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RELATIVE ROLES OF THE PUBLIC AND PRIVATE SECTOR
AS RECREATION OPPORTUNITY PROVIDERS
TO MICHIGAN'S URBAN AND NONURBAN RESIDENTS

presented by

David James Allen

has been accepted towards fulfillment
of the requirements for

M.S. degree in Park and Recreation
Resources

A handwritten signature in cursive script, appearing to read "Donald Allen", written over a horizontal line.

Major professor

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**RELATIVE ROLES OF THE PUBLIC AND PRIVATE SECTOR
AS RECREATION OPPORTUNITY PROVIDERS
TO MICHIGAN'S URBAN AND NONURBAN RESIDENTS**

By

David James Allen

A THESIS

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

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ABSTRACT

RELATIVE ROLES OF THE PUBLIC AND PRIVATE SECTOR AS RECREATION OPPORTUNITY PROVIDERS TO MICHIGAN'S URBAN AND NONURBAN RESIDENTS

By

David James Allen

This study investigates participants' use of the public and private sector for outdoor recreation opportunities. Relative roles of both sectors are assessed. The identification of outdoor recreational needs being met on public and private lands is necessary to make informed recreation allocation decisions.

The data analyzed in this study were from the 1976 Michigan recreation survey. Socioeconomic and recreation participation information were obtained from random samples of residents during the year long telephone survey. Participation in ten outdoor recreation activities was examined for residents in Southern Lower Michigan.

It was found that the private sector is an important component of the outdoor recreation system in Michigan. Only a small percentage of participants (less than 10%) used both public and private recreation resources within activities. Results indicate limited socioeconomic differences between users of public and private resources, but nonurbanites tend to utilize private recreation resources more than urbanites. Travel profiles were developed for urban and nonurban residents.

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	v
LIST OF FIGURES.....	vii
 Chapter	
I. INTRODUCTION.....	1
Objectives of the Study.....	4
Plan for the Thesis.....	5
II. LITERATURE REVIEW.....	6
III. RESEARCH METHODOLOGY AND HYPOTHESES.....	20
Research Methodology.....	20
Survey Design.....	20
Limitations in the Data Base.....	23
The Study Area.....	23
Activity Selection.....	26
Operational Definitions.....	27
Analysis of the Data.....	31
Hypotheses.....	31
Hypothesis 1: Public and Private Sector Participant Characteristics.....	32
Hypothesis 2: Residence and Use of the Public or Private Sector.....	34
Hypothesis 3: Travel Time and Use of the Public or Private Sector.....	36
Hypothesis 4: Travel Time and Residence.....	37
IV. GENERAL FINDINGS.....	39
Characteristics of Recreation Participants and Participations.....	39
Characteristics of Participants in the Public and Private Sectors.....	49
Recreation Travel Profiles.....	55

Chapter	Page
V. ANALYSIS OF THE HYPOTHESES.....	62
Hypothesis 1: Public and Private Sector Participant Characteristics.....	62
Hypothesis 2: Residence and Use of the Public or Private Sector.....	73
Hypothesis 3: Travel Time and Use of the Public or Private Sector.....	79
Hypothesis 4: Travel Time and Residence..	81
VI. SUMMARY AND CONCLUSIONS.....	85
Summary of Findings.....	86
Research Recommendations and Conclusions..	90
APPENDICES	
A. Sampling Rates by Michigan County Population.....	92
B. Classification of Recreation Areas Into Public or Private Sector Recreation Providers.....	93
C. U.S. Census Bureau Criteria for Delineation of Urban and Nonurban Areas.....	94
D. Listing of Urban Areas in Southern Lower Michigan.....	97
LIST OF REFERENCES.....	99

LIST OF TABLES

Table	Page
1. Relative Role of the Private Sector in Providing Recreation Activity Category Participations to Urban and Nonurban Residents.....	15
2. Relative Role of the Private Sector in Providing Selected Recreation Activities to Urban and Nonurban Residents.....	16
3. Number of Sample Participants and Participations Recorded in the 1976 Telephone Survey and Mean Participations per Participant for Ten Outdoor Recreation Activities.....	41
4. Socioeconomic Characteristics of Participants for Ten Outdoor Recreation Activities, 1976.....	43
5. Occupational Distribution of Participants for Ten Outdoor Recreation Activities, 1976.....	45
6. Travel and Trip Characteristics of All Participations for Ten Outdoor Recreation Activities, 1976.....	47
7. Percentage of Participants Utilizing Public, Private, or Both Sectors for Ten Outdoor Recreation Activities, 1976...	50
8. Comparison of Socioeconomic Characteristics Between Participants in the Public and Private Sector for Ten Outdoor Recreation Activities, 1976.....	53
9. Percentage of the Public and Private Sectors Utilized by Urban and Nonurban Residents for Ten Outdoor Recreation Activities, 1976.....	54

Table	Page
10. Percentage of Urban and Nonurban Resident Participations by Travel Destination Zones for Ten Outdoor Recreation Activities, 1976.....	56
11. Percentage of Urban and Nonurban Resident Participations by Travel Time Zones for Ten Outdoor Recreation Activities, 1976...	59
12. Crosstabulation of Participants' Choice of Provider Sector with Income for Ten Outdoor Recreation Activities (Test 1)....	64
13. Crosstabulation of Participants' Choice of Provider Sector with Income for Ten Outdoor Recreation Activities (Test 2)....	68
14. Crosstabulation of Participants' Choice of Provider Sector with Residence for Ten Outdoor Recreation Activities.....	74
15. T-test Showing the Travel Time Differences Between Users of the Public and Private Sectors for Ten Outdoor Recreation Activities.....	80
16. T-test Showing the Travel Time Differences Between Urban and Nonurban Residents for Ten Outdoor Recreation Activities.....	83

LIST OF FIGURES

Figure	Page
1. Continuum of Pure Public to Pure Private Goods and Services.....	8
2. Southern Lower Michigan Study Area.....	25
3. Urban and Nonurban Areas in the Southern Lower Michigan Study Area.....	29

CHAPTER I

INTRODUCTION

The study of the relationship between the public and private sectors as providers of recreational opportunities is in its relative infancy. In 1962, the Outdoor Recreation Resources Review Commission (ORRRC) presented its landmark survey of our country's recreation resources, projected future participation rates, and made subsequent recommendations for the continued provision of recreation resources. The Commission recognized the need to encourage recreation provision by both the public sector and private enterprise.

The ORRRC specifically recommended that recreation planners include the previously neglected private sector in all comprehensive plans (ORRRC, 1962). Legislation (Public Law 88-29) was enacted in 1963 to require coordination between public and private recreation interests.

Despite requirements to include the private sector in recreation planning, attempts have often been cursory or notably lacking. When recreation opportunities provided by the private sector are addressed in plans, there is little consistency making comparisons between plans difficult

(Epperson, 1980). The result is a void in our comprehensive recreation planning efforts and this void hampers making informed public resource allocation decisions (National Academy of Sciences, 1975).

The ORRRC labeled the private sector "the most important single force" for recreation provision (ORRRC, 1962a). The importance of the private sector compared to the public sector for recreation opportunities, however, has not been clearly determined. Recreation expenditures by participants were estimated to be approximately 160 billion dollars annually (U.S. News and World Report, 1977), but no attempts have been made to separate such estimates into public and private sector expenditures. Other economic indicators, such as recreation employment opportunities and tax revenues, reveal an important contribution to our economy by the private sector.

Recreation facility inventories furnish some information on the importance of each sector. For instance, in a comparison of outdoor recreation camping facilities, there are 40,000 private campsites and only 30,000 public units within Michigan (Michigan Department of Natural Resources (MDNR), 1979b). Other facility comparisons disclose varying relationships between public and private facilities, but many types of recreation, especially informal activities, are difficult to accurately assess in this manner. Even less is known about the

similarities and differences between participants in public and private recreation opportunities.

The traditional recreation planning focus on publicly provided facilities and opportunities is particularly acute in urban areas. Private recreational open space is commonly neglected as one component of a comprehensive recreation system (Cordell, 1976). With 70 to 80 percent of the U.S. population living in cities and small towns (USDI, 1978), the role of the public and private sector as providers of recreational opportunities to urbanites appears especially significant.

Increasing urbanization and land use pressure, the relative scarcity of public open space near urban centers, rapidly escalating land acquisition costs, and decreasing public land acquisition budgets necessitate alternatives to public property acquisition for recreation use. Innovative governmental arrangements with the private sector have been recommended (USDI, 1979a) and programs, such as the Michigan hunter access program which opened more private land to public hunting, have been initiated.

Information on the relative roles of the public and private sectors to recreation users is necessary to make more informed public recreation allocation decisions. User demographic characteristics for different provider sectors are important for planning and marketing efforts. This information is vital to true comprehensive recreation plans

and is needed to provide insights into the response of users to public and private recreation opportunities.

Objectives of the Study

The broad conceptual objective of this study was to identify and compare public outdoor recreational needs that are being met on public and private land. Within this context, subgroups of recreation participants were to be compared regarding their selections of provider sector. This should provide a better understanding of current recreation users and result in more efficient utilization and allocation of recreational resources.

Specific operational objectives were developed to direct this study. They were to,

1. examine the socioeconomic characteristics of participants in selected outdoor recreation activities with regard to participants' choices of public or private sector activity providers,
2. determine how public and private outdoor recreation resources are being utilized by urban and nonurban residents,
3. develop travel profiles for urban and nonurban residents and determine the relationship between residence and travel time to activity location for several of the most popular forms of outdoor recreation, and

4. determine the relationship between participants' choices of public or private sector activity providers and travel time to activity location for ten outdoor recreation activities.

