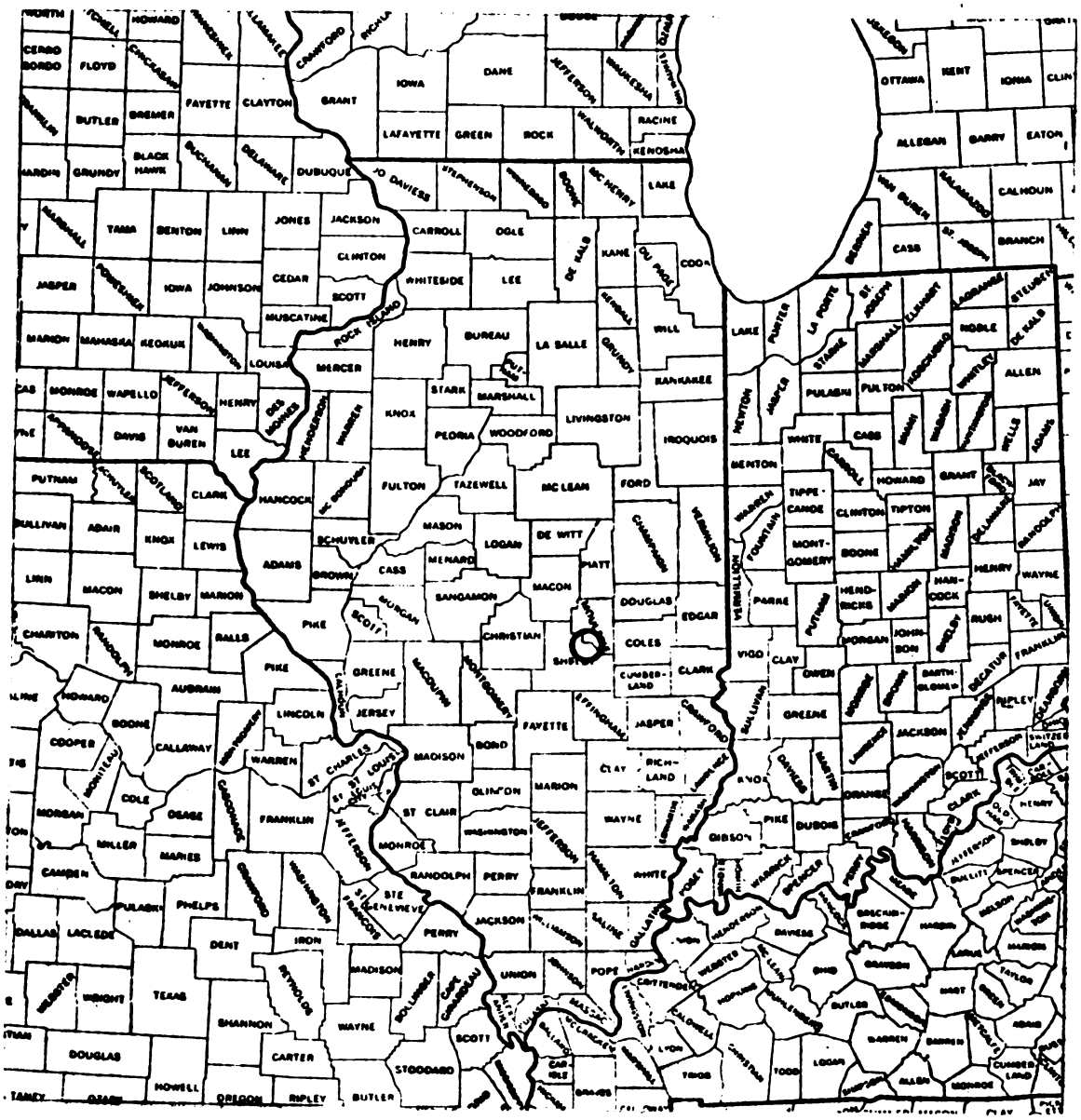

Figure 7

Counties Surrounding Lake Shelbyville[1]

○ Approximate Location of Lake Shelbyville

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[1]U.S., Department of Commerce, Boundaries of Counties and County Equivalents as of January 1, 1970. 1971.

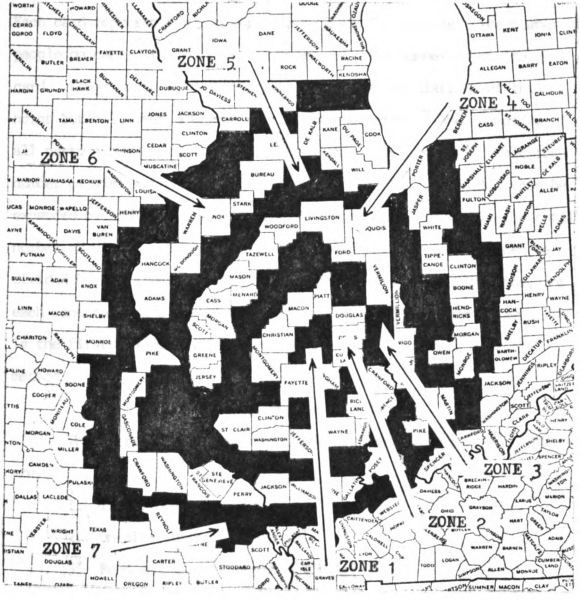

Figure 8

Travel Zones Surrounding Lake Shelbyville

Next, the total number of visits from each zone will be calculated. Each card represents a camping trip to Lake Shelbyville. The number of people on each card (party size) represents the number of visits on that card. Length of stay does not enter into the calculations at this point but will when determining the cost per visit. The summation of all party sizes on the sampled cards within each zone will yield the number of visits from each zone within the sample. This will then be expanded by the total card population in each zone to obtain the total number of visits from each zone. The resultant figure will then be divided by the already determined total population, in thousands, for each zone to obtain the camping use rate per thousand population. This is the first item of information required to apply the travel cost method.

Determining Cost Per Camping Visit

There are four components of the cost per camping visit. These are:

1. Travel cost per visit
2. On-site charges per visit
3. Food and miscellaneous costs per visit
4. Entertainment costs per visit.

Determination of each will be described below.

Travel cost for each camper is dependent upon both the round-trip distance from the residence to the resource and the mode of transportation. The latter can be directly determined from the Camping Registration Cards. The cost per mile of each type of vehicle indicated on the cards must be determined for each year from standards established by other sources, perhaps the Federal Environmental

Protection Agency, the American Automobile Association, a National Camping Club or from individuals with long-time camping experience. The round-trip travel cost for each visit can be determined by multiplying the average round-trip distance to the resource, assumed constant from all points within a given zone, by the vehicle operating cost per mile for each visit originating within that zone. Dividing the summation of these costs by the total number of visits (number of cards sampled) per zone would then be the average travel cost per visit per zone. This is the first component of the total variable cost per visit.

The next item to be considered is the on-site user charge per visit. The problems associated with this have been discussed previously. Suffice it to say that an estimate of the average on-site user charge per visit will be made taking into consideration both the average nightly fee charged in the destination campgrounds and the average length of stay per visit. This is the second component of the total variable cost per visit.

The last two items (food and miscellaneous costs per visit and entertainment costs per visit) will be dealt with jointly. Ideally, the daily cost per person of each item should be obtained from a camping expense study, if one is available. If not, it will be assumed that these expenses are the same at the campground as they would have been if the camper had remained home. If this assumption is made, these expenses will be disregarded.

To complete the information required for the total experience demand curve, all components of the average variable cost per visit will be added together for each zone. Plotting this information against the previously determined number of visits per thousand

will yield this demand curve. By applying hypothetical price increases, the analysis described by the travel cost method may then be used to determine both the demend curve for the camping recreation resource and the total dollar value of the camping resource at Lake Shelbyville.

The Trip Cost Equation

Utilizing the elements of the cost of a camping trip listed above, the following relationship may be established making use of data developed, in part, from both Camping Registration Cards and User Permits:

$$T = \frac{a}{b} + c \quad M + dL + ePL + fPL$$

where

T = the total cost of a camping trip to Lake Shelbyville; each Camping Registration Card represents one trip; this cost will be expressed in dollars per trip

a = gasoline cost in dollars per gallon

b = miles per gallon rating of the vehicle used to make the trip

c = the average "wear and tear" cost in dollars per mile for that vehicle

M = the average round-trip mileage from the camper's residence to the campground

d = the average on-site (user fee) cost in dollars per day per campsite in the destination campground; this will be determined from User Permit data

L = the length of stay of the camping party, in days, as determined from the Camping Registration Cards; it is assumed that the number of days shown on the card represents the <u>total</u> length of stay for that particular trip

e = the average food and miscellaneous expenditure in dollars per person per day

P = the size of the camping party as indicated on the Camping Registration Cards; it is assumed that the entire party stayed in the campground for the entire length of stay

f = the average entertainment expenditure in dollars per day per person.

The summation of all individual trip costs within each zone will equal the total cost of all trips sampled within each zone. By dividing this total by the number of trips (cards) sampled in each zone, the average cost per trip can be determined.

Results and Conclusions from Camping Registration Card Data

A sample of 600 Camping Registration Cards was drawn for both 1977 and 1978 pursuant to procedures described previously. Data from each year was analyzed separately. While the main objective here was to establish information necessary to construct demand curves, a few other readily calculable items were observed. These will be described first. Through the entire analysis presented in this section, it must be remembered that the results describe only campgrounds at Lake Shelbyville operated by the Corps of Engineers. No data was available from those operated by either the State of Illinois or private concerns at the lake.

Modes of Transportation Used by Lake Shelbyville Campers

Table 10 indicates the types of vehicles used by campers to get to Lake Shelbyville. This could have value in planning the size of additional parking lots and length of camping pads at the lake.

Table 10

Modes of Transportation Used by Lake Shelbyville Campers, All Campgrounds Combined

Vehicle Type	% of Total Trips 1977	% of Total Trips 1978	% of Total Trips 2-year Average
Automobile	45.7%	44.0%	44.9%
Pickup truck[1]	36.9%	34.9%	35.8%
Van	4.7%	4.2%	4.5%
Motor home[2]	11.1%	14.8%	12.9%
Parties using more than one mode of transportation	1.6%	2.1%	1.9%
Total	100.0%	100.0%	100.0%

[1]Includes all models and sizes.

[2]Includes full-size and mini-homes as well as buses converted into and used as recreational vehicles.

Fluctuations between 1977 and 1978 are rather small indicating a relatively stable proportion of motor vehicles by type used by Lake Shelbyville campers. Although not performed, analysis of vehicle use in particular campgrounds could indicate significant fluctuations between 1977 and 1978.

The proportion of camping parties using more than one mode of transportation is slightly misleading. Camping parties are required to indicate only one vehicle license number, the item principally used to determine the mode of transportation in this study. As a result, more than one vehicle might be used by a party but only one would be recorded. Based on the author's experience at the lake, it is felt that a significantly higher proportion of camping parties utilize more than one vehicle during their camping trips than that indicated in Table 10. Of the greatest significance are those parties who tow a boat and trailer to the campgrounds with an additional vehicle which does not appear on the Camping Registration Card. This could also have an effect on the estimate of travel cost per trip that will be developed later in this chapter.

Overnight Camping Shelters Used by Lake Shelbyville Campers

Table 11 indicates the proportion of camping shelter types used by Lake Shelbyville campers during 1977 and 1978. As shown in the table, use of tents has increased while use of trailers has declined. This could indicate a trend away from the need for highly developed, sophisticated facilities required by self-contained camping units. It is also possible that some former trailer users have simply switched to motor home use as indicated by the motor home increase shown on the

Table 11

Overnight Camping Shelters Used by Lake Shelbyville Campers, All Campgrounds Combined

Vehicle Type	% of Total Trips 1977	% of Total Trips 1978	% of Total Trips 2-year Average
Tent	23.6%	30.5%	27.1%
Pickup truck with camper shell	17.0%	15.7%	16.3%
Trailer	35.0%	29.6%	32.3%
Van	4.2%	3.9%	4.0%
Motor home	11.0%	14.3%	12.6%
Parties using more than one type of overnight shelter	9.2%	6.0%	7.7%
Total	100.0%	100.0%	100.0%

table.

There are other possible causes for the shift in tent use at the lake. Due to increases in gasoline prices and motel/hotel/restaurant costs, it may be asserted that people are electing to recreate closer to home. If this is the case, people may, in increasing numbers, be turning to camping as a less expensive method of satisfying the need to "get away for the weekend" than spending a weekend in, for example, New York City. These first-time campers could well be choosing to purchase tents to initiate themselves to camping rather than investing in more expensive camping equipment such as trailers. Experienced campers could also be reacting to increasing gasoline costs by switching from trailers to tents. It is certainly much less expensive to operate a vehicle carrying a tent than the same vehicle towing a trailer. New campsites constructed closer to campers' residences catering to trailers could be attracting trailer campers before they reach Lake Shelbyville. Perhaps further investigation can reveal other causes for the increase in tent camping at the lake.

Visits Per Thousand Population

With this section begins the determination of information necessary to construct camping demand curves using the travel cost method. The first component is the number of visits per thousand population from each zone. Since trip cost will be computed per party per zone, a "visit" will consist of a camping trip by a party, not an individual. Thus, the number of sampled Camping Registration Cards observed in each zone represents the number of visits from that zone.[1]

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[1]It was extremely time-consuming to sort Camping Registration Cards by zone. To assist in future card sorting, a list of campers' residences observed while compiling the data and the corresponding

This must be expanded to the total Camping Registration Card population, i.e. the total number issued at all campgrounds in a given year, to estimate the total number of visits from each zone during an entire year. Dividing this figure by the total "people" population, in thousands, from each zone, as determined in a previous section, yields the number of camping trips by camping parties per thousand population. This has been done in Tables 12 and 13 for 1977 and 1978 respectively.

Trip Cost Calculations

The second item of information required to construct the demand curves is the cost per camping trip per party. There are four components of the total cost of a camping trip that have been previously described algebraically as

$$T = \left(\frac{a}{b} + c\right) M + dL + ePL + fPL.$$

The first, and most complex, of these is the travel cost component, i.e. $\left(\frac{a}{b} + c\right) M$.

Travel Cost Calculations

The first component of the travel cost is the gasoline cost in dollars per gallon, i.e. "a" in the above algebraic expression. This was determined from personal records of the author and information provided by the American Automobile Association. These costs are expressed in Table 14.

The second is the miles per gallon rating of the vehicle used to make the trip, i.e. "b" in the above expression. This was particularly difficlut to measure due to the wide variation in types of vehicles used for camping trips and the corresponding variation in their miles per gallon ratings. Table 10 indicates the vehicle types

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zone is provided in Appendix VI.

Table 12

Camping Visits Per Thousand Population

at Lake Shelbyville - 1977

Zone	Cards in Sample (% of Total)	X	Total Card Population	=	Number of Visits from Each Zone	÷	Total Population of Each Zone (Thousands)	=	Visits Per Thousand Population
1	7%		12,222		856		35.9		23.8
2	21%		12,222		2,567		328.7		7.8
3	25%		12,222		3,055		891.3		3.4
4	11%		12,222		1,344		623.2		2.2
5	12%		12,222		1,467		2,771.6		0.5
6	20%		12,222		2,444		8,425.8		0.3
7	1%		12,222		122		2,610,7		0.1
Beyond Zone 7	3%		12,222		367		Not Determined		Not Determined

Table 13

Camping Visits Per Thousand Population

at Lake Shelbyville - 1978

Zone	Cards in Sample (% of Total)	X	Total Card Population	=	Number of Visits from Each Zone	÷	Total Population of Each Zone (Thousands)	=	Visits Per Thousand Population
1	4%		14,925		597		35.9		16.6
2	25%		14,925		3,731		328.7		11.4
3	26%		14,925		3,881		891.3		4.4
4	12%		14,925		1,791		623.2		2.9
5	11%		14,925		1,642		2,771.6		0.6
6	19%		14,925		2,836		8,425.8		0.3
7	2%		14,925		298		2,610.7		0.1
Beyond Zone 7	1%		14,925		149		Not Determined		Not Determined

Table 14

Average Cost of Gasoline in Dollars

Per Gallon in Illinois

Grade of Gasoline	1973	1974	1975	1976	1977	1978
Regular[1]	$0.430	$0.549	$0.575	$0.598	$0.649	$0.686
Unleaded[2]	------	------	------	------	$0.686	$0.733
Average[3]	------	------	------	------	$0.665	$0.710

[1]Based on gasoline purchase records kept by the author for his own personal automobile. Approximately 90% of these purchases were made in the Lake Shelbyville area during each year. Since it is estimated that a majority of Lake Shelbyville campers make at least one gasoline purchase near the lake during each trip to the lake, these prices are felt to be a fairly accurate reflection of the true average price per gallon.

[2]Estimated from values obtained in a telephone conversation with the American Automobile Association Office, Lansing, Michigan on July 2, 1979.

[3]It is not possible to determine what type or grade of gasoline is used by camping vehicles visiting Lake Shelbyville from existing data. As a result, an average between regular and unleaded gasoline was used, i.e. it was assumed that 50% of the gasoline used was unleaded and 50% was regular.

used by Lake Shelbyville campers. The distribution of vehicle types within each travel zone was then determined.

Th U.S. Environmental Protection agency has published the miles per gallon ratings of new automobiles, vans and pickup trucks constructed each year beginning in 1975.[1] Neither the make nor model year of a vehicle can, however, be determined from the Camping Registration Cards. To obtain some estimate of average miles per gallon (MPG) for each vehicle type, the average MPG was determined for all models of American-made automobiles (sedand and station wagons combined), pickup trucks and vans in each model year from 1975 through 1978. American-made vehicles were chosen for, in the author's estimation, they comprise a vast majority of the vehicles used by Lake Shelbyville campers. No MPG ratings were available for vehicles constructed prior to 1975. A detailed summary of the average MPG rating for vehicle types from 1975 through 1978 and an explanation of size classifications is included in Appendix VII.

There is some variation between the average MPG for vehicles constructed in different model years. The distribution of campers' vehicles by model year cannot be determined from existing data. To reach a more accurate average, the following distribution estimate was made:

> For 1977 overall average MPG for each vehicle type, add 40% of 1975 average MPG + 30% of 1976 average MPG + 20% of 1977 average MPG + 10% of 1978 average MPG;

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[1] U.S. , Environmental Protection Agency, Federal Energy Administration, 1975 Gas Mileage Guide for New Car Buyers, 2nd Edition, Revised January 1975. 1975; U.S. , Environmental Protection Agency, Federal Energy Administration, 1976 Gas Mileage Guide for New Car Buyers, September, 1975; U.S. , Environmental Protection Agency, Federal Energy Administration, 1977 Gas Mileage Guide, Second Edition, January, 1977. 1977; U.S. , Environmental Protection Agency, Department of Energy, 1978 Gas Mileage Guide, Second Edition, February, 1978. 1978; U.S. , Environmental Protection Agency, Department of Energy, 1979 Gas Mileage Guide, Second Edition, January, 1979. 1979.

For 1978 overall average MPG for each vehicle type, add 20% of 1975 average MPG + 30% Of 1976 average MPG + 25% of 1977 average MPG + 20% of 1978 average MPG + 5% of 1979 average MPG.

The above will yield the average MPG for automobiles, pickup trucks and vans. It does not, however, indicate either the effects on average MPG of towing a trailer or the average MPG of motor homes. These were obtained from other sources. Based on the personal records of a long-time camper[1] and U.S. Environmental Protection Agency information,[2] it was estimated that towing a trailer reduces a vehicle's average MPG rating by approximately 45%. The details of this calculation have been included in Appendix VII. An estimate of average motor home was obtained from the Michigan Association of Recreational Vehicles and Campgrounds.[3] The average MPG for each vehicle type as used in this study is shown in Table 15.

The third portion of information required to calculate travel cost is the average "wear and tear" cost per mile of vehicle operation, i.e. "c" in the above expression. This was estimated from a study performed by the U.S. Department of Transportation.[4] This study estimated average costs of owning and operating standard, compact and sub-compact sizes of 1976 model automobiles. Two types of costs were extracted

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[1]Personal letter to the author from Don Edgar, Outdoor Writer, on July 3, 1979.

[2]U.S. Environmental Protection Agency, 1975 Gas Mileage Guide.

[3]Telephone interview on July 2, 1979, with Dave Pickering, Michigan Association of Recreational Vehicles and Campgrounds.

[4]U.S. , Department of Transportation, Federal Highway Administration, Office of Highway Planning, Highway Statistics Division, Vehicles, Drivers, and Fuels Branch, "Cost of Owning and Operating an Automobile 1976," by L.L. Liston and C.A. Aiken, 1976. pp. 13-15.

Table 15

Average Miles Per Gallon Rating of Lake Shelbyville Camping Vehicles

Vehicle Type	Average Miles Per Gallon 1977	1978
Automobiles, All Types[1]	17.1	17.7
Automobiles Towing Trailers[2]	9.2	9.4
Standard Pickup Trucks[3]	16.0	16.3
Standard Pickup Trucks Towing Trailers	8.8	9.0
Small Pickup Trucks	24.6	25.4
Vans	16.7	16.8
Motor Homes, All Types[4]	9.5	9.5

[1]Includes both sedans and station wagons.

[2]Includes all sedans and station wagons except those classified as mini-compact and sub-compact. It was felt that these were too small to be reasonably expected to tow a trailer.

[3]Excludes small, ½-ton rated pickup trucks. No separate figure was obtained to adjust MPG for pickup trucks carrying camper shells.

[4]Includes both standard size and mini-homes.

from this study - repair and maintenance costs and tire replacement costs. It was felt that these types of costs would be incurred during a camping trip. The average of these costs for all three vehicle types was found to be $0.0349 per mile for 1976.

Since this cost was calculated only for automobiles and was determined in 1976, applying it "as is" to Lake Shelbyville camping vehicles during 1977 and 1978 could be inaccurate. In an attempt to adjust for both inflation and expected higher "wear and tear" cost for sophisticated camping vehicles, 10% was added each year to the cost determined in 1876. Values of "c" become, then, $0.0384 per mile during 1977 and $0.0423 per mile during 1978.

The final item is the mileage from each zone to Lake Shelbyville, i.e. "M" in the expression. Based on estimated driving time and vehicle miles per hour, values of "M" were determined for each zone. These are shown in Table 16.

Table 16

Estimated Driving Distance from Travel Zones to Lake Shelbyville

Zone	Estimated Average Round-Trip Driving Time (Hours)	Estimated Average Speed (Miles Per Hour)	Estimated Average Round-Trip Distance (Miles)
1	0.50	44	22.0
2	1.50	44	66.0
3	2.50	47	117.5
4	3.50	47	164.5
5	4.50	50	225.0
6	5.50	50	275.0
7	6.50	53	344.5

Combining all these factors, i.e. a, b, c and M, with the distribution of camping vehicles observed from each zone yields an average travel cost per party per trip from each zone. This is summarized in Table 17.

On-site (User Fee) Cost Calculations

The second component of the trip cost equation is the cost contributed by user fees, i.e. dL in the equation. The factor "d" represents the average user fee cost in dollars per party per day camped in the destination campground. This can be determined from Table 8. Since no data for this value was determined for 1977, the 1978 value will be used for both 1977 and 1978. The average value of "d" for all campgrounds, i.e. the average value of $\frac{D_t}{L_t}$ for 1978 from Table 8, is 2.43 dollars per party per day. This will be assumed constant for each zone and, possibly, introduce a bias into the results.

The next step is to determine the value of "L", the total length of stay of the camping party in days per trip. As discussed previously, it is crucial that this value be constant, or approximately so, in each zone. Values of "L" from each zone and year were derived from sampled Camping Registration Cards and are shown in Table 18.

As can be seen from Table 18, the average length of stay varies little with the exception of Zones 1 and 7. These extreme values are probably due to a relatively small number of trips observed from these zones. For purposes of this study, the average length of stay can be considered constant for each zone within each year. The average values of "L" will be used for computation of dL, i.e. 3.66 for 1977 and 3.62 for 1978. The values of dL, then, that will be used are 8.89 for 1977 and 8.80 for 1978.

Table 17

Average Travel Cost in Dollars Per Camping Trip[1]

Zone	1977	1978
1	$2.39	$2.52
2	6.65	7.00
3	11.11	11.94
4	15.78	17.03
5	21.17	22.68
6	25.19	26.53
7	38.79	34.42[2]

[1]These are values of $\left(\frac{a}{b} + c\right) M$ in the trip cost equation.

[2]The table shows an unexpected decrease in Zone 7 trip cost from 1977 to 1978. This is due to the small sample size from this zone. Campers with RV's (motor homes and trailers) were predominantly observed in the 1977 sample; those with tents were observed in 1978. The operational and, therefore, trip cost of an RV is considerably higher than an automobile utilized by tent campers.

Table 18

Average Length of Stay in Days Per Trip

Zone	1977	1978
1	5.40	4.37
2	3.69	3.43
3	3.66	3.78
4	3.28	3.13
5	3.46	3.61
6	3.32	3.76
7	4.00	4.00
Average	3.66	3.62

Food and Miscellaneous Costs

The third component of the trip cost equation is food and miscellaneous costs, i.e. "ePL" in the expression. The major source of values of "e", the average food and micsellaneous cost in dollars per person per day, was a camping cost study performed for the Woodall Publishing Company in 1978 by Viewpoint Incorporated, a Chicago-based survey firm.[1] Although the Woodall Study did not include data from tent campers, it is assumed that values derived here will apply to tent campers also.

The Woodall Study provides average values, in dollars per party per day, for two categories pertaining to this section. These categories are "Groceries, Health Aids, and Sundries" and "Sundries, Film,

[1] Woodall's Reader Profile Study, (Highland Park, Illinois: Woodall Publishing Company). September, 1978.

and Miscellaneous."[1] The values indicated in the study are $17.60 and $10.94 respectively, $28.54 total. Since average party size was not indicated in the portion of the Woodall Study received by the author, it will be assumed that the value derived in Table 6 of this study will accurately reflect the average party size, i.e. 3.68 persons per party. Dividing the above value, i.e. $28.54, by 3.86, the average party size, yields "e", the average food and miscellaneous cost per person per day. This value is $7.73 and will be used for both 1977 and 1978.

The next component is P, the average party size observed from each year's sampled Camping Registration Cards. These values are shown in Table 19. The averages for each year, i.e. 3.75 and 3.66,

Table 19

Average Camping Party Size

Zone	1977	1978
1	3.80	4.22
2	3.80	3.54
3	4.05	3.80
4	3.50	3.64
5	3.73	3.46
6	3.56	3.72
7	3.17	3.68
Average	3.75	3.66

[1]The Woodall Study also included a value for refreshments and restaurant meals. As the length of stay is relatively short at Lake Shelbyville and restaurant facilities in the area are limited, it was felt that Lake Shelbyville campers would not use restaurants extensively if at all. As a result, this was not included in the calculations.

will be used in calculations for 1977 and 1978 respectively. The values of "L", as determined from a previous section, are 3.66 and 3.62 for 1977 and 1978 respectively. Combining these factors yields the values of "ePL". These are $106.37 and $103.24 for 1977 and 1978 respectively and will be assumed constant for all zones.

Entertainment Costs

The final component of the trip cost equation is the average entertainment cost per party per trip, i.e. "fPL" in the equation. The average entertainment cost in dollars per person per day, i.e. "f" in the expression, was also determined from the Woodall Study. Following the analysis presented in the preceeding section, "f" was determined to be $3.78. Combining this with the previously determined values of "P" and "L", the values of "fPL" can be determined as $51.88 and $50.53 for 1977 and 1978 respectively and will be assumed constant for all zones.

A brief clarification of this cost is in order. At first glance, there would appear to be few "entertainment sources" in the area surrounding Lake Shelbyville. Although not clarified in the Woodall Study, it will be assumed that "entertainment costs" at Lake Shelbyville could include such items as golf course fees, boat rental fees, motor rental fees, horseback riding fees and purchases of fishing bait.

Total Trip Cost

The values of T, average total trip cost, can now be determined for each zone. Table 20 reflects these values for 1977, Table 21 for 1978. These values complete the information required to construct the demand curves.