Plan for the Thesis

The remainder of the thesis is comprised of five chapters. The following chapter (Chapter II) reviews the literature relevant to this project. In Chapter III, the methodology employed in this study is discussed and specific hypotheses developed for testing are presented. Chapter III includes an outline of the research design and the statistical methodology utilized to test the hypotheses. Chapter IV presents general results from the study, and Chapter V contains results from analysis of the hypotheses presented in Chapter III. Chapter VI summarizes the study findings, provides limitations on interpreting the findings, and offers suggestions for future research.

CHAPTER II

LITERATURE REVIEW

In this chapter, literature relating to participant use of public and private recreational resources is reviewed. Other literature associated with this study, including related economic terminology and the relevance of socioeconomic variables as explanatory variables in the study of recreation participation, is presented herein. Concluding the literature review is a brief discussion on the marketing applications of this study.

An understanding of some basic economic terminology and theory is important to the framework and overall thrust of this study. To begin with, distinction must be made between a study of demand relationships for outdoor recreation and a study of participation data. Simply stated, demand involves the relationship between prices of a good and the quantities purchased or consumed at those prices. Participation data differ significantly from recreation demand data in that they are actually the result of the interaction between supply and demand factors. Participation data are the measurement of the consequent consumption of quantities taken by consumers given these

supplies and demands (Knetsch, 1974). Participation data are most often collected for analysis in recreation planning and can provide useful insights into existing relationships. They represent only that portion of potential demand that is realized in the context of available recreation opportunities.

The distinction between public and private goods is paramount to any study examining the relationships between the two goods. "A pure public good has been defined as a good or service for which there are high costs of exclusion through the use of a price system and for which the cost of providing the good for one additional consumer is zero," (Farnham, 1980, p. 80). Thus, once supplied, a public good is equally available to all and one person's consumption does not diminish another person's ability to consume (Browning and Browning, 1979). A pure private good possesses exclusion characteristics and is usually predicated on a competitive pricing system (see a microeconomics text such as Samuelson, 1980, or Hirshleifer, 1976). Examples of pure public goods include national defense and regional insect spraying, and pure private goods such as wheat and automobiles are readily identified.

Many other goods do not fit into the concise definitions of pure public and pure private goods. For instance, recreation has come to be regarded as a public

good (Hendee and Cordell, 1980), but it also may contain private good characteristics. The public and private sector both provide many different and similar recreational opportunities, indicating that both sectors have a role in providing recreation opportunities.

An array may be established with all goods arranged on a continuum from pure public goods at one end to pure private goods at the other end (Brazer, 1974) as depicted in Figure 1. Most goods provided by the public sector are located on the continuum between the polar ends, thus research on the roles of the public and private sectors may improve public allocation decisions.

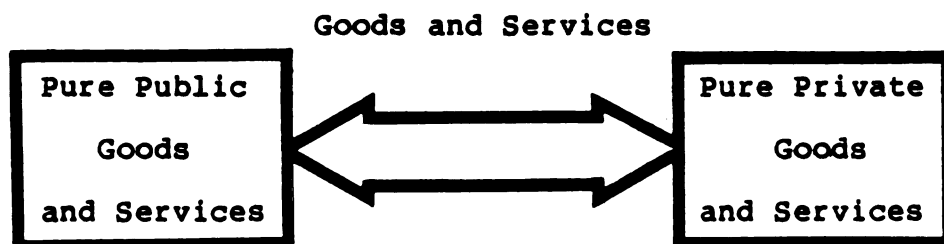


Figure 1.--Continuum of Pure Public to Pure Private Goods and Services

The history of public provision of recreation is succinctly described in the following quotation from the Third Nationwide Outdoor Recreation Plan (U.S. Department of the Interior, 1979b, p. 262):

Support for public recreation development originated at a time when the conditions for private sector development were less favorable. In the late 1800's, recreation demand by the public was not substantial due to limited mobility, small discretionary incomes, little free time, and unrecognized values associated with recreation. Social welfare attitudes stimulated the provision of government services that the private sector could not or did not provide. Activities on government lands were simple, and development was minimal. The facilities and services were offered free of charge. Gradually, as government agencies received larger appropriations, landholdings became more extensive, investments in elaborate facilities more abundant, and fees instituted.

The above excerpt, prepared by a task force on private outdoor recreation enterprises, indicates the early history of recreation was not conducive to attracting private entrepreneurs. The task force further noted the difficulty of the private sector to compete with public recreation development, the restrictions private enterprises may have, and the lack of consideration of the private recreation role in our statewide comprehensive outdoor recreation plans.

With the growth of real incomes and improved mobility, people can afford the alternatives which are most appealing, and "this has encouraged the private and commercial sectors to make greater efforts in the recreation and parks field," (Howard and Crompton, 1980, p. 41). However, the potential for expanded development of private lands and waters for recreation is largely untapped (Styles, 1974), resulting in current pleas for more evaluation of the relative roles of government and the

private sector as recreation opportunity providers (Hendee and Cordell, 1980). The need for investigation on public and private roles has become more acute, especially in urban areas, with the increasingly complex energy picture and escalating land costs.

Few attempts have been made to seriously evaluate the actual relationships between public and private sector provided recreation goods and services. One study (Cordell, 1976) concluded that households were willing to substitute between public and private open space; however, no data was presented on specific recreation activities for which households were willing to substitute public for private opportunities. This study also found income levels and the existing supply of private recreational open space to be significant factors in defining the substitution relationship. The substitutability concept has been studied between recreation activities and activity packages (Christenson and Yoesting, 1977; Hendee and Burdge, 1974), but distinction between the providers of activities as substitutes for each other is lacking in these studies.

A spatial distribution (geographical) study (Lovingood and Mitchell, 1978) compared and classified public and private urban recreation systems. The authors concluded that the two systems are complementary because of their nonduplicative facility characteristics and that substitution between public and private facilities was

limited (Mitchell and Lovingood, 1980). Based on resource inventory data, it was generalized that the public sector provides general opportunities for the entire population and the private sector delivers specific recreation experiences to special groups. This study was confined to urban parks and did not consider nonurban open space recreation resources.

The economic concept of substitution between public and private recreational resources is an important issue to examine (Farnham, 1980), and one factor defining this concept might be the cost of different opportunities. The cost of the whole recreation experience includes "the cost of transportation, the cost of food in excess of what it would have been at home, and any entrance fees," (Clawson and Knetsch, 1966, p. 50). Transportation costs are a large component of the overall cost of outdoor recreation participation and often exceed entry fees at most public and many private recreation areas. Study of the substitutability between public and private sector recreation resources should include examination of travel costs, reflected by travel distances, to determine if they affect substitution or usage patterns.

Hendee (1969) drew a parallel between substitutability and the "opportunity theory" which specifies that people participate in what is available, and this is particularly true when the activity is provided nearly free of charge.

Since many private landowners permit free use of their land for recreational purposes (Kalter and Gosse, 1970) and recreation on public land is free for many activities, other factors, such as travel distance and accessibility, may affect substitution between public and private resources. When fees are involved, they are often only a small fraction of the overall participation cost (Hendee and Cordell, 1980). Therefore, fees may be less of an obstacle to use of public or private resources than travel cost (distance) that must be borne by participants to reach outdoor recreation locations. This has ramifications for understanding urban and nonurban resident recreation participation differences. Public outdoor recreation resources are available to all but are typically located at greater distances from the population base. Many private resources are usually not as distant as public resources, however, accessibility to some, especially urban residents, may be limited because of lack of knowledge of their existence, different preferences, or other factors.

State comprehensive outdoor recreation planning efforts have resulted in some study of the relationship between public and private providers. Although many of these plans focus predominantly on public resources, some include an inventory of private facilities. The 1979 Michigan Recreation Plan and survey data base provided some understanding of recreation users and their selection of

public and private facilities (MDNR, 1979a). One report analyzing the survey data (MDNR, 1977b) suggested that more than half of the recorded recreational participations by Michigan residents were provided by the private sector. This is clear evidence of the significant role of the private sector in Michigan's present recreation system. These studies did not examine the public and private sector roles for individual activities.

Further analysis of the survey data base collected for the 1979 Michigan Recreation Plan was conducted to provide a better understanding of the private sector's role in providing recreation opportunities (Holecek, Willis, and Allen, 1980). The analysis focused on broad activity groupings rather than individual activities. For instance, the "Shooting Sport" group contained archery and firearm activity for big game, small game, and waterfowl. A "Food Related" group included picnicking and eating out while a "Land Mobile" category combined snowmobiling, off-road vehicles, bicycling, auto pleasure riding, vehicle repair, and others. Aggregation within activity groups tended to mask the outdoor recreation portion of the group. Other limitations in the report, such as lack of statistical analysis and the use of expanded data rather than sample data, led to suggestions for more indepth analysis on individual activities of interest to resource managers (Stynes, 1980).

Results from the report (Holecek et al, 1980) indicated the private sector was slightly more important to nonurban residents than urbanites especially for Camping, On-Foot, Land Mobile, Nature Related, and Winter Related activity groupings. Both urban and nonurban residents exhibited strong preferences for the private sector in many activity groups, including, Food Related, Shooting Sports, and Watercraft. The public sector was utilized extensively for Land Mobile, On-Foot, Visiting Sites, Viewing Competitive Events, and Arts and Crafts activity groups. These results are summarized in Table 1. The number of cases in each group was not given because these are estimated population percentages expanded from the survey sample data.

Some limited results were presented on individual activities including a few traditional outdoor recreation activities. Selected activity results are summarized in Table 2 indicating a strong private sector role for nonurban residents. Interpretation of the data is subject to the previously stated limitations. Finally, the report presented socioeconomic comparisons for participants within activity groupings indicating high income earners, older participants, and females more often utilized the private sector. Public opportunities were more often chosen by people with more formal education.