Considerable time and effort was spent determining these trip

Table 20

Total Camping Trip Cost Per Party - 1977

Zone	$\frac{a}{b} + c^{M}$	+ dL	+ ePL	+ fPL	= T (Total Trip Cost)
1	$2.39	$8.89	$106.37	$51.88	$169.53
2	6.65	8.89	106.37	51.88	173.79
3	11.11	8.89	106.37	51.88	178.25
4	15.78	8.89	106.37	51.88	182.92
5	21.17	8.89	106.37	51.88	188.31
6	25.19	8.89	106.37	51.88	192.33
7	38.79	8.89	106.37	51.88	205.93

Table 21

Total Camping Trip Cost Per Party - 1978

Zone	$\frac{a}{b} + c^{M}$	+ dL	+ ePL	+ fPL	= T (Total Trip Cost)
1	$2.52	$8.80	$103.24	$50.63	$164.92
2	7.00	8.80	103.24	50.63	169.40
3	11.94	8.80	103.24	50.63	174.34
4	17.03	8.80	103.24	50.63	179.43
5	22.68	8.80	103.24	50.63	185.08
6	26.53	8.80	103.24	50.63	188.93
7	34.42	8.80	103.24	50.63	196.82

cost values. Even with this, all potential sources of information were not tapped. In addition, due to various assumptions made above, the accuracy of the values is certainly open to question. To aid others who may wish to develop similar costs, a list of potential information sources discovered by the author in the course of this study are included in Appendix VII.

Demand for the Total Recreation Experience

The demand curves for the total recreation experience at Lake Shelbyville can now be constructed for each year. This is done by plotting cost per trip vs. visits per thousand population. Figures 9 and 10 show these curves for 1977 and 1978 respectively.

Demand for the Camping Recreation Resource

The next step is to determine the effect on camping trips experienced at Lake Shelbyville by imposing hypothetical price increases on the cost per trip. The result of these increases is shown graphically in Figures 11 and 12 for 1977 and 1978 respectively. To facilitate interpretation of these curves, it can be said that increasing the current nightly fee charged by $1.00 per night will increase the average trip cost by approximately $2.66. The corresponding reduction in the number of camping trips might then be expected.

The area under these recreation resource demand curves represents the total consumer surplus benefits derived by campers visiting Lake Shelbyville. This is estimated to be approximately $112,000 for 1977 and $82,500 for 1978. Dividing this by the total number of visits experienced during each year (16,000 in 1977 and 14,500 in 1978) will yield the surplus benefit obtained by each camping party. This calculation results in a value of $7.00 per party per trip in 1977

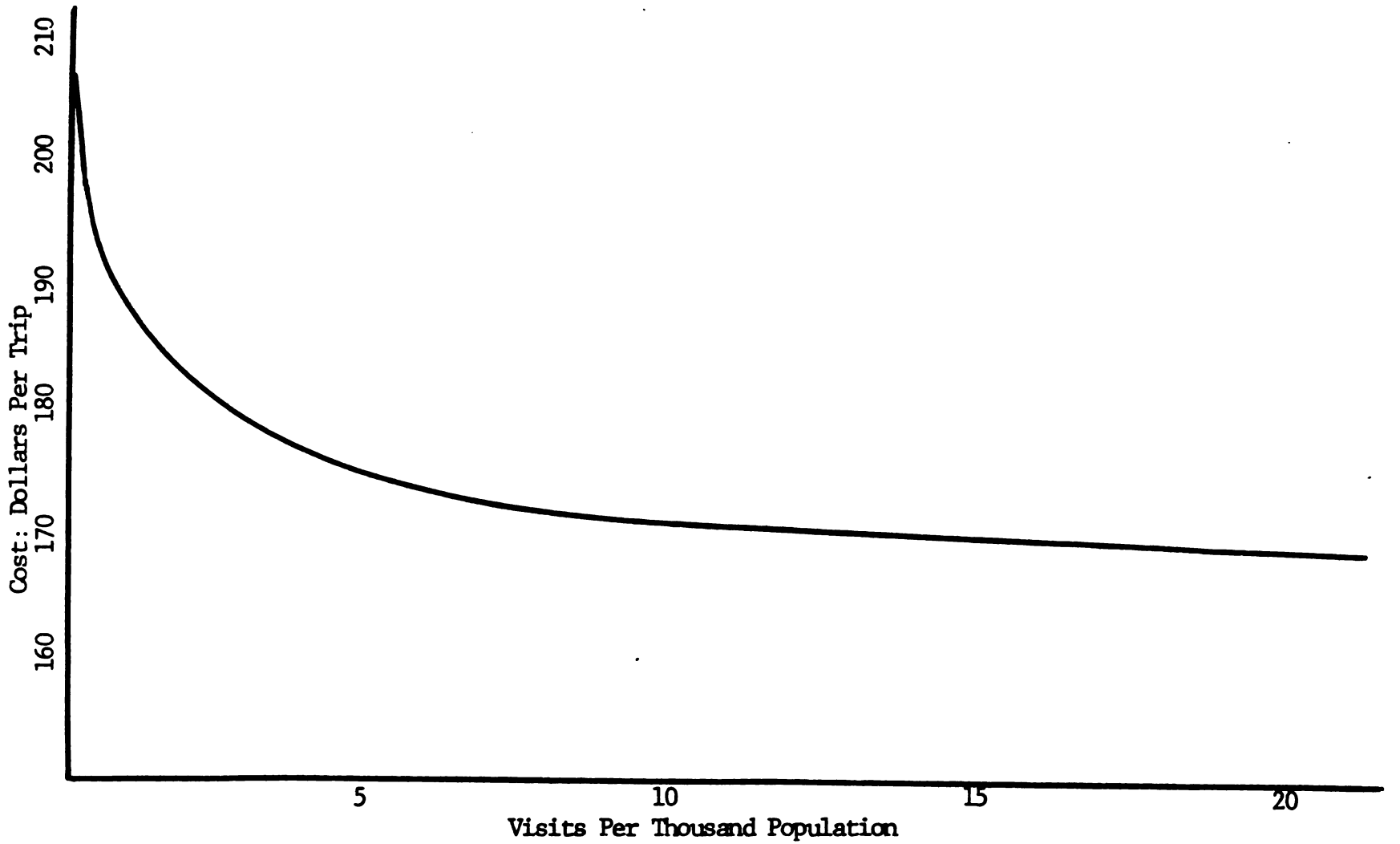

Figure 9

Demand for the Total Recreation Experience - 1977

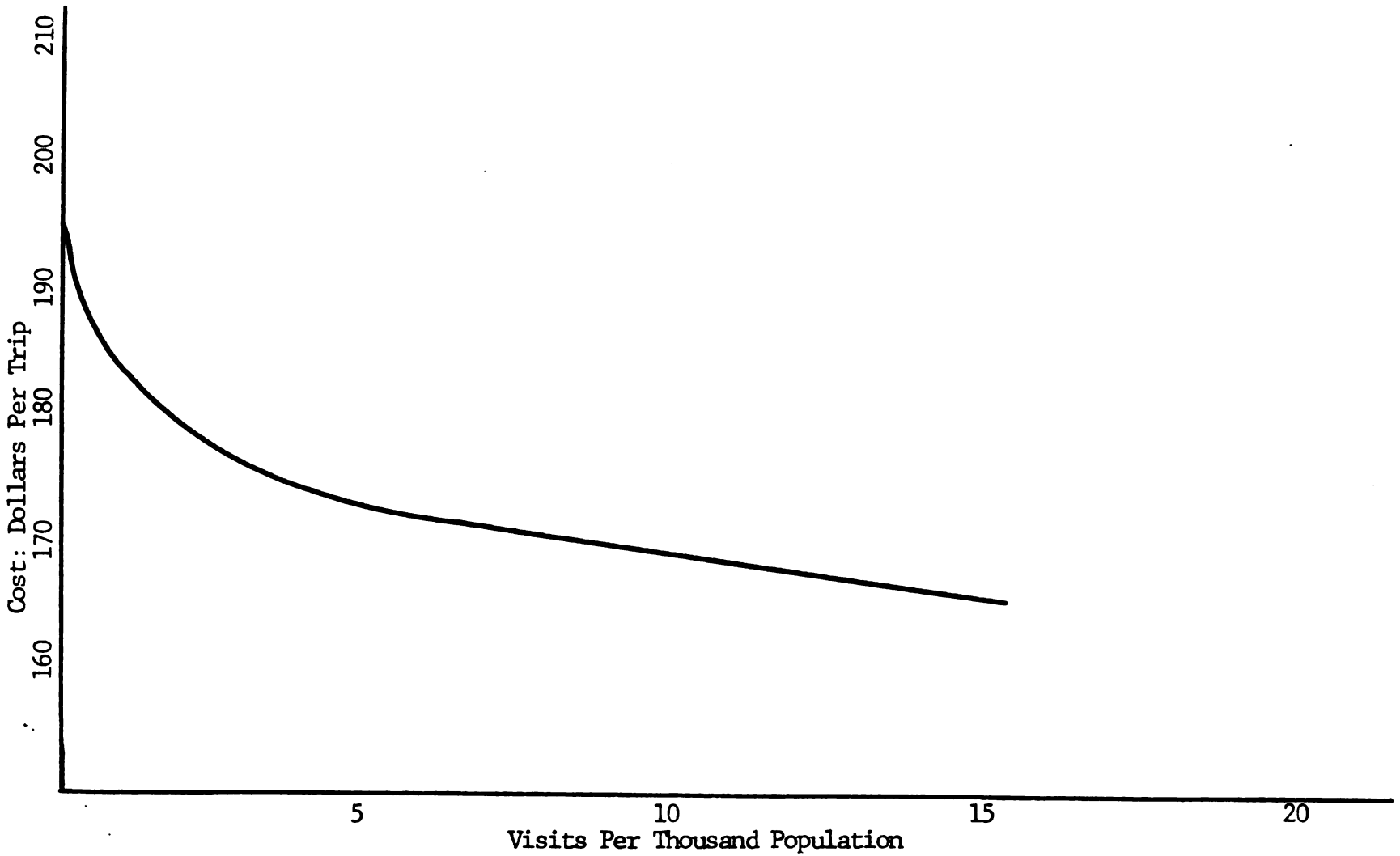

Figure 10

Demand for the Total Recreation Experience - 1978

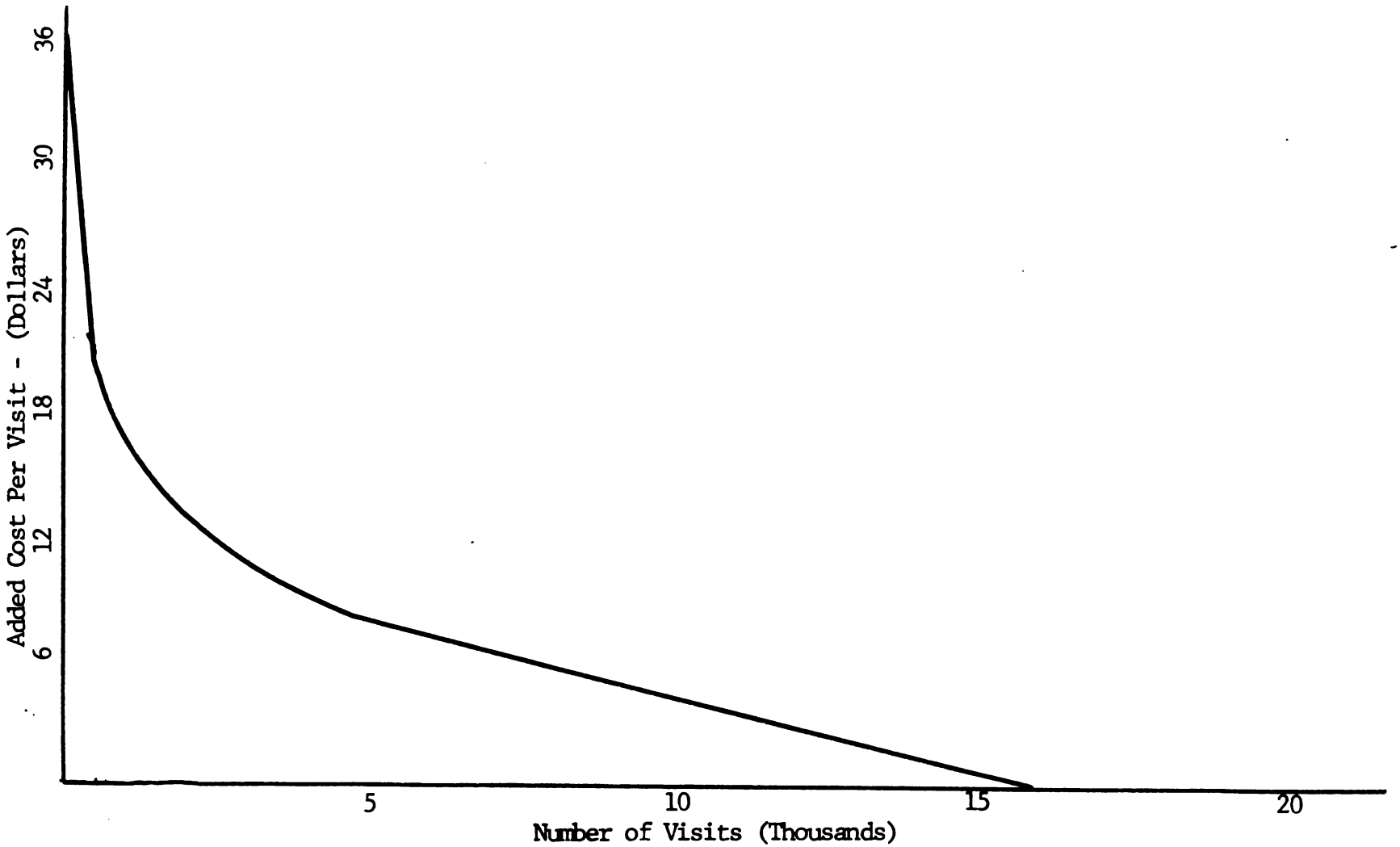

Figure 11

Demand for the Camping Recreation Resource - 1977

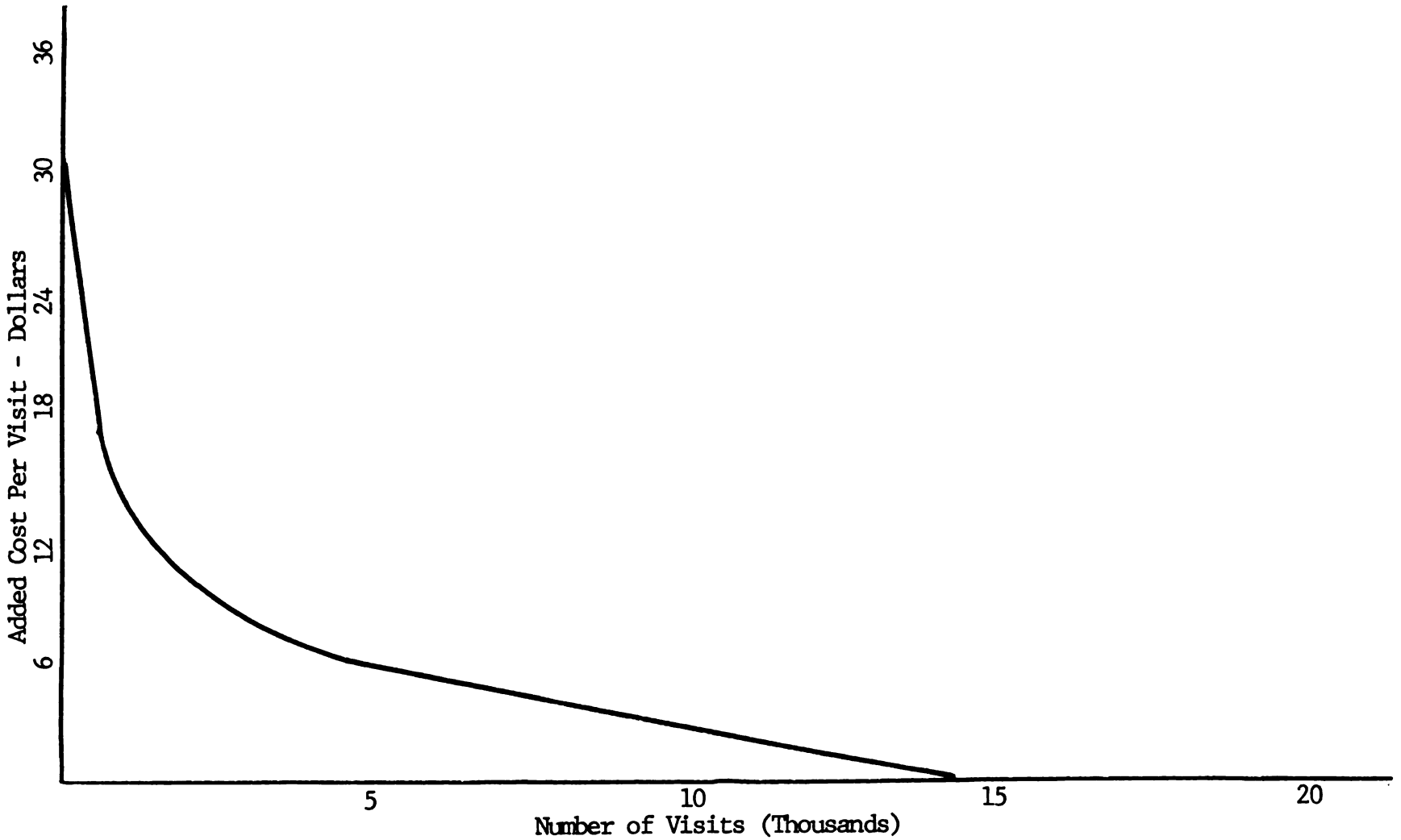

Figure 12

Demand for the Camping Recreation Resource - 1978

and $5.69 per party per trip in 1978. In other words, each camping party in 1977 obtained an average of $7.00 worth of benefits for which they did not pay during each trip; each party in 1978 gained only $5.69 worth of benefits.

A Shift in the Demand Curve

By comparing Figures 11 and 12, the demand curves for the camping recreation resource at Lake Shelbyville, it can be seen that the demand has decreased from 1977 to 1978, i.e. the curve has shifted downward to the left. This does not mean that consumption, i.e. visitation, will necessarily decrease also; it means simply that fewer trips will be made at a given price, or cost, per trip.

There are many possible reasons for the shift. Part of the answer could be found in the prices of both complimentary and substitute products and services. An increase in the prices of complimentary products such as gasoline, camping equipment and recreational vehicles could increase the price of a camping trip and cause such a shift. Increased availability of recreation areas and facilities closer to the campers' residences could, in effect, cause the price of a camping trip to Lake Shelbyville to become relatively higher, leading to substitution and its effects. Inflation and its relation to available disposable income could also cause this type of shift.

It is clear that camping visitation at Lake Shelbyville is not declining. It is, in fact, increasing in spite of the observed decrease in demand. What could, perhaps, actually be happening is that persons in zones close to the lake are substituting a camping trip to the lake for some other recreation experience. In other words, to some people, a camping trip to Lake Shelbyville may, due to price changes in

other products and services, now be less expensive relative to these other products and services.

This hypothesis can be partially verified by observine the changes in visits per thousand population between 1977 and 1978 from Zones 2 and 3 in Tables 12 and 13. Visits per thousand have increased substantially in both these zones, particularly in Zone 2. This is not conclusive evidence by any means since the visits per thousand for the same period declined for Zone 1, that nearest the lake. This apparent inconsistancy could, however, be due to the small sample size in this zone. It would be useful to observe shifts of the camping resource demand curve in future years and attempt to determine causes of the shift.

Reduction in Cost Per Trip

What is the effect of reducing cost per trip? This can be thought of as essentially reducing the nightly user fee for camping. The effect of cost reduction on number of visits was calculated and then expressed in graphic form in Figures 13 and 14 for 1977 and 1978 respectively. The range of cost reduction, i.e. from $0.00 to $9.00, is roughly equvalent to reducing the nightly user fee charged at Lake Shelbyville from its current level per trip to zero.

An inspection of these curves indicates that if user fees, or any other aspect of total trip cost, were reduced by $9.00 per trip, total visits to Corps of Engineers campgrounds at Lake Shelbyville would increase to approximately 64.000 per year. The average length of stay per visit during, for example, 1978 is 3.62 days. The product of these two items (3.62 days per visit X 64,000 visits per year) equals approximately 232,000 days campsites would be occupied during

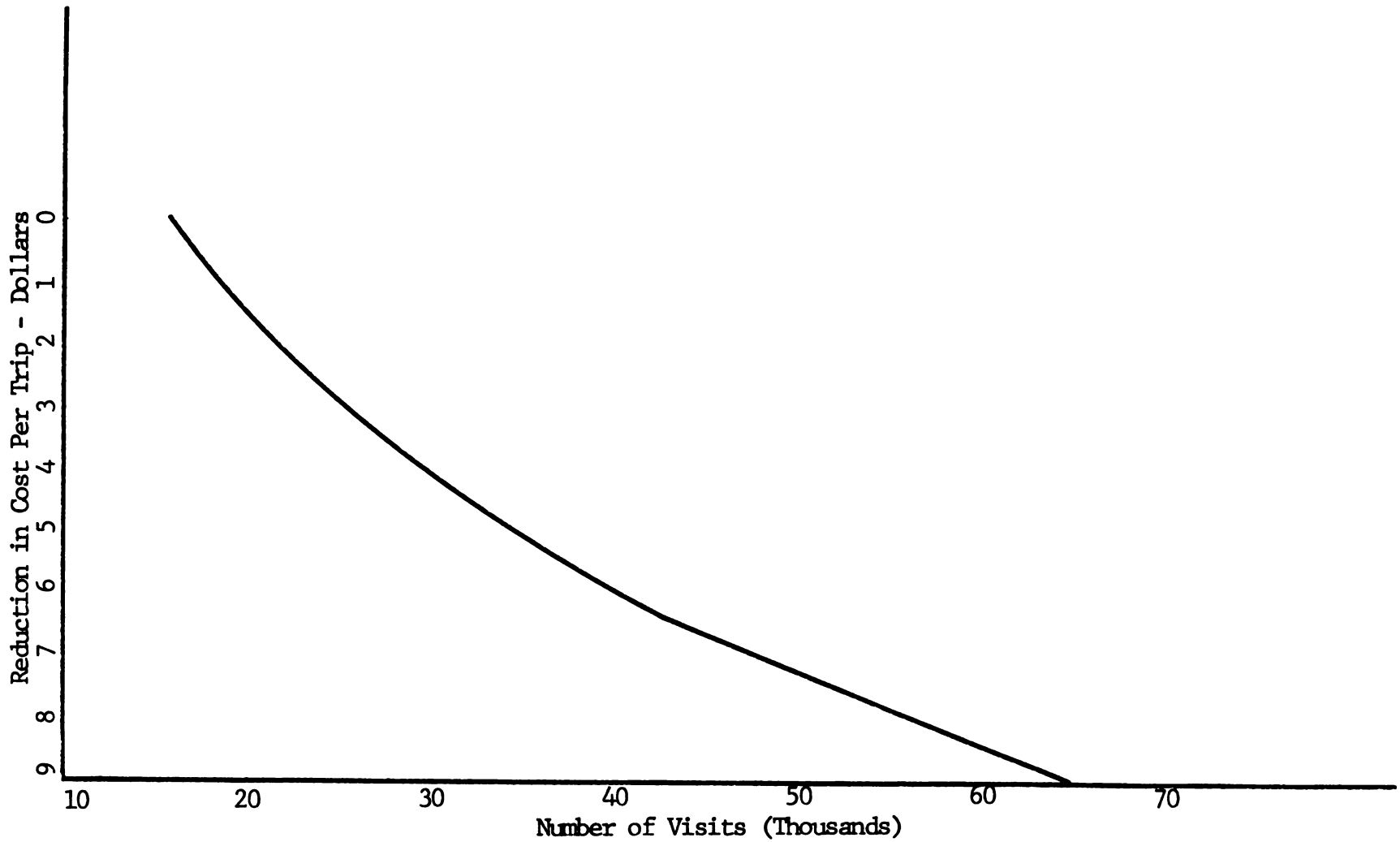

Figure 13

Effects of Trip Cost Reduction - 1977

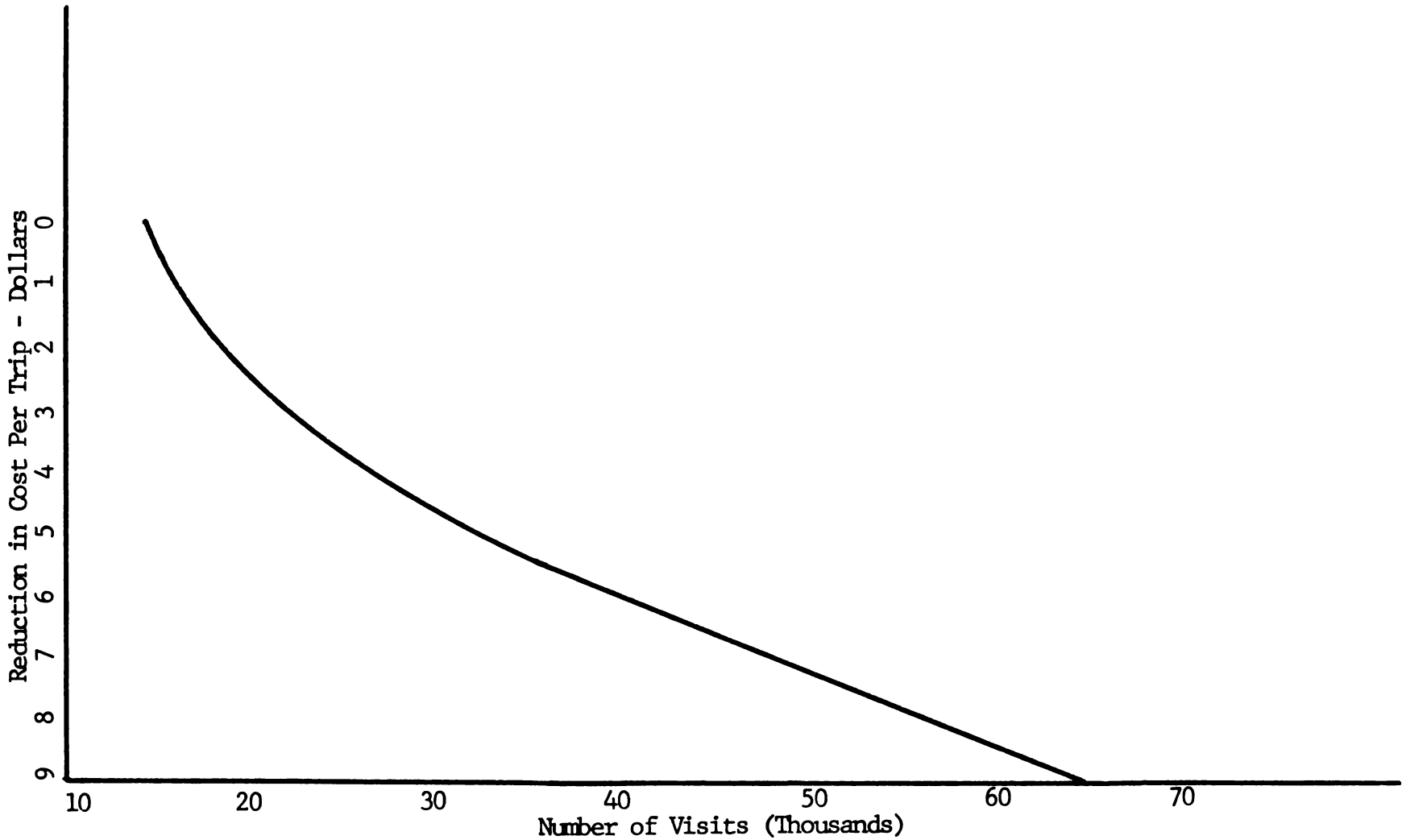

Figure 14

Effects of Trip Cost Reduction - 1978

a year ("campsite days") if the user fee, for example, were reduced to zero.

Before proceeding further, it will be apparent to some that the common error of equating consumption with demand is about to occur. The figure 64,000 actually represents the number of camping trips all parties would desire to take if total trip cost were reduced by $9.00 per trip, i.e. demand for camping at this reduced cost (price). As the discussion continues, it will become evident that expecting any semblance of this consumption level implied by the curve (232,000 campsite days per year) is unrealistic as it would exceed the supply limits. From this it may be inferred that this level of demand is too high also.

There were 742 campsites available at Corps of Engineers campgrounds at Lake Shelbyville during the 1978 camping season. The camping season extends from approximately March 15 through November 15, or 244 days. Assuming that every campsite was available during that period - and this is a generous assumption since three of the campgrounds are not open that long each year - there are only a maximum number of 181,000 (742 campsites X 244 days) campsite days available each year. This is clearly less than that predicted by the curve.