Table 1.--Relative Role of the Private Sector in Providing
Recreation Activity Category Participations to
Urban and Nonurban Residents

<u>Activity Category</u>	<u>Urban Private Sector Provided % of Total</u>	<u>Nonurban Private Sector Provided % of Total</u>	<u>Urban % Minus Nonurban %</u>
Competitive Sports	55%	56%	-1%
Land Mobile	14	31	-17
Swimming	64	63	+1
Miscellaneous	86	87	-1
Food Related	87	88	-1
On-Foot Activities	17	35	-18
Viewing			
Noncompetitive			
Events	80	79	+1
Visiting Sites	30	30	0
Fishing	47	54	-7
Attending Meetings			
or Centers for			
Pleasure	74	69	+5
Other Games	76	61	+15
Winter Related	59	74	-15
Watercraft	66	76	-10
Viewing Competitive			
Events	28	17	+11
Camping	38	57	-19
Shooting Sports	70	82	-12
Nature Related	46	62	-16
Arts and Crafts	38	40	-2
Air Related	33	67	-34

Source: Holecek, Willis, and Allen, 1980.

**Table 2.--Relative Role of the Private Sector in Providing
Selected Recreation Activities to Urban and
Nonurban Residents**

<u>Activity</u>	<u>Urban Private Sector Provided % of Total</u>	<u>Nonurban Private Sector Provided % of Total</u>
Swimming (Inland Lake or Stream)	52%	52%
Power Boating	76	67
Hunting (Firearm, Small Game)	67	86
Fishing (From Boat on Inland Lake)	47	67
Camping (Vehicle Unit- Developed Sites)	66	54
Horseback Riding	87	76
Sledding, Tobogganing	51	70
Snowmobiling	32	75
Hunting (Firearm, Big Game)	76	77
Fishing (Not From Boat, Inland Lake)	40	75
Hiking	38	60
Picnicking (Away From Private Home)	20	35

Source: Holecek, Willis, and Allen, 1980.

These findings serve as a first step toward understanding the role of the public and private sectors as recreation activity providers. Detailed study, including statistical analysis of selected outdoor recreation activities, will provide more specific information for resource managers. Further study must address the limitations inherent in this initial work and disaggregate activity groupings.

One method of studying the relationship between public and private providers of recreation experiences is to examine the characteristics (e.g., income level, education, age, sex, residence, etc.) of people that partake in these activities to determine if any significant differences exist in those selecting one provider type over another. The use of social aggregate or socioeconomic variables to project future patterns and use may be limited (Burdge and Field, 1972; Field and O'Leary, 1973; Young and Smith, 1979). Such variables have been extensively used (ORRRC, 1962; Owens, 1970), and "almost all studies of leisure and outdoor recreation include some user profile data, although the explained variance in leisure or outdoor recreation behavior is usually quite moderate" (Cheek et al, 1976).

Others have suggested different uses for participation data collections in identifying typologies of recreationists based on variations in participation rates (Romsa and Girling, 1976), and many continue to request

information on traditional socioeconomic, demographic, and other characteristics (Driver et al, 1978). West (1977) utilized education and income variables in studies of status-based diffusion of outdoor recreation in which survey data was the primary information base. Whitaker and Browne (1971) hypothesized that the "functional restriction (of private facilities) would be expected to result in a sorting of clientele into fairly homogeneous socioeconomic groups" (cited by Lovingood and Mitchell, 1978). Testing this hypothesis necessitates examination of social and economic characteristics of users.

Socioeconomic variables are also important to many marketing efforts. Marketing is a relatively new concept to outdoor recreation and is defined by Howard and Crompton (1980, p. 320) as:

. . . the analysis, planning, implementation, and control of carefully formulated programs designed to bring about voluntary exchanges with target markets for the purpose of achieving agency objectives. It relies heavily upon designing offerings consistent with client wants . . .

The identification of target markets or potential client groups is accomplished through the market segmentation process. "Markets can be segmented geographically, demographically, psychographically, or behaviorally," (Kotler, 1975, p. 58). Demographic segmentation has been the most common approach due to the simple measurability of socioeconomic characteristics, while geographic characteristics are clearly important (Howard and Crompton, 1980).

Some have called for more study of recreation marketing and for "a better understanding of how recreation markets are working," (LaPage, 1977, p. 81). Study of public and private outdoor recreation markets should improve our understanding of these markets, and examination of the socioeconomic characteristics of recreation participants will provide useful information for marketing efforts. Finally, understanding user needs that are currently being met on public and private lands may provide information to assist future public recreation allocation decisions between public and private markets.

CHAPTER III

RESEARCH METHODOLOGY AND HYPOTHESES

Research Methodology

The data analyzed in this study were part of the Michigan 1976 Recreation Survey data base collected by the Michigan Department of Natural Resources. The year long telephone survey was conducted to provide information to develop the State Comprehensive Outdoor Recreation Plan (SCORP). A summary of the survey design and limitations is presented herein. Complete details of the survey procedures may be found in the "Michigan 1976 Recreation Survey Design and Application" (MDNR, 1977a).

Following the survey design summary is the research methodology used in this study. Included in the methods section are delineation of the study area, activity selection criteria, operational definitions, and data analysis procedures.

Survey Design

A telephone interview format was utilized to survey a sample generated from the Michigan resident population. Each week of the year a predetermined random sample of

Michigan households were contacted and recreational participation data were obtained from one randomly selected member within each chosen household. The number of samples per week for individual counties or groups of counties was determined according to their estimated 1975 populations. Sampling was slightly reduced in the three largest counties to allow a higher rate of sampling in less populated areas (see Appendix A for Sampling Rates). Phone numbers were randomly drawn weekly for each county based on the working blocks of numbers in each telephone exchange. The listing of sample household telephone numbers was randomized before interview calls were made. This survey resulted in a random sample of 17,781 Michigan residents and 73,902 recreation participations were recorded (MDNR, 1977a). Completed interviews were obtained from approximately 9,708 residents (54.6 percent completion rate).

Recreation participation information was obtained by reading the selected family member a definition of recreation and asking the respondent to specify any activities during the previous two weeks which fit the definition. The definition was:

For our survey we are defining recreation very broadly to include anything done mainly for pleasure or enjoyment, except inside the private home. This includes cultural and entertainment activities, as well as activities which are social, group, civic, craft and hobby oriented, as long as they are done mainly for pleasure or enjoyment outside a private home (MDNR, 1977a, p. 2).

Use of this definition was more expedient than reading a comprehensive list of activities, however, due to its broad nature a listing of over 200 specific activities was generated. In addition to recreation activity data, the respondent was asked for socioeconomic and detailed trip information.

A number of important points need to be emphasized concerning this survey design. The survey was conducted over a whole year giving us information on recreation participation across all seasons of the year. Since respondents were only asked to report their recreation activities for the previous two week period, recall problems were minimized. A longer period of time would likely be less accurate, however, the broad definition of recreation used and its open-ended nature may have resulted in an underestimation of participations for some activities.

One of the most significant inclusions in the survey was the procedure which established a linkage between the activity participation and the sector in which the activity occurred, such as commercial enterprise, local, state, or federal government, private individual and so on. This linkage has permitted further study of the relationship between the public and private sectors as recreation opportunity providers.

Limitations in the Data Base

There are limitations in the data base that should be recognized. The data was collected in 1976 and patterns of recreation use may have changed since the collection, especially with concern over energy, the economy, and other factors that influence recreation patterns. This study provides insights on recreation use patterns in 1976, and future comparisons to this study would be valuable for determining trends and changes in recreation use.

The telephone survey design suffers from all the drawbacks of this type of methodology, such as overrepresentation of middle and working class persons and underrepresentation of upper and lower class persons and certain minority groups (Field, 1973). According to Field, people may tend to overstate their recreation participation in such surveys. The nonresponse rate was 45.4 percent which included refusals and no-answer numbers. The possible bias associated with nonrespondents is unknown and could have significantly altered the findings. Finally, the broad definition of recreation utilized possesses inherent problems previously mentioned.

The Study Area

Although the completed telephone survey resulted in an extensive statewide collection of participation data, the study area for this project was limited to Southern Lower Michigan identified by the Michigan Department of Natural Resources as approximately Region III (delineated in

Figure 2). While most of the public land available for outdoor recreation is in the northern two thirds of the state, the majority of people reside in the southern lower portion. The densely populated urban portion is one of the primary foci of this study.

An important consideration was to include nonurban residents in the study area. Differences and similarities in recreational land use patterns between the urban and nonurban residents could then be examined. Southern Lower Michigan is comprised of the most populous areas in the state as well as many townships and counties which are predominantly rural. The contrast between these two user groups was expected to provide information which could ultimately improve the recreation resources available to all residents.

An additional reason for choosing this area was to coordinate it with other recreation land-use studies conducted in the same approximate region (see Westfall, 1975; Feltus, 1979; Lineback, 1980; and Westfall, 1980). These studies dealt primarily with supply aspects or land availability for recreation in this region. A study by Holecek, Willis, and Allen (1979) utilized nearly the same region and resulted in a preliminary examination of recreational use of public and private resources from the user's standpoint. This study continues that early work but concentrates on specific outdoor recreation activities.



Figure 2.--Southern Lower Michigan Study Area

Activity Selection

For the purpose of this study, only traditional outdoor recreation activities were selected for examination. Furthermore, they were chosen because they are resource base oriented and typically require large areas of land for participation. Some individual activities were grouped together for analysis because of their similarity and to increase the sample size for statistical analysis. The activities and activity groups selected from the 1976 recreation survey data base were: Hunting with a Firearm (big and small game); Fishing on Inland Lakes and Streams; Cross Country Skiing; Swimming on Inland Lakes, Streams, and the Great Lakes; Off-Road Vehicle Use (includes motorcycling, trail biking, or other); Snowmobiling; Picnicking Away From a Private Home; Camping-Vehicle; Camping-Tent; and Hiking-Nature Walking.