Those wishing to defend the curve's validity in predicting consumption could perhaps argue that if trip cost were thus reduced, the lake would be inundated with people desiring to camp regardless of the number of available sites. In other words, overflow conditions would constantly exist. Based on the author's six years of observing camping use at the lake, overflow conditions have existed only irregularly, occurring most frequently on three-day holiday weekends during

the summer months. During 1972, when no user fees were charged, overflow conditions did occur more frequently. At that time, however, fewer campsites were available which would certainly have contributed to the overflow conditions. The most valid conclusion to be derived from these curves appears to be that the decision to take a camping trip, i.e. the demand for camping, does not depend solely upon price, or cost, of the trip.

CHAPTER V

SUMMARY, FURTHER RESEARCH AND RECOMMENDATIONS

The overall goal of this study has been to demonstrate additional uses of existing data sources. The sources investigated here have been user fee and camping registration records from Lake Shelbyville, a U.S. Army Corps of Engineers multiple purpose reservoir located near the City of Shelbyville in Central Illinois. It is felt that this goal has been met.

Based on information contained on User Permits, a number of relationships were developed. These included the average party size, the average length of stay and average amount of user fee paid per User Permit. These were further subdivided into values indication use by senior citizens and full-price visitors. An additional value, the number of recreation days experienced per user fee dollar collected, was also developed for each campground. These values can also be used to calculate camping visitation in Lake Shelbyville campgrounds during some specified time period.

Analysis of the above information indicates that use, i.e. recreation days spent camping, of Lake Shelbyville campgrounds has increased steadily from 1974 to 1978. Use by each type of visitor -

senior citizen and full-price - has also increased. Although it was determined that use by full-price visitors has increased at a faster rate, use by senior citizens still comprises a sizeable portion of total camping visitation (13%). If this percentage should increase in the future, it may be appropriate to begin planning services desired by senior citizens. While not an immediate necessity, this may become of greater importance as persons born during the post-World War II "baby boom" approach age 62. Planning now could aid future campground users. The trends required to aid planning can be observed by monitoring information from User Permits.

Although use in terms of recreation days is lower than for full-price visitors, the proportion of total user fee monies contributed by senior citizens has steadily increased from 1974 to 1978. This is attributed to the steadily increasing length of stay observed for senior citizen parties; that of full-price visitors has not varied significantly. Thus, in terms of camping parties rather than individual visitors, it can be said that use in terms of campsite occupancy by senior citizen parties has been increasing at a faster rate than that of full-price parties. Without changes in price or use patterns, the rate of total user fee revenue increase should continue to decline.

Information contained on Camping Registration Cards was also analyzed. It was determined that automobile and pickup trucks comprise the most common types of vehicles utilized by Lake Shelbyville campers (approximately 80% of all trips). Use of tents and motor homes have both increased from 1977 to 1978 although trailer use declined for the same period. While some minor changes have occurred, there is no

distinct trend either toward or away from increased use of more fuel-efficient vehicles by Lake Shelbyville campers.

Camping Registration Card information was also utilized to construct demand curves for camping for both 1977 and 1978 following the travel cost method. Detailed trip costs were developed for Lake Shelbyville campers as part of the information required for curve construction. A downward shift in the demand curve was observed between 1977 and 1978. This was reflected by the decline of the average consumer surplus benefit per camping trip from $7.00 in 1977 to $5.69 in 1978.

Further Research

It is apparent that the analyses presented here do not fully exhaust the potential uses of the data contained on these forms. Additional questions were also raised in previous chapters. Some potential further investigations are listed below.

1. The above analyses of User Permit data could be applied to individual campgrounds and months to describe seasonal trends.

2. What is the reason for the apparent attraction of Bo Wood and Coon Creek Recreation Areas to Golden Age campers?

3. The same analyses applied to User Permits in this study could be applied to User Permits from other Corps of Engineers projects; those from years not sampled at Lake Shelbyville could be analyzed to confirm or deny the results of this study.

4. What is the reason for the increase over time in the average length of stay by Golden Age camping groups?

5. For what reasons do camping groups renew their User Permits rather than paying for their entire trip when first arriving?

6. Do parties desire to camp with friends at adjoining sites? Does the lack of "buddy sites" at Lake Shelbyville play a part in campground or campsite selection?

7. The campsite number of the site selected and utilized by each camping party is listed on each Camping Registration Card. Determining which sites are used most frequemtly and why could indicate site-type popularity and aid in future campsite design and planning.

8. Based upon the arrival date on the Camping Registration Card, use patterns with respect to campground, month and even day of the week can be established. Coupling this with the departure date could provide an occupancy rate profile of each day during each year at each campground - even at each campsite if carried to extreme. Periods of peaking and the amount of use associated with them could also be identified quite specifically.

9. By expanding the sample size of Camping Registration Cards from each campground and refining trip cost calculations to being campground-specific, individual campground demand curves can be established.

10. It was observed on some Camping Registration Cards that some camping parties changed campsites within a campground as often as three times during a particular trip. Discovering the reasons for this could aid in campground design.

11. By determining from Camping Registration Cards the amount of use per year, i.e. the number of recreation days experienced, at each campsite could aid in identifying and preventing both overuse at and damage to specific campsites.

12. When used in conjunction with additional surveys, the data

on the forms could aid in describing the effect of increasing gasoline prices on camping at Lake Shelbyville.

Recommendations

It is clear that the value of the forms as they currently exist is great. In the course of this study it was often difficult to assimilate and correlate the information contained on the forms. This is, to a great extent, due to the format and the information requested, or not requested, on each. Analysis could also have been greatly speeded and more complete had the data been computerized. What will be suggested below is a possible method of alleviating many of these problems and at the same time increasing the value of the data.

There are three criteria to be met when developing a new Camping Registration Form. These are:

1. Combine the User Permit and Camping Registration Card into one form.
2. Increase and improve the information requested on the form.
3. Record the information in a format that can be readily analyzed by computer.

A method incorporating these criteria is currently in use by the New York State Department of Environmental Conservation.[1]

Under this system, only one form is used for camping registration and paying user fees. A sample copy of the form is shown in Figure 15. The form consists of three parts - an original and two copies. The original serves as the camper's receipt, the first copy is retained by

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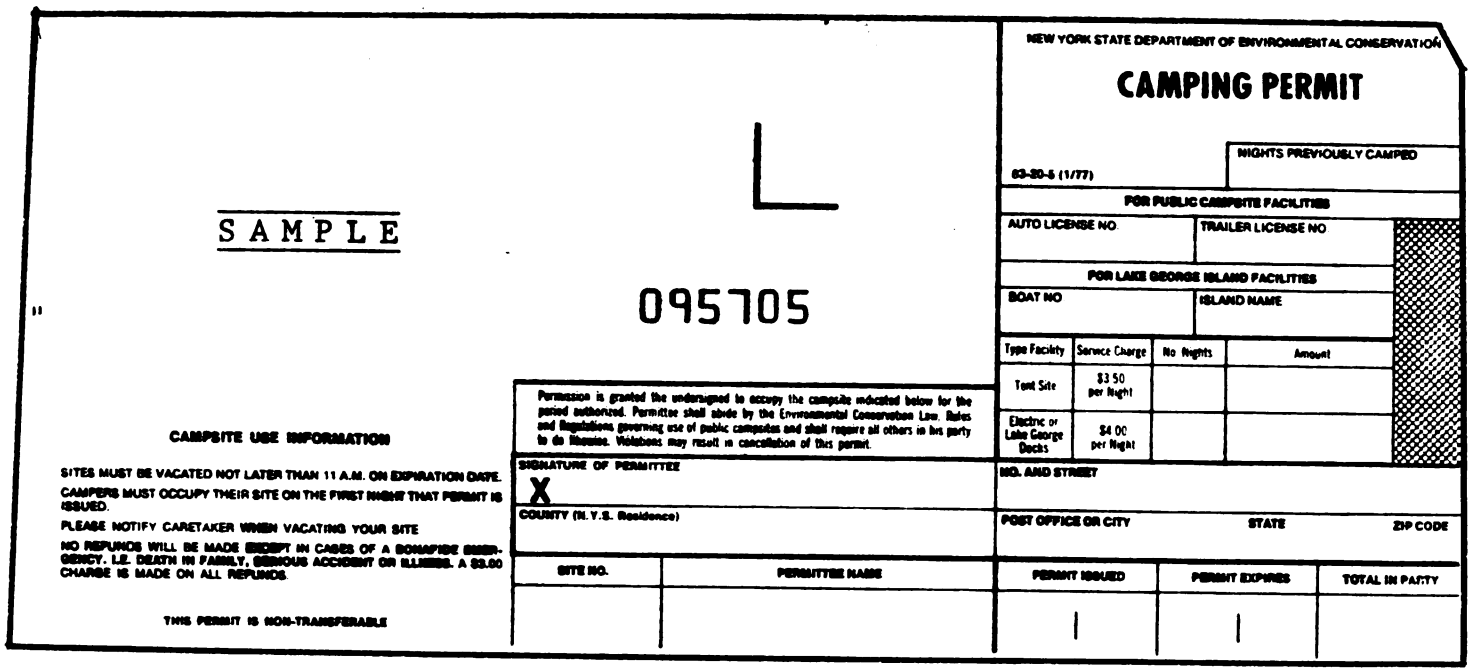
[1]Information regarding the method was provided in August 1979 by Wayne G. Blanchard, Graduate Student in the Department of Park and Recreation Resources at Michigan State University and a former employee of the New York Department of Environmental Conservation.



SAMPLE

095705

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

CAMPING PERMIT

63-30-5 (1/77)

NIGHTS PREVIOUSLY CAMPED

FOR PUBLIC CAMPSITE FACILITIES

AUTO LICENSE NO.

TRAILER LICENSE NO

FOR LAKE GEORGE ISLAND FACILITIES

BOAT NO

ISLAND NAME

Type Facility	Service Charge	No Nights	Amount
Tent Site	$3.50 per Night		
Electric or Lake George Docks	$4.00 per Night		

CAMPSITE USE INFORMATION

SITES MUST BE VACATED NOT LATER THAN 11 A.M. ON EXPIRATION DATE.

CAMPERS MUST OCCUPY THEIR SITE ON THE FIRST NIGHT THAT PERMIT IS ISSUED.

PLEASE NOTIFY CARETAKER WHEN VACATING YOUR SITE

NO REFUNDS WILL BE MADE EXCEPT IN CASES OF A BONAFIDE EMERGENCY. I.E. DEATH IN FAMILY, SERIOUS ACCIDENT OR ILLNESS. A $3.00 CHARGE IS MADE ON ALL REFUNDS.

THIS PERMIT IS NON-TRANSFERABLE

Permission is granted the undersigned to occupy the campsite indicated below for the period authorized. Permittee shall abide by the Environmental Conservation Law, Rules and Regulations governing use of public campsites and shall request all others in his party to do likewise. Violations may result in cancellation of this permit.

SIGNATURE OF PERMITTEE

X

COUNTY (N.Y.S. Residence)

NO. AND STREET

POST OFFICE OR CITY

STATE

ZIP CODE

SITE NO.	PERMITTEE NAME	PERMIT ISSUED	PERMIT EXPIRES	TOTAL IN PARTY
		/	/	

Figure 15

New York State Department of Environmental Conservation Camping Permit

the park office and the second copy is utilized at the Department of Environmental Conservation Headquarters in Albany, New York for visitation calculations. The second copy is made of heavier material, similar to that of computer cards, and is the same size as a standard computer card.

During a typical registration at a park entrance, the right-hand portion of the form is completed by hand. The form is then placed in a data recorder, similar to a credit card machine commonly used at vehicle service stations, to imprint additional information on the form such as party size, a code number to indicate the camper's county of origin and the number of nights camped. Following the techniques used in reading "marked sense" forms, information on the second copy, i.e. the computer card, can then be directly analyzed by computer. While the format would require revision to meet U.S. Army Corps of Engineers regulations and requirements, the principle certainly warrants careful consideration.

Although an actual form will not be designed here, there are a number of items of information that should be included on the form. These would aid greatly in computations both suggested and performed here. These items are:

1. A unique serial number should appear on each form.
2. Corps of Engineers District name.
3. Lake or Project name.
4. Campground name.
5. Party Size.
6. Whether or not the camper registered on the form was a Golden Age Passport bearer.

7. The mode(s) of transportation; boat trailer use could also be recorded here; if desired, vehicle license number(s) could also be recorded for use by campground personnel on-site.

8. The type(s) of overnight camping shelter(s) used.

9. The campsite number and whether or not the campsite has an electrical hookup.

10. The camper's name, address and telephone number. These prove useful to field personnel as stated in a previous chapter. If desired, the city of residence could be coded as to zone to be used in application of the travel cost method.

11. The dates of arrival and departure for that particular visit. From this can be determined the total length of stay per party per visit except for renewals. Perhaps recording the serial number(s) of the registration form(s) previously issued during that particular visit on the newly issued form could indicate a renewal. This would allow the computer to extend that party's length of stay by "adding it onto" that indicated on the previously issued form(s). This correlation would also allow an accurate apportionment of all or part of a trip into the proper month(s). Without this, or some similar method, the average length of stay per trip will never be more accurate an indicator of total trip length than that derived from User Permits currently in use.

The information contained here could then be compiled and analyzed at the District level for District and Lake Project use. Further aggregation could occur at the Division level and at the Office of the Chief of Engineers in Washington, D.C. to describe regional and national trends. While the Corps of Engineers currently gathers a

number of statistics nationally through the Recreation Resource Management System (RRMS),[1] the above recommendation allows a more accurate and uniform description of camping information. It has the added feature of being of greater value to specific lake projects yhan most of the data generated by RRMS. Although covering a much wider range of items, the RRMS information is most useful in describing national trends and conditions.

One frequent criticism of "new-fangled systems" by field personnel who must implement them is that they commonly create additional work without any tangible return. This study has demonstrated some tangible values that would allow application of results to such specific items as maintaining a single campsite. In addition, the proposed registration format contains no information not already recorded by gate attendants on existing forms. In fact, putting a single mark on a "marked sense" form could actually decrease registration time from that required by the hand-written methods currently employed. In addition, a single form would take less time to complete than two separate ones. It is felt that the proposal here would actually require less time per registration once the new format is learned by employees.

It is hoped that this study will be only the beginning of investigations into further use of existing data sources - not only in the Corps of Engineers but also in other public agencies. It is also

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[1]U.S., Department of the Army, Corps of Engineers, Office of the Chief of Engineers, Project Operations: Recreation Resource Management System (RCS DAEN-CWO-39 (R1)) , Engineering Regulation 1130-2-414. October 1, 1976. This regulation is currently undergoing revision and should be finalizes in early 1980.

hoped that at least some of the questions raised here will be answered and that the proposed revision to the camping registration form will be implemented. If this is the case, this study will have been successful.

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APPENDICES

APPENDIX I

LAKE SHELBYVILLE RECREATION AREAS

AND THEIR FACILITIES

Table 22

Public Recreation Areas and Their Facilities Operated by the U.S. Army Corps of Engineers at Lake Shelbyville, Illinois, as of March, 1979[1]

Area Name	County	Number of Amphitheaters	Number of Beaches	Number of Boat Launch Ramps	Number of Campsites Electric	Number of Campsites Non-electric
Dam East	Shelby	0	0	0	0	0
Spillway	Shelby	0	0	0	0	0
Dam West	Shelby	0	1	1	0	0
Opossum Creek	Shelby	0	0	1	0	99
Coon Creek	Shelby	1	1	1	107	118
Lone Point	Shelby	1	0	1	0	95
Lithia Springs	Shelby	1	1	1	124[2]	7
Whitley Creek	Moultrie	1	0	1	0	85
Bo Wood	Moultrie	1	0	1	84	0
Wilborn Creek	Moultrie	0	1	1	0	23
Sullivan Beach	Moultrie	0	1	0	0	0
Total		5	5	8	315	427

Table 22 (cont'd.)

Area Name	Number of Fish Cleaning Stations	Number of Picnic Sites (Individual)	Number of Picnic Shelters (Group)	Number of Playgrounds	Number of Shower Buildings	Number of Trailer Dump Stations
Dam East	0	23	1	1	0	0
Spillway	2	28	2	1	0	0
Dam West	1	76	2	1	0	0
Opossum Creek	1	11	1	1	0	0
Coon Creek	1	0	0	1	1	1
Lone Point	1	12	2	1	1	1
Lithia Springs	1	30	1	1	1	1
Whitley Creek	1	0	0	1	1	1
Bo Wood	1	18	1	1	1	1
Wilborn Creek	1	21	1	1	0	0
Sullivan Beach	0	20	0	0	0	0
Total	10	239	11	10	5	5

[1] Lake Shelbyville Basic Data Book, March 1979, pp. 9-13.

[2] Electric hookups not available until 1979 season.

APPENDIX II

OPEN/CLOSE DATES AND USER FEES CHARGED AT LAKE SHELBYVILLE CORPS OF ENGINEERS CAMPGROUNDS FROM 1973 TO 1979

Table 23

Open/Close Dates and User Fees Charged at Lake Shelbyville Corps of Engineers Campgrounds from 1973 to 1979

1973

Campground	Open	Close	Full Price Fee[1] Without Electricity	With Electricity
Opossum Creek	May 21	Sep 29	$1.00	-----
Coon Creek	May 21	Sep 29	$3.00	$3.50
Lone Point	May 21	Sep 29	$3.00	-----
Lithia Springs	May 21	Sep 29	$3.00	-----
Bo Wood[2]	May 21	Oct 29	$3.00	$3.50
Whitley Creek	May 21	Oct 29	$3.00	-----

1974

Opossum Creek	Open All Year		No Charge	
Coon Creek	Apr 1	Nov 30	$3.00	$3.50
Lone Point	Open All Year		No Charge	
Lithia Springs	Apr 1	Nov 30	$3.00	-----
Bo Wood	Apr 1	Nov 30	$3.00	$3.50
Whitley Creek	Apr 1	Nov 30	$3.00	-----

Table 23 (cont'd.)

1975

Campground	Open	Close	Full Price Fee Without Electricity	With Electricity
Opossum Creek	Open All Year		No Charge	
Coon Creek	Mar 15	Nov 15	$3.00	$3.50
Lone Point	Mar 15	Nov 15	No Charge	
Lithia Springs	Mar 15	Nov 15	$3.00	-----
Bo Wood	Mar 15	Nov 15	$3.00	$3.50
Whitley Creek	Mar 15	Nov 15	$3.00	-----

1976

Campground	Open	Close	Full Price Fee Without Electricity	With Electricity
Opossum Creek	Open All Year		No Charge	
Coon Creek	Mar 15	Nov 15	$3.50	$4.00
Lone Point	Mar 15	Nov 15	$3.50	-----
Lithia Springs	Mar 15	Nov 15	$3.50	-----
Bo Wood	Mar 51	Nov 15	$3.50	$4.00
Whitley Creek	Mar 15	Nov 15	$3.50	-----

Table 23 (cont'd.)

1977

Campground	Open	Close	Full Price Fee Without Electricity	Full Price Fee With Electricity
Opossum Creek	Open All Year		No Charge	
Coon Creek	Apr 15	Oct 15	$3.50	$4.00
Lone Point	May 15	Sep 15	$3.50	-----
Lithia Springs	Mar 15	Nov 15	$3.50	-----
Bo Wood	Mar 15	Nov 15	$3.50	$4.00
Whitley Creek	May 15	Sep 15	$3.50	-----
Lone Point Group Camp	May 15	Sep 15	0-25 persons 26-50 persons More than 50 persons	$15.00/group[3] $20.00/group $25.00/group
Wilborn Creek Group Camp	Apr 15	Oct 15	-----	$3.00/group

1978

Opossum Creek	Open All Year		No Charge	
Coon Creek	Apr 14	Oct 15	$3.50	$4.00
Lone Point	May 12	Sep 17	$3.50	-----
Lithia Springs	Mar 10	Nov 19	$3.50	-----
Bo Wood	Mar 10	Nov 19	$3.50	$4.00
Whitley Creek	May 12	Sep 17	$3.50	-----
Lone Point Group Camp	May 12	Sep 17	0-25 persons 26-50 persons More than 50 persons	$15.00/group $20.00/group $25.00/group
Wilborn Creek	Apr 14	Oct 15	-----	$3.00/group

Table 23 (cont'd.)

1979

Campground	Open	Close	Full Price Fee Without Electricity	Full Price Fee With Electricity
Opossum Creek	Open All Year		No Charge	
Coon Creek	Apr 13	Oct 14	$3.50	$4.00
Lone Point	May 11	Sep 16	$3.50	-----
Lithia Springs	Mar 9	Nov 18	$3.50	$4.00
Bo Wood	Mar 9	Nov 18	$3.50	$4.00
Whitley Creek	May 11	Sep 16	$3.50	-----
Lone Point Group Camp	May 11	Sep 16	0-25 persons 26-50 persons More than 50 persons	$15.00/group $20.00/group $25.00/group
Wilborn Creek Group Camp	Apr 13	Oct 14	0-25 persons 26-50 persons More than 50 persons	$10.00/group $15.00/group $20.00/group

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[1]User fee listed is the full price fee charged per campsite per night. Divide the fee in half to obtain the fee charged to Golden Age Passport bearers.

[2]Bo Wood Recreation Area was named Sullivan Access Area prior to 1976.

[3]The fee shown represents the full price fee charged per grouo per night for the entire group camp area. Divide the fee in half to obtain the fee charged to Golden Age Passport bearers. There are no electrical hookups available in either group camp.

APPENDIX III

DETAILED SUMMARY OF

P_t, L_t, F_t AND P_tL_t

BY PARK AND YEAR

Table 24

P_t, L_t, P_tL_t and F_t

at Bo Wood Recreation Area[1]

Year	P_t	L_t	P_tL_t	F_t
1974	3.19	3.21	10.24	7.03
1976	3.28	3.24	10.63	7.68
1978	3.13	3.34	10.45	8.00
3-Year Average	3.20	3.26	10.44	7.57

Table 25

P_t, L_t, P_tL_t and F_t

at Coon Creek Recreation Area

Year	P_t	L_t	P_tL_t	F_t
1974	3.54	2.83	10.02	7.00
1976	3.66	3.07	11.24	8.13
1978	3.80	3.02	11.47	7.95
3-Year Average	3.67	2.97	10.91	7.69

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[1] P_t = Average party size per User Permit

L_t = Average length of stay in days per User Permit

P_tL_t = Average number of recreation (camper) days per User Permit

F_t = Average fee paid in dollars per User Permit.

Table 26

P_t, L_t, P_tL_t and F_t

at Lithia Springs Recreation Area

Year	P_t	L_t	P_tL_t	F_t
1974	3.79	2.69	10.20	5.30
1976	3.66	2.80	10.25	6.71
1978	3.67	2,64	9.69	6.39
3-Year Average	3.71	2.71	10.05	6.13

Table 27

P_t, L_t, P_tL_t and F_t

at Whitley Creek Recreation Area

Year	P_t	L_t	P_tL_t	F_t
1974	3.98	2.52	10.03	5.11
1976	3.91	2.58	10.09	5.89
1978	4.03	2.67	10.76	6.31
3-Year Average	3.97	2.59	10.29	5.77

Table 28

P_t, L_t, P_tL_t and F_t

at Lone Point Recreation Area

Year	P_t	L_t	P_tL_t	F_t
1974	- No Fees Collected During 1974 -			
1976	3.92	2.70	10.58	6.53
1978	3.80	2.72	10.34	6.52
3-Year Average	3.86	2.71	10.46	6.53

Table 29

P_t, L_t, P_tL_t and F_t

Overall Lake Average - All Years

Campground	P_t	L_t	P_tL_t	F_t
Bo Wood	3.20	3.26	10.44	7.57
Coon Creek	3.67	2.97	10.91	7.69
Lithia Springs	3.71	2.71	10.05	6.31
Whitley Creek	3.97	2.59	10.29	5.77
Lone Point	3.86	2.71	10.46	6.53
Overall Lake Average	3.68	2.85	10.43	6.74

APPENDIX IV

THE IMPORTANCE OF AND MEASUREMENT DIFFICULTIES ASSOCIATED WITH DEMAND FOR RECREATION

Introduction

The economic concepts of supply and demand are familiar to all students of microeconomics. One frequently overhears reference to "the old law of supply and demand" in such diverse places as small farming communities and the largest urban centers. These concepts have been studied and restudied, applied and reapplied to nearly all products and services in American society. One area in which supply and demand measurement is still in its infancy, however, is the field of outdoor recreation.

If the concepts of supply and demand are so well understood and have been widely applied to most products and services, why the difficulty with outdoor recreation? This appendix will explore the complexities of one of these concepts - demand - with respect to outdoor recreation. It will in addition briefly introduce the concepts of one recreation demand estimation technique - the travel cost method developed by Marion Clawson and Jack L. Knetsch.[1]

What Is Demand?

At this point, it will be useful to explain what "demand" is and how this term is applied to outdoor recreation. Gregory defines demand as:

> " . . . the functional relationship between the price of a given commodity and the quantity of that commodity that will be sold in a market specified as to time and place." [2]

Each individual has a personal list, or schedule, of the quantities

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[1] Marion Clawson and Jack L. Knetsch, Economics of Outdoor Recreation (Baltimore: Johns Hopkins Press, 1966).

[2] G. Robinson Gregory, Forest Resource Economics (New York: John Wiley and Sons, 1972), p. 23.

of a product that he/she will purchase at various prices. This schedule is commonly expressed graphically in the form of a "demand curve" with the price on the vertical axis and quantity on the horizontal axis. It is typically downward sloping, i.e. the lower the price, the greater the quantity that will be purchased. When aggregated, these curves represent the total demand for a given product or service. This basic relationship should hold true for outdoor recreation as it does for other products and services.

Many of the demand analyses applied to outdoor recreation have equated demand with consumption, i.e. saying that the number of recreation days experienced at an area is the demand for recreation at that area. This is in error. Quantity demanded is only a function of price while quantity consumed is a function not only of price but also of supply.[1]

The Importance of Demand for Outdoor Recreation

A great deal of time and effort has been spent over the years on the development of demand curves for various products and services. In light of this, for what can a demand curve be used? What specifically is its value in the field of outdoor recreation? In the private sector, where profit is the motive, a demand curve can tell the private recreation entrepreneur what effect changes in price will have on both the quantity of recreation purchased at his area and his profits. This use is essentially the same as the "classical" application of demand to traditional products and services.

In the public sector, which provides a substantial portion of the recreational opportunities available in the United States. the

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[1]Ibid., p. 470.

value of demand information is less tangible but no less important. Its importance is three-fold.

1. Demand information can give public officials an estimate of the value of a recreation area in dollar terms. This allows the comparison of other public programs' value to the value of a recreation program. Recreation program value has in the past been expressed most frequently in terms of consumption volume which does not allow inter-program quantitative comparisons.
2. A comparison of demand for different recreation programs and facilities can help public officials determine which programs and facilities to emphasize.
3. In a more "classical" sense, recreation demand information can provide public officials some guidance as to the effects of price changes on both attendance at recreation areas and revenue generated by these areas. This is often termed "willingness to pay" and differs from the private sector in that profit is not the motive in public sector decisions.

The Complexities of the Recreation Experience and Demand Measurement

Now that recreation demand has been defined and its importance identified, the next logical step would be to measure it. Unfortunately, the very nature of recreation itself makes demand measurement difficult. It will be appropriate here to indicate why these difficulties exist.

Outdoor recreation means many things to many people. It has been defined in many ways by Doell and Twardzik, Meyer and Brightbill,

Clawson and Knetsch, McCormack, the U.S. Army Corps of Engineers, the U.S. Department of the Interior and the Water Resources Council, to name but a few.[1] In spite of this wide variance, Clawson and Knetsch have isolated the five components of essentially all outdoor recreation experiences.[2] These form what is termed the "total recreation experience" and are:

1. Anticipation of the experience
2. The trip to the recreation site
3. The on-site experience
4. The return trip home
5. Recollection of the experience.

The key element tying all of the components together is time; each of the components makes demands on an individual's time. It is this fact that separates recreation demand measurement from measurement of

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[1]Charles E. Doell and Louis F. Twardzik, Elements of Park and Recreation Administration, Third Edition (Minneapolis: Burgess Publishing Company, 1973), pp. 10-27; Harold D. Meyer and Charles K. Brightbill, Recraetion Administration (Englewood Cliffs, New Jersey: Prentice-Hall Incorporated, 1956), p. 1 as quoted in Jesse A Reynolds and Marion N. Hormachea, Public Recreation Administration (Reston, Virginia: Reston Publishing Company, 1976). p. 4; Clawson and Knetsch, Economics of Outdoor Recreation, pp. 6-7; Thelma McCormack, "Politics and Leisure," International Journal of Comparative Sociology, Volume XII, 1971, pp. 168-181 as quoted in Geoffrey Godbey and Stanley Parker, Leisure Studies and Services: An Overview (Philadelphia: W. B. Saunders Company, 1976), p. 6; U.S., Department of the Army, Corps of Engineers, Project Operation: Management of Natural Resources and Outdoor Recreation at Civil Works Water Resource Projects (Draft), Engineering Regulation 1130-2-400. 1978, p. 3; U.S. Department of the Interior, Bureau of Outdoor Recreation, Assessing Demand for Outdoor Recreation. 1975, p.1; Water Resources Council, Evaluation Standards for Primary Outdoor Recreation Benefits, p. 2.