These activities were chosen for two other notable reasons. They were thought to be potentially applicable to provision in private markets, whereas other activities were provided predominantly by the private or the public sector. Finally, they were selected because sufficient participation responses were recorded to conduct the appropriate statistical analysis.

Operational Definitions

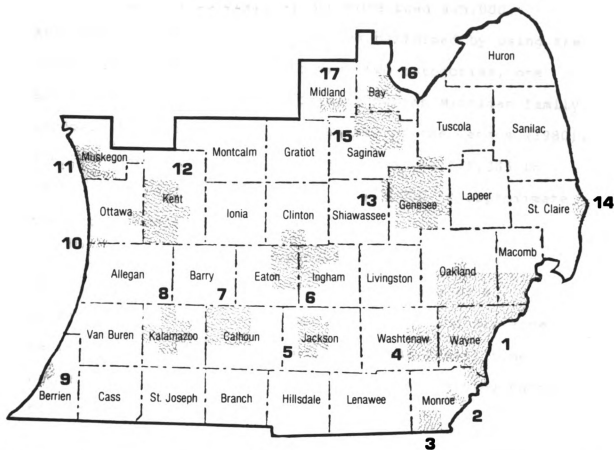
The definition of key variables used in this study are presented in this section. Age of the respondent was recorded in years at the last birthday. Education was recorded as the last grade completed. The respondent's sex was listed in conventional male-female format and length of each participation in outdoor recreation activities was recorded to the nearest half hour. Trip destinations were measured in travel time and descriptively by county (transformed to regions). Detailed definitions of other important variables follow below.

The variable of recreation provider sector requires further explanation. In the telephone survey, the provider of the recreation opportunity was denoted by the respondent based on the participation location, identifiable provider, or site where the activity occurred. These were recoded into two categories of participations: public sector and private sector recreation providers. Private sector recreation refers to opportunities provided by an individual, firm, or organization which is supported predominantly by nongovernmental revenues. Public sector recreation is defined as governmental provision of recreational opportunities and services supported primarily by taxation. The specific inclusions in each of these categories are listed in Appendix B. Recreation provider sector was designated as the dependent variable for the statistical test procedures.

The respondent's residence was a key variable in studying the differences and similarities of participant's choice of recreation provider sector. This analysis was less concerned about the specific location of the activity participation, which occurred anywhere in or out of the state, than with residence of the participant. Residence was recorded at the city or township level. These were recoded into urban and nonurban categories based on U.S. Census Bureau criteria (see Appendix C). The urban and nonurban areas are denoted in Figure 3, and urban cities and townships in Southern Lower Michigan are listed in Appendix D.

Two other variables analyzed in this study, income and travel time to the respondent's destination, require some elaboration. Income information was gathered from the "head-of-household" or the respondent. Income was the combined total earnings of all wage earners in a family household or the income of only the respondent in a non-family household. Family households were defined as "one in which at least some of the members are related by a husband-wife and/or parent-child relationship" (MDNR, 1977a). Unrelated individuals or self-supporting related individuals were considered non-family households.

Gross income (total taxable income) was recorded in income categories. These categories were: less than \$5,000; \$5,000 to \$6,999; \$7,000 to \$9,999; \$10,000 to



Key

URBAN AREAS



Urban Area



Nonurban Area

1. Detroit
2. Monroe
3. Portion of Toledo Urban Area
4. Ann Arbor
5. Jackson
6. Lansing - E. Lansing
7. Battle Creek
8. Kalamazoo - Portage
9. Benton Harbor - St. Joseph
10. Holland
11. Muskegon - Muskegon Hts. - Norton Shores
12. Grand Rapids
13. Flint
14. Port Huron
15. Saginaw
16. Bay City
17. Midland

Figure 3.--Urban and Nonurban Areas in the
Southern Lower Michigan Study Area

\$14,999; \$15,000 to \$24,999; and more than \$25,000.

Analysis of the income variable was performed by using the above six categories or by forming two categories, one above and one below the approximate median Michigan family income. According to the U.S. Bureau of the Census (1980), the Michigan median family money income was \$15,385 in 1975. This study used a median of \$15,000 to approximate the actual median income.

Travel time from a respondent's origin to his destination was used as a proxy for distance to a recreation site. It may in fact represent the distance variable in more meaningful terms because travel time rather than distance is in many cases the limiting factor to recreation participation.

Travel time was recorded differently on the survey instrument depending on the activity type: day trip, overnight trip, or miscellaneous activities. The activities chosen for study were distributed in all three activity types, but the specific types were not individually examined. Day trips were recorded to the nearest minute. Overnight trips were rounded to the closest hour on the survey instrument and recoded to minutes in this study for consistency. The miscellaneous type had a zero travel time registered because they took place less than 30 minutes from home, occurred on non-recreation trips, had no specific destination, or occurred

outdoors around the home. This may have resulted in an underestimation of actual travel time.

Analysis of the Data

The data used for analysis was received on magnetic tape from the Michigan Department of Natural Resources, Recreation Services Division. Processing of data was done at the Michigan State University Computer Laboratory on a CDC Cyber 750 computer system. The data processing was essentially a two-step process. The first step involved implementation of a series of Fortran programs to establish files on individual participants and total participations for each of the activities in the study.

The second step was to statistically analyze the data using the Statistical Package for the Social Sciences (SPSS). SPSS is a system of statistical techniques and procedures conveniently packaged for social science research. Two statistical test routines were applied to the sample data: crosstabulations with chi-square as the test of statistical significance and t-tests. A .05 level of significance was selected for hypothesis testing.

Hypotheses

Based on a review of pertinent literature and the possibilities presented in the available data base, several hypotheses were developed for statistical testing. These hypotheses follow directly from the stated objectives of

this study introduced in Chapter I. The hypotheses are designed to test for significant differences between users of public and private outdoor recreation resources and between urban and nonurban residents.

Hypothesis 1: Public and Private Sector
Participant Characteristics

The first hypothesis addresses the differences and similarities between users of public and private outdoor recreation opportunities. Traditional beliefs hold that differences exist between the users of public and private sector recreation resources. For instance, higher income earners are generally believed to be the predominant users of private resources. The previous chapter indicated that high income earners often chose the private sector when recreation use was examined within broad activity groupings. The activity groupings were comprised of many diverse activities possibly masking the true role of income in the selection of public versus private sector provided opportunities. Potential relationships between choice of provider sector and other social characteristics were also noted but these were not statistically tested. The strength of these relationships and applicability to specific outdoor recreation activities remains to be tested.

The literature review furthermore indicated some possible discrepancies in the theory that differences exist

between public and private participants, particularly for outdoor recreation activities. Outdoor recreation participants may be able to afford both publicly and privately provided opportunities regardless of level of income because recreation fees are usually only a small percentage of the participation cost. Many private landowners permit free use of their land for outdoor recreation and much public land is available for free use. When fees are charged, the rise in real incomes has made both public and private alternatives attainable to more participants. These factors suggest income and other demographic characteristics may not be constraints on choosing between public and private sector opportunities.

The following hypothesis investigates the statistical significance of socioeconomic characteristics of users in their choices of public or private sector providers. Ten individual outdoor recreation activities are examined. Since urban and nonurban residents usually have differing outdoor recreation opportunities available, the test is also applied to participants while holding residence constant. This diminishes the influence residence may have on the socioeconomic variables being examined. The test statistic applied is chi-square with a significance level of .05.

Hypothesis 1:

- H_1 : There are differences in the socioeconomic characteristics of participants in public and private sector provided outdoor recreational activities.
- H_0 : There are no differences in the socioeconomic characteristics of participants in public versus private sector provided outdoor recreational activities.

Hypothesis 2: Residence and Use of the Public or Private Sector

The second hypothesis tests the relative roles of public and private sector provided outdoor recreation opportunities in serving urban and nonurban residents. Current evidence suggests nonurban residents make greater use of private outdoor recreation opportunities than do urban residents. Since outdoor recreation, as defined, depends on large areas of land, such activities generally are expected to be located in closer proximity to nonurban residents. Intuitive reasoning suggests private resources are more accessible to the nonurbanite, both in travel time and ease of obtaining permission to use them. Knowledge of the availability of private land for recreation is an advantage nonurban residents seemingly possess given the proximity of resources to participants.

An additional factor associated with knowledge of availability is the permission or consent required of landowners to utilize private land for recreation. Landowner studies (Feltus, 1979) have shown some reluctance on the part of private owners to allow access to every user. Urban residents especially may be confronted with access difficulties.

These limitations of access primarily concern informal¹ recreation areas. Established recreation sites, public and private, are assumed to be accessible to all users, and furthermore, information of their existence is assumed to be available to everyone. Unfortunately, limitations in this study do not allow the separation of informal areas from established recreation sites. Thus, this examination focuses on use of combined areas by urban and nonurban residents. The variables are compared for ten individual outdoor recreation activities using a chi-square statistical test and a significance level of .05.

Hypothesis 2:

H₁: Nonurban residents participate more in private sector provided outdoor recreation opportunities

¹Informal recreation area is used in this context to refer to areas with recreation potential but not formally designated as such. The site may not be developed for recreation or recreation may be a secondary use of the land. Hunting on farmland is an example of such a use of informal recreation areas.

than urban residents, and urban residents participate more in public sector provided opportunities.

H_0 : There are no differences in consumption of private and public sector provided recreation opportunities between urban and nonurban residents.

The final two hypotheses examine the relationship of travel time to urban and nonurban populations and the relationship of travel time to the use of public and private sector resources. Travel time is used as a substitute for distance because of the survey design and because, as noted earlier, travel time may be a better measure of how users perceive distance.

Hypothesis 3: Travel Time and Use of the Public or Private Sector

The first hypothesis examining travel time analyzes the relation of travel time to the use of public and private sector recreation sites for ten outdoor recreation activities. This hypothesis was developed from the knowledge that many of our public outdoor recreation sites are located away from densely populated areas. Consequently, the user must travel further to utilize public sector outdoor recreation opportunities than private ones. This has not been shown using actual use patterns although the relationship is suspected.

The survey data responses of public and private sector participants are compared using the t-test. A significance level of .05 was selected.

Hypothesis 3:

H_1 : Travel time to outdoor recreation sites is higher for participants at public sector locations than for participants at private sector locations.

H_0 : There is no difference in travel time between outdoor recreation participants in the public and private sector.

Hypothesis 4: Travel Time and Residence

The relationship between travel time by urban versus nonurban outdoor recreation participants is the final hypothesis examined. Many of our outdoor recreation resources are thought to be located outside urban areas because they are dependent on large areas of open space. The premise that urban residents expend more time to reach outdoor recreation participation locations than nonurbanites is examined. If the difference between the two population groups is substantial, perhaps we need to look closely at techniques to provide more opportunities near users. The relationship is tested utilizing the t-test and a .05 level of significance.

Hypothesis 4:

H_1 : Urban residents spend more time traveling than nonurbanites to reach outdoor recreation activity locations.

H_0 : There is no difference in travel time to outdoor recreation activity locations between urban and nonurban residents.

CHAPTER IV

GENERAL FINDINGS

In this chapter, a general analysis of the characteristics of participants in outdoor recreation activities for the Southern Lower Michigan study area is presented. Summary statistics are also used to summarize pertinent characteristics for all participations in selected recreation activities. The relative importance of the public and private sectors is examined, socioeconomic characteristics of users of public versus private sector recreation opportunities are compared, and differences are discussed. The general findings conclude with the development of travel profiles for urban and nonurban residents. The travel patterns are depicted in two formats: trip distance measured in travel time and by destination zones.

Characteristics of Recreation Participants and Participations

The survey data were collected and formatted in a manner to allow examination of participant and participation characteristics. Analysis of participation characteristics included all participations in a specific activity. These were employed primarily to obtain trip

and travel information, such as, travel time to recreation locations. Analysis of participant characteristics includes only one participation per participant and was used when socioeconomic characteristics of participants were examined. The number of cases analyzed in both circumstances are listed in Table 3 for the ten outdoor recreation study activities.

Calculation of the mean number of participations per participant for each activity (see Table 3) reveals that participants partake extensively in outdoor recreation activity. Considering the recall period for survey respondents was only two weeks, an average of 2.7 participations for each participant was recorded for all activities combined. Hunting, swimming, off-road vehicle, and camping-vehicle participants averaged over three participations per participant. Fishing, cross country skiing, snowmobiling, and camping-tent participants ranged between 2.6 and 2.8 participations. These are substantial means considering the length of travel time often required before participating in these activities. Picnicking participants deviate sharply from other participants, but they did average more than one participation during the two week recall period. It should also be noted that many of these activities are seasonal, concentrating the participations over a few months or seasons.

**Table 3.--Number of Sample Participants and Participations
Recorded in the 1976 Telephone Survey and Mean
Participations per Participant for Ten Outdoor
Recreation Activities**

<u>Activity</u>	<u>Total Number of Participants in Sample Data</u>	<u>Total Number of Participations in Sample Data</u>	<u>Mean Number of Participations Per Participant</u>
Hunting	248	824	3.3
Fishing	521	1,376	2.6
Hiking	327	773	2.4
Cross Country Skiing	21	57	2.7
Swimming	469	1,448	3.1
Off-Road Vehicle	132	411	3.1
Snowmobiling	219	604	2.8
Picnicking	279	393	1.4
Camping-Tent	105	286	2.7
Camping- Vehicle	171	587	3.4
All Activities	2,492	6,759	2.7

In general, the socioeconomic characteristics of participants in outdoor recreation activities exhibit considerable variability (see Table 4). The average age of participants in individual activities ranges from twenty-one (swimming) to thirty-four (camping-vehicle), with a mean age of twenty-eight for all activities combined. Swimming, off-road vehicle, and camping-tent participants have a mean age considerably below the overall mean while participants in hunting, fishing, and camping-vehicle have a higher mean age.

The sex of participants is variable but males generally appear to be more extensively involved in outdoor recreation activities. Males comprise over 58 percent of all participants for the ten activities. Hiking, swimming, and picnicking indicate a slightly greater percentage of female participants. Males participate in fishing, off-road vehicles, and snowmobiling much more than females, and over 91 percent of hunting participants are male.

Education is the least variable socioeconomic characteristic measured with an overall mean of ten years. Only hunting participants (12 years) and cross country skiing participants (14 years) exhibit a higher mean education. Skiing should be cautiously interpreted due to the small number of cases available for analysis. Swimming participants (9 years) have a slightly lower mean education compared to the mean of all ten activities

Table 4.--Socioeconomic Characteristics of Participants
for Ten Outdoor Recreation Activities, 1976

<u>Activity</u>	<u>Mean Age¹ (Years)</u>	<u>Sex¹ (% Male)</u>	<u>Mean Education¹ (Years)</u>	<u>Income¹ (% Greater Than \$15,000)</u>	<u>Residence (% Urban)</u>
Hunting (N=248)	32	91.1%	12	44.2%	26.2%
Fishing (N=521)	33	71.2	10	39.3	29.8
Hiking (N=327)	28	46.2	10	52.2	36.7
Cross Country Skiing (N=21)	32	52.4	14	47.3	42.9
Swimming (N=469)	21	42.6	9	48.3	34.8
Off-Road Vehicle (N=132)	23	65.9	10	54.1	28.0
Snowmobiling (N=219)	26	63.9	10	48.9	21.5
Picnicking (N=279)	28	40.6	10	36.5	38.0
Camping- Tent (N=105)	23	50.5	10	41.3	45.7
Camping- Vehicle (N=171)	34	55.6	10	45.5	27.5
All Activities (N=2492)	28	58.1%	10	45.2%	32.0%

¹Missing data were excluded.

combined. Since the mean age of swimmers is considerably less than for most of the other activities, the swimming population would be expected to include a higher percentage of individuals with less education.

The percent of high income earners is above 50 percent for hiking and off-road vehicle participants. A relatively low percentage of fishing, picnicking, and tenting participants are high income earners when compared to the percentage of participants earning more than \$15,000 in all activities combined. In general, the median income of outdoor recreation participants in this sample data falls below the statewide median income of slightly over \$15,000.

A relatively low percentage (32%) of outdoor recreation participants are urban residents. Cross country skiing and camping-tent participants indicate the highest percentages of urban residents, but they are both under 50 percent. The consistently low urbanite participant percentage may be due to a variety of reasons, including, distance to recreation sites, environmental differences, limited knowledge about outdoor recreation activities, or differences in preferences. Unfortunately, the specific reasons could not be determined from this data base.

The occupational distribution of participants for the ten outdoor recreation activities is presented in Table 5. Students comprise a large percentage of all participants, however, most respondents between the age of

Table 5.--Occupational Distribution of Participants for Ten Outdoor Recreational Activities, 1976

Activity	Occupation (percent)							
	<u>Laborer</u>	<u>Farmer</u>	<u>Profes- sional</u>	<u>Service Worker</u>	<u>Craftsman</u>	<u>Manager or Proprietor</u>	<u>Home- maker</u>	<u>Clerical</u> <u>Student</u>
Hunting (N=225)	28.0	4.4	18.2	7.1	8.4	6.2	3.6	2.2 21.8
Fishing (N=416)	17.3	1.2	15.9	9.6	6.7	7.7	8.2	3.8 29.6
Hiking (N=279)	9.7	0.4	18.3	7.5	2.5	3.2	13.6	6.5 38.4
Cross Country Skiing (N=19)	0.0	0.0	38.6	0.0	0.0	10.5	10.5	10.5 31.6
Swimming (N=376)	6.4	0.5	13.6	10.4	1.9	4.0	12.5	5.6 45.2
Off-Road Vehicle (N=124)	19.4	0.0	11.3	7.3	3.2	3.2	6.5	4.8 44.4
Snowmobiling (N=191)	13.6	4.2	9.9	7.3	9.4	5.2	8.4	3.1 38.7
Picnicking (N=215)	8.8	0.5	13.5	14.4	2.8	4.2	14.0	9.8 32.1
Camping- Tent (N=88)	10.2	0.0	14.8	4.5	6.8	3.4	10.2	4.5 45.5
Camping- Vehicle (N=143)	18.2	0.7	12.6	9.8	7.0	8.4	13.3	5.6 24.5
All Activities (N=2076)	14.0	1.3	14.9	9.0	5.0	5.3	10.2	5.2 35.1

four and twenty-one were classified as students. Laborers and professionals are the next largest groups with farmers comprising the smallest group of participants.

Comparisons can be made indicating the relative propensity of participants to participate in the various activities within occupational categories. For instance, comparing individual activity percentages to the overall percentages within occupations, farmers pursue hunting and snowmobiling to a greater extent than the combined percentage of all ten activities. Farmers exhibit limited participation in hiking, cross country skiing, off-road vehicle, and camping-tent. Laborers participate extensively in hunting, fishing, off-road vehicle, and camping-vehicle. The percentages of students participating in swimming, off-road vehicle, and camping-tent are higher than the percentage of students in all activities combined, while homemakers and clerical workers are not extensively involved in hunting. Several occupational groups reveal zero cross country skiing participants, indicative of the relative newness of this activity in 1976. Similar comparisons can be made within other occupational categories.