[2]Clawson and Knetsch, Economics of Outdoor Recreation, pp. 33-35.

demand for other products and services.[1] It is also the item that makes recreation demand measurement both complex and difficult. Assuming that outdoor recreation occurs during leisure time as opposed to work and other non-discretionary time, how does one measure the value of leisure time, i.e. the cost or "price" of outdoor recreation?

A number of proposals for surmounting this obstacle have been suggested. Among the more notable are the concept of foregone earnings,[2] the development of a national time budget[3] and the use of recreational travel costs as surrogates for price.[4] The former two approaches consider more factors than the latter; it is, however, difficult, if not impossible, to measure the variables necessary for their application.

What is left, then, is the Clawson and Knetsch approach to recreation demand measurement, commonly referred to as the travel cost method. This statement is not meant to deride this approach although it has been criticized as being overly simplistic and

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[1]Acquisition and/or purchase of most other products and services occur instantaneously, or nearly so, and make little demand upon an individual's time.

[2]Gary S. Becker, "A Theory of the Allocation of Time," The Economics Journal, September, 1965, pp. 493-517.

[3]Mary A. Holman, "A National Time Budget for the Year 2000," Sociology and Social Research, Volume 46, Number 1, October, 1961; John P. Robinson and Phillip E. Converse, 66 Basic Tables of Time Budgets for the United States (Ann Arbor, Michigan: University of Michigan, Survey Research Center, Institute for Social Research, 1966) as cited by Stanley G. Detering, "An Extension into the Time Dimension of the Model of Consumer Behavior," in An Economic Study of the Demand for Outdoor Recreation, a collection of papers presented at the Annual Meeting of the Cooperative Regional Technical Committee for Project Number WM-59, Reno, Nevada, June 16-18, 1970. pp. 15-46.

[4]Clawson and Knetsch, Economics of Outdoor Recreation.

without basis in economic theory.[1] It is instead meant to indicate that the travel cost method is probably the only outdoor recreation demand measurement technique that can be readily understood and applied by both managers and researchers alike. The technique is not without flaw as the authors were quick to point out.[2] It is its simplicity, however, that makes it so valuable.

Concepts of the Travel Cost Method

As mentioned above, the basic concepts of the travel cost method are quite simple. The objective of the method is to establish the public's willingness to pay for an outdoor recreation experience, the elusive missing element in recreation demand measurement. Working from the travel cost idea conceived by Harold Hotelling in 1949, the current technique developed.[3]

Since there appeared to be no good way to directly measure the value in dollars of each of the five components of the total recreation experience, Hotelling, and Clawson in turn, suggested measuring the sum of the value of all components in terms of travel costs, allowing these costs to serve as a proxy for price. The idea here is that the greater the travel cost (the "price" of an outdoor recreation experience at a given recreation area), with all other associated costs being equal regardless of distance traveled, the lower

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[1]An excellent summary of many of the technique's criticisms can be found in Nicholas H. Coomber and Asit K. Biswas, Evaluation of Environmental Intangibles, (New York: Genera Press, 1973), pp. 18-27.

[2]Clawson and Knetsch, Economics of Outdoor Recreation, pp. 86-89.

[3]Harold Hotelling, cited by Roy A. Prewitt, in U.S., Department of the Interior, National Park Service, The Economics of Outdoor Recreation - An Economic Survey of the Monetary Evaluation of Recreation in the National Parks. 1949.

the quantity of recreation experiences demanded at that area. This relationship, if expressed graphically, would take the form of a typical, downward-sloping demand curve with "price," actually cost, per visit, on the vertical axis and quantity on the horizontal axis. Hypothetical price increases are then applied to this curve's data to produce a similar curve. It is this second curve, more truly a demand curve in the "classical" sense than the first, that is most useful. The area under the second curve, then, represents the dollar value, or "consumer surplus" value, of the recreation resource of the area. This in a nutshell is the travel cost method of estimating recreation benefits.

While it is clear that recreation demand analysis is by no means an exact science, the travel cost method can certainly give better guidance for making resource allocation decisions than many of the "seat of the pants" methods currently employed. To paraphrase what has been said by others, it is better to be approximately right than completely wrong.

APPENDIX V

COUNTIES SURROUNDING LAKE SHELBYVILLE, THEIR POPULATION AND COUNTY SEAT BY TRAVEL ZONE

Zone 1: Estimated average round-trip driving time 30 minutes; (22 miles)

State/ County Name	1970 Population[1] (Thousands)	County Seat
Illinois		
Moultrie	13.3	Sullivan
Shelby	22.6	Shelbyville
Zone 1 Total:	35.9	

Zone 2: Estimated average round-trip driving time 1 hour 30 minutes; (66 miles)

State/ County Name	1970 Population (Thousands)	County Seat
Illinois		
Christian	35.9	Taylorville
Coles	47.8	Charleston
Cumberland	9,8	Toledo
Douglas	19.0	Tuscola
Effingham	24.6	Effingham
Fayette	20.8	Vandalia
Macon	125.0	Decatur
Montgomery	30.0	Hillsboro
Piatt	15.5	Monticello
Zone 2 Total:	328.7	

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[1] All population information was found in the World Almanac and Book of Facts 1979, "1970 Census and Areas of Counties and States," (from U.S. Bureau of the Census records). New York: Newspaper Enterprise Association, Incorporated, 1978. pp. 247-252.

Zone 3: Estimated average round-trip driving time 2 hours 30 minutes; (117.5 miles)

State/ County Name	1970 Population (Thousands)	County Seat
Illinois		
Bond	14.0	Greenville
Champaign	163.3	Urbane
Clark	16.2	Marshall
Clay	14.7	Louisville
Dewitt	17.0	Clinton
Edgar	21.6	Paris
Jasper	10.7	Newton
Logan	33.5	Lincoln
Macoupin	44.6	Carlinville
Madison	251.6	Edwardsville
Marian	39.0	Salem
McLean	104.4	Bloomington
Sangamon	161.3	Springfield
Zone 3 Total:	891.3	

Zone 4: Estimated average round-trip driving time 3 hours 30 minutes; (164.5 miles)

State/ County Name	1970 Population (Thousands)	County Seat
Illinois		
Cass	14.2	Virginia
Clinton	28.3	Carlyle
Crawford	19.8	Robinson
Edwards	7.1	Albion
Ford	16.4	Paxton

Zone 4 (Continued)

State/ County Name	1970 Population (Thousands)	County Seat
Greene	17.0	Carrolton
Iroquois	33.5	Watseka
Jefferson	31.8	Mount Vernon
Jersey	18.5	Jerseyville
Lawrence	17.5	Lawrenceville
Livingston	40.7	Pontiac
Mason	16.2	Havana
Menard	9.7	Petersburg
Morgan	36,2	Jacksonville
Richland	16.8	Olney
St. Clair	285.2	Belleville
Scott	6.1	Winchester
Tazewell	118.6	Pekin
Vermillion	97.0	Danville
Washington	13.8	Nashville
Wayne	17.0	Fairfield
Woodford	28.0	Eureka
Indiana		
Sullivan	19.9	Sullivan
Vermillion	16.8	Newport
Vigo	114.5	Terre Haute
Zone 4 Total	623.2	

Zone 5: Estimated average round-trip driving time 4 hours 30 minutes; (225.0 miles)

State/ County Name	1970 Population (Thousands)	County Seat
Illinois		
Brown	5.6	Mount Sterling
Calhoun	5.7	Hardin
Franklin	38.3	Benton
Fulton	41.9	Lewiston
Grundy	26.5	Morris
Hamilton	8.7	McLeansbors
Kankakee	97.3	Kankakee
La Salle	111.4	Ottawa
Marshall	13.3	Lacon
Monroe	18.8	Waterloo
Peoria	195.3	Peoria
Perry	19.8	Pickneyville
Pike	19.2	Pittsfield
Putnam	5.0	Hennepin
Randolph	31.4	Chester
Schuyler	8.1	Rushville
White	17.3	Carmi
Indiana		
Benton	11.3	Fowler
Clay	23.9	Brazil
Fountain	18.3	Covington
Gibson	30.4	Princeton
Greene	26.9	Bloomfield

Zone 5 (continued)

State/ County Name	1970 Population (Thousands)	County Seat
Knox	41.5	Vincennes
Montgomery	33.9	Crawfordsville
Newton	11.6	Kentland
Parke	14.6	Rockville
Putnam	26.9	Greencastle
Missouri		
Franklin	55.1	Union
Jefferson	105.2	Hillsboro
Lincoln	18.0	Troy
St. Charles	93.0	St. Charles
St. Louis City	623.2	St. Louis
St. Louis County	951.7	Clayton
Warren	9.7	Warrenton
Zone 5 Total:	2,771.6	

Zone 6: Estimated average round-trip driving time 5 hours 30 minutes; (275.0 miles)

State/ County Name	1970 Population (Thousands)	County Seat
Illinois		
Adams	70.9	Quincy
Bureau	38.5	Princeton
Cook	5,493.8	Chicago
De Kalb	71.7	Sycamore
Du Page	490.8	Wheaton
Gallatin	7.4	Shawneetown

Zone 6 (continued)

State/ County Name	1970 Population (Thousands)	County Seat
Hancock	23.7	Carthage
Jackson	55.0	Murphysboro
Kendall	26.4	Yorkville
Knox	60.9	Galesburg
Lee	37.9	Dixon
McDonough	36.7	Macomb
Saline	25.7	Harrisburg
Stark	7.5	Toulon
Warren	21.6	Monmouth
Will	247.8	Joliet
Williamson	49.0	Marion
Indiana		
Boone	30.9	Lebanon
Clinton	30.9	Frankfort
Daviess	26.6	Washington
Hendricks	54.0	Danville
Jasper	20.4	Rensselaer
Lake	546.3	Crown Point
Martin	11.0	Shoals
Monroe	85.2	Bloomington
Morgan	44.2	Martinsville
Owen	12.2	Spencer
Pike	12.3	Petersburg
Porter	87.1	Valparaiso

Zone 6 (continued)

State/ County Name	1970 Population (Thousands)	County Seat
Posey	21.7	Mount Vernon
Tippecanoe	103.4	Lafayette
Vanderburgh	168.8	Evansville
White	21.0	Monticello
Missouri		
Crawford	14.8	Steelville
Gasconade	11.9	Hermann
Montgomery	11.0	Montgomery City
Perry	14.4	Perryville
Pike	16.9	Bowling Green
St. Francois	36.9	Farmington
Ste. Genevieve	15.9	Ste. Genevieve
Washington	15.1	Potosi
Zone 6 Total:	8,425.8	

Zone 7: Estimated average round-trip driving time 6 hours 30 minutes; (344.5 miles)

State/ County Name	1970 Population (Thousands)	County Seat
Illinois		
Boone	25.4	Belvidere
Hardin	4.9	Elizabethtown
Henry	53.2	Cambridge
Henderson	8.4	Oquawka
Johnson	7.6	Vienna
Lake	382.6	Waukegan

Zone 7 (continued)

State/ County Name	1970 Population (Thousands)	County Seat
McHenry	111.6	Woodstock
Mercer	17.3	Aledo
Ogle	42.9	Oregon
Pope	3.9	Golconda
Rock Island	166.7	Rock Island
Union	16.1	Jonesboro
Whiteside	62.9	Morrison
Indiana		
Brown	9.1	Nashville
Carroll	17.1	Delphi
Cass	40.5	Logansport
Dubois	30.9	Jasper
Hamilton	54.5	Noblesville
Howard	83.2	Kokomo
Johnson	61.1	Franklin
La Porte	105.3	La Porte
Lawrence	38.0	Bedford
Marion	793.8	Indianapolis
Orange	17.0	Paoli
Pulaski	12.5	Winamac
Starke	19.3	Knox
Tipton	16.7	Tipton
Warrick	28.0	Boonville
Missouri		
Audrain	25.3	Mexico

Zone 7 (continued)

State/ County Name	1970 Population (Thousands)	County Seat
Bollinger	8.8	Marble Hill
Callaway	26.0	Fulton
Cape Girardeau	49.4	Jackson
Clark	8.3	Kahoka
Dent	11.5	Salem
Iron	9.5	Ironton
Lewis	11.0	Monticello
Madison	8.6	Fredericktown
Maries	6.9	Vienna
Marion	28.1	Palmyra
Osage	11.0	Linn
Phelps	26.6	Rolla
Ralls	7.7	New London
Iowa		
Des Moines	47.0	Burlington
Lee	43.0	Fort Madison/Keokuk
Kentucky		
Henderson	36.0	Henderson
Union	15.9	Morganfield
Zone 7 Total:	2,610.7	

Summary - Total Population in Each Zone

Zone	1970 Population (Thousands)
1	35.9
2	328.7
3	891.3
4	623.2
5	2,771.6
6	8,425.8
7	2,610.7

APPENDIX VI

SELECTED CITIES AND TOWNS

SURROUNDING LAKE SHELBYVILLE

AND THEIR TRAVEL ZONE LOCATION

The travel zones are defined in the following manner.

Zone	Estimated Average One-Way Driving Time to Lake Shelbyville	Estimated Average One-Way Driving Distance to Lake Shelbyville
1	15 minutes	11.0 miles
2	45 minutes	33.0 miles
3	1 hour 15 minutes	58.8 miles
4	1 hour 45 minutes	82.3 miles
5	2 hours 15 minutes	112.5 miles
6	2 hours 45 minutes	137.5 miles
7	3 hours 15 minutes	172.3 miles

Note: All cities and towns are in Illinois unless otherwise indicated.

Table 30

Selected Cities and Towns Surrounding Lake Shelbyville and Their Travel Zone Location

City	Zone	City	Zone
A		Assumption	2
		Astoria	5
Addison	6	Athens	4
Affton, Mo.	5	Atlanta	3
Aledo	7	Atwood	2
Allerton	4	Auburn	3
Alsip	6	Augusta	6
Altamont	2	Aurora	6
Alton	4	Ava	6
Arcola	2		
Argenta	2	B	
Arlington Heights	6		
Armington	3	Baldwin	5
Armstrong	4	Bartonville	5
Arrowsmith	3	Batavia	6
Arthur	1	Beardstown	5
Ashkum	4	Beecher	5
Ashland	4	Beecher City	2

Table 30 (cont'd.)

City	Zone
Belleville	4
Bellwood	6
Bement	2
Berwyn	6
Bethalto	3
Bethany	1
Bloomingdale	6
Bloomington	3
Blue Mound	2
Bolingbrook	6
Boody	2
Bourbannais	5
Bradford	6
Bradley	5
Braidwood	5
Bridgeport	4
Bridgeview	6
Brighton	4
Broadlands	3
Brimfield	5
Buckley	4
Bunker Hill	4
Burbank	6
Bushnell	6
C	
Cahokia	4
Calumet City	6
Camargo	2
Campus	6
Canton	5
Cantrall	3
Carlock	3
Carpentersville	6
Casey	3
Cayuga, Indiana	4
Centralia	3
Cerro Gordo	2
Champaign	3
Charleston	2
Chatham	3
Chatsworth	4
Chenoa	3
Chesterfield	3
Chesterfield, Missouri	5
Chestnut	3
Chicago	6
Chillicothe	5
Cissna Park	4
Clarendon Hills	6
Clinton	3
Coal City	5
Colchester	6
Colfax	3
Collinsville	3
Collison	3
Cornell	4
Country Club Hills	6
Cowden	1
Crescent City	4
Crestwood	6
Crete	6
Creve Coeur	5
Crystal Lake	6
Cuba	5
D	
Dalton City	1
Danville	4
Dawson	3
Decatur	2
Deer Creek	5
Dieterich	2
Dolton	6
Downers Grove	6
Downs	3
Dundas	4
Dunlap	5
Dwight	4
E	
East Alton	4
East Peoria	5
East St. Louis	3
Edelstein	5
Edinburg	2
Edwards	5
Edwardsville	3
Effingham	2
Elgin	6
Elk Grove Village	6
Elkhart	3
Elmhurst	6
Elmwood	5
Elmwood Park	6
Elwood	6
Emden	3

Table 30 (cont'd.)

City	Zone
Evergreen Park	6
F	
Fairbury	4
Fairview Heights	2
Farina	2
Farmer City	3
Findlay	1
Fisher	3
Fithian	4
Flanagan	4
Florissant, Missouri	5
Forsyth	2
Franklin	4
Franklin Park	6
G	
Galesburg	6
Galva	7
Gardner	7
Gary, Indiana	6
Gays	1
Georgetown	4
Gibson City	4
Gifford	3
Gilman	4
Girard	3
Glasford	4
Glenarm	2
Glen Carbon	4
Glendale Heights	6
Godfrey	3
Goodfield	4
Granite City	3
Grayville	4
Greenup	2
Greenville	3
H	
Hammond	1
Hammond, Indiana	6
Hanover Park	6
Hartsburg	3
Harvey	6
Havana	4
Hazel Crest	6
Hazelwood, Missouri	5
Henry	5
Heyworth	3
Hidalgo	3
Highland	3
Highland, Indiana	6
Hillsboro	3
Hinsdale	6
Hoffman Estates	6
Holder	3
Homewood	6
Hoopeston	4
Humboldt	2
I	
Iberia, Missouri	7
Imperial, Missouri	5
Indianapolis, Indiana	7
J	
Jacksonville	4
Jennings, Missouri	5
Jerseyville	4
Jewett	3
Joliet	6
Justice	6
K	
Kankakee	5
Kansas	3
Kewanee	7
Kirkland	6
Kirkwood	6
L	
Lafayette, Indiana	6
LaGrange	6
Lake City	1
LaMoille	6
Lansing	6
LaPlace	2
Latham	3
Lawrenceville	4
Lebanon, Indiana	6
Lemont	6
Leroy	3
Lincoln	3

Table 30 (cont'd.)

City	Zone
Lindenhurst	6
Litchfield	3
Lockport	6
Lombard	6
Loogootee	3
Livington	1
Ludlow	3
Lynwood	6
Lyons	6
M	
Mackinaw	4
Macomb	6
Macon	2
Mahomet	3
Manchester, Missouri	5
Manhattan	6
Manito	4
Manteno	5
Manville	6
Markham	6
Marion	6
Maroa	2
Marseilles	6
Marshall	3
Mascoutah	4
Mattesson	6
Mattoon	2
Mendota	5
Meredosia	4
Merrillville, Indiana	6
Metamora	4
Metcalf	3
Michigan City, Indiana	7
Middletown	3
Midlothian	6
Milford	4
Millstadt	4
Milmine	2
Mineral	6
Minonk	6
Mokena	6
Moline	7
Monee	6
Monticello	2
Moro	4
Morrisonville	2
Morton	5
Mount Olive	3
Mt. Prospect	6
Mt. Pulaski	3
Mt. Zion	2
Moweaqua	1
Mundelein	6
Munster, Indiana	6
N	
Naperville	6
Neoga	2
New Berlin	3
New Holland	3
New Lenox	6
Newton	3
Normal	3
North Pekin	4
O	
Oak Forest	6
Oakland	2
Oak Lawn	6
Oakley	2
Oakwood	4
Odell	4
O'Fallon	4
Onarga	4
Oreana	2
Orion	7
Orland Park	6
Ottawa	5
Overland, Missouri	5
P	
Palos Heights	6
Pana	2
Papineau	4
Paris	3
Park Forest	6
Patoka	3
Pawnee	3
Paxton	4
Pekin	4
Peoria	3
Peotone	6
Perrysville, Indiana	4
Peru	6
Pesotum	3

Table 30 (cont'd.)

City	Zone
Piper City	4
Plainfield, Indiana	7
Plano	6
Pleasant Plains	3
Polo	7
Pontiac	4
Potomac	4
Princeton	6
Princeville	5
R	
Rankin	4
Rantoul	3
Raymond	2
Richton Park	6
Ridge Farm	4
River Grove	6
Riverton	3
Robinson	4
Rochester	3
Rock Falls	7
Rockville, Indiana	5
Rolling Meadows	6
Romeoville	6
Royal	3
Royalton	5
Rushville	5
Rutland	5
S	
Sadorus	3
St. Ann, Missouri	5
St. Anne	5
St. Charles	6
St. Charles, Missouri	5
St. Elmo	2
St. Joseph	3
St. Joseph, Missouri	5
Salem	3
Sandoval	3
San Jose	4
Sauk Village	6
Saunemin	4
Savoy	3
Saybrook	3
Schaumburg	6
Secor	4
Seymour	3
Sheffield	6
Shelbyville	1
Sheridan	5
Sherman	3
Sidney	3
South Chicago Heights	6
South Pekin	4
Sparland	5
Springfield	3
Stanford	3
Staunton	3
Sterling	7
Stewardson	1
Stonington	2
Strasburg	1
Streamwood	6
Streator	5
Sullivan	1
T	
Taylorville	2
Terre Haute, Indiana	4
Thomasboro	3
Tilden	5
Tinley Park	6
Toledo	2
Tolono	3
Towanda	3
Tower Hill	1
Tremont	4
Trilla	2
Troy	3
Tuscola	2
U	
Urbana	3
V	
Valparaiso, Indiana	6
Vandalia	3
Villa Grove	2
Villa Park	6
W	
Warrensburg	2
Warrenville	6

Table 30 (cont'd.)

City	Zone
Washburn	5
Washington	5
Watseka	4
Webster Grove, Missouri	5
Westchester	6
Westfield	3
West Frankfort	5
West Salem	3
Westville	4
Wheaton	6
Wheeling	6
White Heath	3
Whitestown, Indiana	6
Wilmington	5
Windsor	1
Witt	2
Wood Dale	6
Wyoming	6

APPENDIX VII

SOURCES OF TRAVEL COST INFORMATION AND SELECTED MATERIALS USED TO ESTIMATE TRIP COST

The following is a list of potential sources of information regarding vehicle operating costs and camping costs. Not all of the sources were investigated by the author. Addresses and telephone numbers are correct as of July 1979.

1. U.S. Department of Transportation
   Federal Highway Administration
   Office of Highway Planning
   Highway Statistics Division
   Vehicles, Drivers, and Fuels Branch
   Washington, D.C. 20590

2. The U.S. Environmental Protection Agency has published annual Gas Mileage Guides beginning in 1975. Single copies of the current guide can be obtained without cost by writing to:

   Fuel Economy
   Consumer Information Center
   Pueblo, Colorado 81009

   Automobile dealers are also supposed to have supplies of the current guide.

3. The Hertz Corporation periodically publishes a detailed cost of operation study based on records maintained for their vehicles.

   Public Affairs Department - Car Study
   Hertz Corporation
   660 Madison Avenue
   New York, New York 10021
   Telephone: (212) 980-2121

4. Gary M. LaBella, Public Relations Administrator
   Recreation Vehicle Industry Association
   P.O. Box 204
   14650 Lee Road
   Chantilly, Virginia 22021
   Telephone: (703) 968-7722

5. Mike Schneider
   Editorial Department
   Trailer Life Publishing Company, Incorporated
   23945 Craftsman Road
   Calabasas, California 91302
   Telephone: (213) 888-6000

Trailer Life has published both a demographic study of its readership as well as reprints of articles bt long-term "permanent" campers who have maintained detailed cost records of their travels.

6. American Automobile Association (AAA) offices have access to a number of automobile operating costs.

7. Dave Pickering
Michigan Association of Recreational Vehicles and Campgrounds
19045 Farmington Road
Livonia, Michigan 48152
Telephone: (313) 477-3434

8. Paul Foght
Director of Marketing
Woodall Publishing Company
500 Hyacinth Place
Highland Park, Illinois 60035
Telephone: (312) 433-4550

9. The Michigan Department of Commerce Travel Bureau, Michigan Department of Transportation and Bill Cornish in the Michigan Department of Natural Resources, Parks Division, are possible sources of information.

10. Don Edgar
17330 Rougeway Drive
Livonia, Michigan 48152
Telephone: (313) 421-2752

Mr. Edgar is a professional outdoor writer and is a member of the Outdoor Writers Association of America. He is also a long-time camper who has maintained cost records of his camping trips.

11. National Automobile Dealers Association (NADA)
Civina, California 91722

12. Gordon Terwilliger
Historian and Statistics Director
National Campers and Hikers Association
10555 Sheridan Avenue South
Bloomington, Minnesota 55431

13. Jim Summers
Executive Vice President
Recreation Vehicle Dealers Association of North America
Suite 142
3215 Old Lee Highway
Fairfax, Virginia 22030

14. Don Ryan
Recreation Marketing Services
3237 Country Club Circle
Billings, Montana 59102

Calculation of Miles Per Gallon (MPG) for Vehicles Towing Trailers

1. From personal records kept by a long-time camper,[1] the following was determined:

   a. During 1976, a 1973 Chevrolet Blazer averaged 8.52 MPG while towing a trailer.

   b. During 1978, the same vehicle averaged 8.12 MPG while towing a trailer.

   c. The overall average of the two years is 8.30 MPG.

2. From an Environmental Protection Publication,[2] 1975 Chevrolet Blazers, all models, averaged 15.20 MPG.

3. Assuming that the MPG for the 1973 vehicle is comparable to that of the 1975 models, the MPG when towing a trailer was reduced from 15.20 MPG to 8.30 or by 6.90 MPG. This represents a reduction of 45% (6.90 ÷ 15.20) in the average MPG when towing a trailer. It was then assumed that the same percentage would apply to other vehicles towing trailers.

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[1] Personal letter from Don Edgar.

[2] U.S., Environmental Protection Agency, 1975 Gas Mileage Guide.

The following pages in this appendix summarize the average miles per gallon (MPG) ratings of all American-made sedans, station wagons, pick-up trucks and vans as recorded in the U.S. Environmental Protection Agency (EPA) Gas Mileage Guides from 1975 through 1979. The MPG ratings shown represent the average MPG rating of all models constructed during that particular year.

The EPA has, beginning in 1977, divided sedans, station wagons and pick-up trucks into size classes. No description of size classes was made in either the 1975 or 1976 guides. A description of how the EPA defines size classes is as follows:

SEDANS

1975 and 1976: Vehicles not divided into size classes.

1977: Subcompact - Cars having up to 100 cubic feet of passenger and luggage volume; a division of these into mini-and subcompact was made by the author on the basis of future models in subsequent years.

Compact - Cars having between 100 and 110 cubic feet of passenger and luggage volume.

Mid-size - Cars having between 110 and 120 cubic feet of passenger and luggage volume.

Large - Cars having more than 120 cubic feet of passenger and luggage volume.

1978 and 1979:

Mini-compact - Cars having less than 85 cubic feet of passenger and luggage volume.

Subcompact - Cars having between 85 and 100 cubic feet of passenger and luggage volume.

Compact - Cars having between 100 and 110 cubic feet of passenger and luggage volume.

Mid-size - Cars having between 110 and 120 cubic feet of passenger and luggage volume.

Large - Cars having more than 120 cubic feet of passenger and luggage volume.

STATION WAGONS

1975 and 1976: Vehicles not divided into size classes.

1977, 1978 and 1979:

Small - Station wagons having less than 130 cubic feet of passenger and cargo volume.

Mid-size - Station wagons having between 130 and 160 cubic feet of passenger and cargo volume.

Large - Station wagons having more than 160 cubic feet of passenger and cargo volume.

PICK-UP TRUCKS

1975 and 1976: Vehicles not divided into size classes.

1977, 1978 and 1979:

Small - Trucks having gross vehicle weight rating (weight plus carrying capacity) of less than 4500 pounds.

Standard - Trucks having gross vehicle weight rating (weight plus carrying capacity) of between 4500 and 6000 pounds.

VANS

No size classifications during any year.

Table 31

Average Miles Per Gallon (MPG) Ratings of American-Made Sedans, Station Wagons, Pick-up Trucks and Vans for 1975 through 1979 Models [1]

Vehicle Type[2]	Average Miles Per Gallon				
	1975	1976	1977	1978	1979
Sedans	16.2	17.5	19.9	20.8	18.6
Station Wagons	14.9	15.6	15.2	17.4	15.5
Pick-up Trucks	17.8	17.9	20.5	20.6	18.7
Vans	16.7	15.8	17.9	17.3	15.1

[1] U.S., Environmental Protection Agency, Gas Mileage Guides, 1975 through 1979.

[2] Includes all sizes and models.