An examination of all outdoor recreation participations focused on travel and trip characteristics (see Table 6). The mean travel time and percentage of participations in the private sector are two parameters with noteworthy implications. Generally, users appear

**Table 6.--Travel and Trip Characteristics of All
Participations for Ten Outdoor Recreation
Activities, 1976**

<u>Activity</u>	<u>Mean Length of Participation (Hours)</u>	<u>Mean Travel Time From Residence to Activity Site (Minutes)</u>	<u>Percentage Provided by the Private Sector</u>	<u>Percentage of Trips Overnight</u>
Hunting (N=824)	4.3	60	76%	22.3%
Fishing (N=1376)	3.3	68	54	31.2
Hiking (N=773)	2.1	220	45	43.2
Cross Country Skiing (N=57)	2.6	41	56	14.0
Swimming (N=1448)	2.1	69	51	33.0
Off-Road Vehicle (N=411)	2.3	46	76	16.8
Snowmobiling (N=604)	3.0	62	69	23.3
Picnicking (N=393)	2.6	238	32	19.6
Camping- Tent (N=286)	N.A.	288	36	91.6
Camping- Vehicle (N=587)	N.A.	412	54	99.5

N.A. - Not Applicable

to participate extensively in private sector outdoor recreation opportunities. Only hiking, picnicking, and camping-tent reveal more use of public sector facilities. These three activities also exhibit exceptionally high average travel time by users--over three and one-half hours. The travel time for picnicking may be misleading, in that, picnicking may have been part of other activity packages. Camping-vehicle is an exception to this general pattern, indicating very high mean travel time but more even use of public and private resources.

The mean travel times for the remaining six activities range between forty and seventy minutes and participation occurs in predominantly private sector opportunities. This suggests many private outdoor recreation resources are available near participants, however, participants in fishing, cross country skiing, and swimming indicate nearly equivalent use of the public and private sectors.

As one would expect, participants in vehicle camping stayed overnight nearly 100 percent of the time with tent camping following closely behind at nearly 92 percent. The mean length of participation indicates hunting and fishing participants participate somewhat longer than other activity users. The remaining activities are closely clustered in relation to the time spent participating, but all average over two hours per participation. Participation length was meaningless for the camping activities based on the measurement units employed.

Characteristics of Participants in
the Public and Private Sectors

A closer examination of respondents' selection of public and private sector recreation resources was desired to gain more insight into use of the two sectors. Substitution between sectors could also be examined. The results (see Table 7) indicate very high utilization of the private sector by participants in hunting, snowmobiling, and off-road vehicles. These are relatively intensive recreational uses but do not necessarily require extensive facilities or land development. Participants in picnicking, and to a lesser extent camping-tent, swimming, and hiking, exhibit high utilization of public resources.

An indication of public and private sector recreation resource substitution by participants is presented in the last column of Table 7. It is noteworthy that less than 10 percent of participants utilized both the public and private sector for these ten activities. Less than 5 percent of the participants utilized both sectors in six of the activities, including, fishing, hiking, swimming, off-road vehicle, and picnicking, and camping-tent was under 1 percent. This indicates a significant lack of use of different sectors within the limited time frame of this study. The short, two week recall period may have affected the results if users participated only once in a given activity, however, outdoor recreation participants averaged

Table 7.--Percentage of Participants Utilizing Public,
Private, or Both Sectors for Ten Outdoor
Recreation Activities, 1976

<u>Activity</u>	<u>Percentage of Participants Utilizing Only the Public Sector</u>	<u>Percentage of Participants Utilizing Only the Private Sector</u>	<u>Percentage of Participants Utilizing Both the Public and Private Sector</u>
Hunting (N=248)	23.0%	71.0%	6.0%
Fishing (N=521)	45.9	49.5	4.6
Hiking (N=327)	52.9	42.8	4.3
Cross Country Skiing (N=21)	52.4	38.1	9.5
Swimming (N=468)	53.6	41.9	4.5
Off-Road Vehicle (N=132)	32.6	64.4	3.0
Snowmobiling (N=219)	25.6	67.1	7.3
Picnicking (N=279)	65.6	32.3	2.1
Camping- Tent (N=105)	56.2	42.9	0.9
Camping- Vehicle (N=171)	42.7	51.5	5.8

nearly three participations for each activity except picnicking (Table 3).

Interpretation of these results should be judicious and not taken to imply participants never use alternative provider sectors. Furthermore, the extent to which personal preference, supply, price, or other factors influence the choice of one or more sectors remains unknown. These results do provide some real data indicating limited alternation between the public and private sectors by participants in selected outdoor recreation activities.

Selected socioeconomic characteristics of participants in the public sector were compared with private sector outdoor recreation participants to provide general information on the differences and similarities of users. Formal hypothesis testing to assess the statistical significance of the findings are presented in Chapter V. In these general results and the associated statistical tests, respondents were divided into two groups of either public or private sector participants. If a respondent partook in both dichotomous sectors, the social and economic characteristics of that person were included within each group. Less than 10 percent of the respondents participated in more than one sector as previously indicated.

The socioeconomic comparisons of public and private participants are presented in Table 8. Wide variability in the mean age, sex, and mean education of participants are revealed between public and private recreation users, and no consistent patterns emerge. Income of participants exhibits a more consistent relationship. A higher percentage of participants with incomes greater than \$15,000 chose private opportunities than public for seven of the ten activities. Only users of public snowmobiling and public vehicle camping facilities possessed a greater percentage of participants with income over \$15,000 when compared to private users in these activities. Camping-tent participants exhibit no income differences.

A comparison of the residence of participants in the public and private sectors (see Table 9) is presented to gain more understanding of recreation participant characteristics. The relative importance of the two sectors to urban and nonurban residents is examined in Chapter V. These results reveal some general relationships. A higher percentage of nonurbanites compared to urbanites utilizing recreation resources in both sectors is readily apparent. Only camping-tent participants in the public sector deviate from this pattern.

Every activity except camping-vehicle has a greater percentage of urban residents utilizing public resources

Table 8.--Comparison of Socioeconomic Characteristics
Between Participants in the Public and Private
Sector for Ten Outdoor Recreation Activities, 1976

<u>Activity</u>	<u>Mean Age¹ (Years)</u>		<u>Sex¹ (% Male)</u>		<u>Mean Education¹ (Years)</u>		<u>Income¹ (% Greater Than \$15,000)</u>	
	<u>Pub.</u>	<u>Pri.</u>	<u>Pub.</u>	<u>Pri.</u>	<u>Pub.</u>	<u>Pri.</u>	<u>Pub.</u>	<u>Pri.</u>
Hunting (N=263)	34	31	90	91	11	12	40	45
Fishing (N=545)	32	34	75	69	10	10	37	43
Hiking (N=341)	28	29	48	44	10	10	49	58
Cross Country Skiing (N=23)	30	34	38	60	14	14	33	67
Swimming (N=489)	21	22	41	44	9	9	45	52
Off-Road Vehicle (N=136)	27	22	55	72	12	10	50	55
Snowmobiling (N=235)	29	25	69	61	11	9	57	46
Picnicking (N=285)	26	33	38	46	9	11	35	38
Camping- Tent (N=105)	25	21	57	43	11	8	42	42
Camping- Vehicle (N=181)	33	34	57	53	10	10	46	44

¹Missing data were excluded.

**Table 9.--Percentage of the Public and Private Sectors
Utilized by Urban and Nonurban Residents for
Ten Outdoor Recreation Activities, 1976**

<u>Activity</u>	<u>Sample Size¹</u>	<u>Public Sector</u>		<u>Private Sector</u>	
		<u>Urban</u>	<u>Nonurban</u>	<u>Urban</u>	<u>Nonurban</u>
Hunting	(Pu:N=72) (Pr:N=191)	33%	67%	25%	75%
Fishing	(Pu:N=263) (Pr:N=282)	32	68	27	73
Hiking	(Pu:N=187) (Pr:N=154)	42	58	29	71
Cross Country Skiing	(Pu:N=13) (Pr:N=10)	46	54	40	60
Swimming	(Pu:N=272) (Pr:N=217)	35	65	34	66
Off-Road Vehicle	(Pu:N=47) (Pr:N=89)	43	57	21	79
Snowmobiling	(Pu:N=72) (Pr:N=163)	26	74	20	80
Picnicking	(Pu:N=189) (Pr:N=96)	42	58	30	70
Camping-Tent	(Pu:N=60) (Pr:N=46)	60	40	28	72
Camping- Vehicle	(Pu:N=83) (Pr:N=98)	23	77	30	70

¹Pu - Public Sector
Pr - Private Sector

than urbanites using private resources. Conversely, a higher percentage of nonurbanites use private sector resources than public sector resources except for camping-vehicle participants. Swimming participants in the public and private sector exhibit nearly identical percentages of urban and nonurban residents. The most variation in residence between the two sectors is indicated by camping-tent participants. Sixty percent of public sector tenting participants were urbanites but only 28 percent of private sector participants were urban residents--a 32 percent difference.

Recreation Travel Profiles

Travel profiles for urban and nonurban outdoor recreation participants are presented in the following two tables. The travel profiles are depicted in two formats. First, a descriptive profile has been developed arranging destinations by regions or zones including the Southern Lower Michigan study area region. The second travel profile was developed with increasing travel time zones for urban and nonurban residents.

The first travel profile, arranged by travel destination zones (see Table 10), shows a dominant use of Southern Lower Michigan for most activities by both urban and nonurban residents. Nonurban tent and vehicle camping participants do not fit this pattern, and less than 50 percent of urban hunting, camping-tent, and camping-vehicle

Table 10.--Percentage of Urban and Nonurban Resident Participations by Travel Destination Zones for Ten Outdoor Recreation Activities, 1976

Activity	Residence	Trip Destination ¹ (percentage of total)					
		So. Lower Mich.	No. Lower Mich.	Upper Peninsula Michigan	Other Great Lake States (IL, IN, MN, OH, WI)	Other U.S.	Canada ²
Hunting	Urban (N=175)	66.9	33.1	0.0	0.0	0.0	0.0
	Nonurban (N=649)	81.8	12.0	4.6	0.0	1.5	0.0
Fishing	Urban (N=377)	65.0	33.2	0.0	0.5	0.0	1.3
	Nonurban (N=999)	73.3	18.1	3.5	1.9	1.1	2.1
Hiking	Urban (N=248)	46.4	30.2	7.3	1.2	12.5	2.4
	Nonurban (N=525)	67.2	21.5	3.6	1.0	5.7	0.0
Cross Country Skiing	Urban (N=13)	84.6	15.4	0.0	0.0	0.0	0.0
	Nonurban (N=44)	88.6	11.4	0.0	0.0	0.0	0.0
Swimming	Urban (N=467)	63.2	27.4	6.2	0.6	2.6	0.0
	Nonurban (N=981)	74.0	19.3	4.1	1.4	1.2	0.0
Off-Road Vehicle	Urban (N=64)	56.2	34.4	1.6	4.7	1.6	1.6
	Nonurban (N=347)	88.5	10.1	0.3	0.3	0.0	0.9
Snowmobiling	Urban (N=120)	58.3	40.0	1.7	0.0	0.0	0.0
	Nonurban (N=484)	80.0	18.0	1.6	0.0	0.4	0.0
Picnicking	Urban (N=154)	76.0	4.5	0.6	1.9	13.6	3.2
	Nonurban (N=239)	81.6	7.5	5.0	4.2	1.3	0.4
Camping-Tent	Urban (N=151)	41.7	29.1	2.0	1.3	18.5	7.3
	Nonurban (N=134)	37.3	41.8	8.2	3.0	9.7	0.0
Camping-Vehicle	Urban (N=184)	48.4	30.4	4.9	3.3	11.4	1.6
	Nonurban (N=403)	21.6	45.7	15.4	9.2	6.7	1.5

¹Less than 1% of participations occurred in other countries, excluding Canada.

²More than 90% of Canadian destinations were in the Province of Ontario.

participants remained in Southern Lower Michigan. As one would expect, the second highest percentage of outdoor recreation participations was recorded in Northern Lower Michigan, aside from nonurban tent and vehicle camping participants which recorded the highest percentage of participation in this zone. Trip destinations to Michigan's Upper Peninsula were limited as were those to Other Great Lake States and Canada. Nonurban camping-vehicle participants indicate the highest percentage of trips to the Upper Peninsula (15.4%) and to Other Great Lake States (9.2%). Travel to other parts of the United States was high for urban hikers (12.5%), urban picnicking participants (13.6%), urban tent campers (18.5%), and urban vehicle campers (11.4%).

A comparison of urban and nonurban resident travel patterns indicates a smaller percentage of urbanite than nonurbanite participation in Southern Lower Michigan, except for the camping activities. A higher percentage of participations by urban residents in Northern Lower Michigan was indicated for all activities except picnicking, camping-tent, and vehicle camping. In these activities nonurbanites recorded a higher percentage of participations in Northern Lower Michigan. It is also interesting to note that over 98 percent of the participations by urban and nonurban hunting, cross country skiing, and snowmobiling participants and urban fishing

participants occurred within Michigan. For many of the activities studied which did have out-of-state participations, urban residents often exhibited a greater percentage of participation outside of Michigan than nonurbanites.

The second form of travel profile is presented with outdoor recreation trip distances measured in travel time. Time zones were established to permit a finer breakdown of travel destinations than the broad descriptive regions presented in Table 10. As in the descriptive travel profiles, these are divided into urban and nonurban residents to assess the similarities and differences among the two groups.

The travel profiles (see Table 11) for urban and nonurban residents indicate relatively high use of many outdoor recreation resources within a short travel time for many of the activities studied. Only swimming, picnicking, camping-tent, and camping-vehicle participants did not utilize resources close to residences (within thirty minutes travel time) as extensively as further away resources. It was not possible to determine if this was due to participant preferences, lack of resources near residences, or other factors.

Urban fishing participants exhibit a classical distance decay function since participations decline from zone to zone with increasing distance. In other activities

Table 11.--Percentage of Urban and Nonurban Resident Participations by Travel Time Zones for Ten Outdoor Recreation Activities, 1976

Activity	Residence	Less Than 30 Minutes	Travel Time Zone (percentage of Total)				
			Less Than 1 Hour	Less Than 2 Hours	Less Than 3 Hours	Less Than 4 Hours	More Than 4 Hours
Hunting	Urban (N=175)	55.4	9.1	13.1	12.6	5.1	4.6
	Nonurban (N=649)	78.7	3.5	4.2	4.0	3.1	6.5
Fishing	Urban (N=377)	43.0	21.8	16.7	9.8	5.8	2.9
	Nonurban (N=990)	72.6	6.2	6.1	6.6	3.2	5.1
Hiking	Urban (N=235)	37.4	15.3	12.3	9.8	5.5	19.6
	Nonurban (N=503)	63.4	5.4	7.5	9.9	5.0	8.8
Cross Country Skiing	Urban (N=13)	0.0	69.2	0.0	15.4	15.4	0.0
	Nonurban (N=44)	0.0	84.1	0.0	2.3	4.5	9.1
Swimming	Urban (N=467)	8.6	30.0	34.0	12.6	9.8	5.0
	Nonurban (N=981)	9.6	27.5	30.9	15.0	11.6	5.4
Off-Road Vehicle	Urban (N=64)	42.2	4.7	10.9	15.6	10.9	15.7
	Nonurban (N=347)	85.6	2.0	2.6	4.3	3.2	2.3
Snowmobiling	Urban (N=120)	49.2	10.0	10.8	13.3	7.5	9.2
	Nonurban (N=481)	78.8	4.6	5.4	5.6	4.0	1.4
Picnicking	Urban (N=153)	3.9	28.8	22.9	16.3	13.1	15.0
	Nonurban (N=239)	5.4	27.2	32.6	11.7	7.9	15.1
Camping-Tent	Urban (N=136)	3.7	31.6	11.0	14.0	12.5	27.2
	Nonurban (N=124)	16.1	18.5	21.8	20.2	13.7	9.7
Camping- Vehicle	Urban (N=165)	0.0	33.3	26.7	15.2	11.5	13.3
	Nonurban (N=376)	0.8	19.9	17.8	18.9	10.4	32.2

such as hunting and snowmobiling, participants almost exhibit a similar distance decay, but many activities indicate irregular response to increasing travel distances.

Comparing urban and nonurban resident travel patterns, every activity reveals a higher percentage of nonurban residents utilizing recreation resources within thirty minutes travel time than urban residents. In general, urbanites exhibit greater percentages of participation in the higher time zones for many activities, however, in the more than four hour travel time zone, nonurban participants disclose a slightly increased percentage of participation in some activities compared to urbanites. Participation by nonurbanites generally decreased more dramatically than urbanites when travel time exceeded thirty minutes. In swimming, picnicking, and the two camping activities, both urban and nonurbanite participations were low in the thirty minute time zone. The most interesting finding, however, is that nonurban residents appear to use more close-to-home outdoor recreation resources than urbanites.

The findings presented in this chapter provide a general understanding of the users of public and private sector outdoor recreation opportunities with a focus on urban and nonurban resident recreation use patterns. Integration of the findings reveals some interesting results. Among them, users generally participated in private opportunities in close proximity to their

residences, which may have lead to the extensive private sector use recorded. Use of public resources involves greater travel time leading to diminished use except for the hiking, picnicking, and camping activities.

In general, nonurban residents exhibit more private than public sector resource utilization and very high recreation participation within thirty minutes travel time. If we infer that extensive use is made of the private sector on adjacent or nearby land by nonurban residents, then considerable potential recreational opportunity may exist on private lands within Southern Lower Michigan. In contrast to nonurban residents, urbanites tend to utilize public sector resources more than private and travel longer to reach activity locations than nonurbanites. Urbanites also participate less in Southern Lower Michigan and in the overall state than nonurbanites.

These results cannot entirely explain the reasons for differences in urban and nonurban user groups. Preferences, cultural differences, greater accessibility by one group, knowledge of availability, or other factors may be involved. However, the findings do suggest the potential availability of a private sector recreation resource base within Southern Lower Michigan for a variety of activities. Such land opened to the public could reduce the travel time of urban residents to recreation sites and provide more recreational area within Michigan.

CHAPTER V

ANALYSIS OF THE HYPOTHESES

The statistical test results of the hypotheses outlined in Chapter III are presented in this chapter. Each hypothesis is restated followed by a discussion of the hypothesis test and associated test results. A .05 level of significance was used in the analysis, meaning there was a 5 percent chance of obtaining the measured association as a result of sampling error (Babbie, 1973). Thus, in five out of one hundred tests an erroneous conclusion may be drawn from the sample data.

Hypothesis 1: Public and Private Sector Participant Characteristics

Hypothesis 1: There are differences in the socioeconomic characteristics of participants in public and private sector provided outdoor recreational activities.

The chi-square test of statistical significance was used to test this hypothesis, and a null hypothesis was formulated which states there are no differences in the socioeconomic characteristics of participants in the public and private sector. The test was conducted on ten outdoor recreation activities and for four socioeconomic variables:

income, age, sex, and education. Income earned by participants was the variable of primary interest in this test; however, results for the other variables are also reported briefly.

The income variable was analyzed in three separate manners. The first procedure, presented in Table 12, divides public and private sector participants into two income groups: one above the approximate 1975 Michigan median family gross income and one below the median. The results indicate that no significant statistical difference exists in the income earned between participants in public and private sector outdoor recreation for any of the ten activities examined. These results are mitigated by the high number of missing observations, presumably attributable to a lack of response to this sensitive question. The effect of non-response on the resulting randomness of the remaining sample analyzed is not known; however, based on the available data, the null hypothesis cannot be rejected.

The second test of this hypothesis involved public and private sector participants grouped into the six income categories. This procedure gave a finer breakdown of the income variable. Based on the results (see Table 13), in which no activity indicated a significant relationship, the null hypothesis again cannot be rejected. These results should be cautiously interpreted due to the high non-

**Table 12.--Crosstabulation of Participants' Choice of
Provider Sector with Income for Ten Outdoor
Recreation Activities (Test 1)**

a. Hunting

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	27.9%	24.2%
Private	72.1	75.8
	100%	100%
	(N=122)	(N=95)
Chi-square	0.369	Significance 0.556
Degrees Freedom	1	Non-response 46

b. Fishing

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	49%	43.5%
Private	51	56.5
	100%	100%
	(N=241)	(N=161)
Chi-square	1.166	Significance 0.284
Degrees Freedom	1	Non-response 143

c. Hiking

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	60.4%	51.7%
Private	39.6	48.3
	100%	100%
	(N=134)	(N=149)
Chi-square	2.200	Significance 0.148
Degrees Freedom	1	Non-response 58

Table 12.--Continued

d. Cross Country Skiing

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	72.7%	40%
Private	27.3	60
	100%	100%
	(N=11)	(N=10)
Fisher's Exact Test Significance		0.118
Non-response		2

e. Swimming

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	59.6%	52.7%
Private	40.4	47.3
	100%	100%
	(N=198)	(N=186)
Chi-square	1.860	Significance 0.180
Degrees Freedom	1	Non-response 106

f. Off-Road Vehicle

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	41.5%	36.7%
Private	58.5	63.3
	100%	100%
	(N=53)	(N=60)
Chi-square	0.278	Significance 0.616
Degrees Freedom	1	Non-response 23

Table 12.--Continued

g. Snowmobiling

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	29.2%	39.4%
Private	70.8	60.6
	100%	100%
	(N=96)	(N=94)
Chi-square	2.193	Significance 0.148
Degrees Freedom	1	Non-response 45

h. Picnicking

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	68%	65.5%
Private	32	34.5
	100%	100%
	(N=147)	(N=84)
Chi-square	0.158	Significance 0.694
Degrees Freedom	1	Non-response 54

i. Camping-Tent

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	56.9%	56.8%
Private	43.1	43.2
	100%	100%
	(N=51)	(N=37)
Chi-square	0.0001	Significance 0.99
Degrees Freedom	1	Non-response 18

Table 12.--Continued

j. Camping-Vehicle

Provider Sector	Income	
	0-\$14,999	\$15,000 or More
Public	48.1%	50%
Private	51.9	50
	100%	100%
	(N=79)	(N=64)
Chi-square	0.051	Significance
Degrees Freedom	1	Non-response
		0.827
		38

Table 13.--Crosstabulation of Participant's Choice of
Provider Sector with Income for Ten Outdoor
Recreation Activities (Test 2)

a. Hunting

Provider Sector	Income					
	Less Than \$5,000	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	More Than \$25,000
Public	20%	54.5	27.3	25.9	23.3	27.3
Private	80%	45.5	72.7	74.1	76.7	72.7
	100%	100	100	100	100	100
	(N=20)	(N=11)	(N=33)	(N=58)	(N=73)	(N=22)
Chi-square	5.3156		Significance		0.3786	
Degrees Freedom	5		Non-response		46	

b. Fishing

Provider Sector	Income					
	Less Than \$5,000	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	More Than \$25,000
Public	40%	44	56	49.6	45.3	38.6
Private	60%	56	44	50.4	54.7	61.4
	100%	100	100	100	100	100
	(N=35)	(N=25)	(N=50)	(N=131)	(N=117)	(N=44)
Chi-square	4.1302		Significance		0.5308	
Degrees Freedom	5		Non-response		143	

Table 13.--Continued

f. Off-Road Vehicle						
Provider Sector	Income					
	Less Than \$5,000	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	More Than \$25,000
Public	28.6%	50	52.9	36	29.5	56.2
Private	71.4%	50	47.1	64	70.5	43.8
	100% (N=7)	100 (N=4)	100 (N=17)	100 (N=25)	100 (N=44)	100 (N=16)
Chi-square	5.6645		Significance		0.3403	
Degrees Freedom	5		Non-response		23	

g. Snowmobiling						
Provider Sector	Income					
	Less Than \$5,000	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	More Than \$25,000
Public	33.3%	27.3	22.7	31.6	41.1	33.3
Private	66.7%	72.7	77.3	68.4	58.9	66.7
	100% (N=6)	100 (N=11)	100 (N=22)	100 (N=57)	100 (N=73)	100 (N=21)
Chi-square	3.2465		Significance		0.6620	
Degrees Freedom	5		Non-response		45	

h. Picnicking						
Provider Sector	Income					
	Less Than \$5,000	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	More Than \$25,000
Public	80.8%	87.5	55.3	65.7	63.6	72.2
Private	19.2%	12.5	44.7	34.3	36.4	27.8
	100% (N=26)	100 (N=16)	100 (N=38)	100 (N=67)	100 (N=66)	100 (N=18)
Chi-square	8.2631		Significance		0.1423	
Degrees Freedom	5		Non-response		54	

Table 13.--Continued

i. Camping-Tent

Provider Sector	Income					
	Less Than \$5,000	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	More Than \$25,000
Public	57.1%	66.7	57.1	54.2	56	58.3
Private	42.9%	33.3	42.9	45.8	44	41.7
	100%	100	100	100	100	100
	(N=7)	(N=6)	(N=14)	(N=24)	(N=25)	(N=12)
Chi-square	0.3249		Significance		0.9971	
Degrees Freedom	5		Non-response		18	

j. Camping-Vehicle

Provider Sector	Income					
	Less Than \$5,000	\$5,000 to \$6,999	\$7,000 to \$9,999	\$10,000 to \$14,999	\$15,000 to \$24,999	More Than \$25,000
Public	66.7%	60	42.9	46.8	49.1	55.6
Private	33.3%	40	57.1	53.2	50.9	44.4
	100%	100	100	100	100	100
	(N=6)	(N=5)	(N=21)	(N=47)	(N=55)	(N=9)
Chi-square	1.5538		Significance		0.9068	
Degrees Freedom	5		Non-response		38	

response rate and the limited number of income categories above the median income of \$15,000. Discrete income categories above \$25,000 may have divulged an existing relationship.

The final procedure testing this hypothesis examined public and private sector participants and the two income groups (above and below the median Michigan family income) while controlling for residence. This reduced the influence of residence on the variables examined. The results of this test indicated no significant statistical relationships and this hypothesis could not be supported at the .05 significance level.

Test results for other socioeconomic variables, age, sex, and education of participants, indicated limited statistical significance. Off-road vehicle participants revealed significant relationships for all three variables. Supported at the .05 significance level were relationships indicating private sector off-road vehicle participants are likely to be younger and less educated than public sector participants. Also more males chose the private sector than the public sector. The only other significant relationships found were camping-tent participants in the private sector tended to be older and less educated than public sector participants. Aside from these results, no other differences could be supported. No relationships were revealed when the test controlled for residence.

One additional factor to note is the aggregation of activities or survey respondents which was necessary to obtain the desired sample size. This may have masked some differences and thus the results should be cautiously interpreted.

Hypothesis 1 Results: The overall conclusion drawn from the results is that there are minimal differences in the socioeconomic characteristics between participants in public and private sector outdoor recreation activities. The hypothesis tested is not supported at the .05 significance level.

Hypothesis 2: Residence and Use of
the Public or Private Sector

Hypothesis 2: Nonurban residents participate more in private sector provided outdoor recreation opportunities than urban residents, and urban residents participate more in public sector provided opportunities.

Testing this hypothesis involved the chi-square test of statistical significance. The null hypothesis was that no differences existed among urban and nonurban residents with respect to participation in public or private sector opportunities. This test was applied to all outdoor recreation participations for the ten study activities.

Results from this test are presented in Table 14, indicating statistically significant relationships for hunting, fishing, hiking, swimming, off-road vehicle,

**Table 14.--Crosstabulation of Participants' Choice of
Provider Sector with Residence for Ten Outdoor
Recreation Activities**

a. Hunting

Provider Sector	Residence		
	Urban	Nonurban	
Public	31.4%	22%	
Private	68.6	78	
	100%	100%	
	(N=175)	(N=649)	
Chi-square	6.6640	% Difference	9.4
Degrees Freedom	1	Phi	0.0899
Significance	0.0098	Non-response	0

b. Fishing

Provider Sector	Residence		
	Urban	Nonurban	
Public	55.4%	41.8%	
Private	44.6	58.2	
	100%	100%	
	(N=377)	(N=999)	
Chi-square	20.3980	% Difference	13.6
Degrees Freedom	1	Phi	0.122
Significance	0.0000	Non-response	0

Table 14.--Continued

c. Hiking

Provider Sector	Residence			
	Urban	Nonurban		
Public	69.4%	48.6%		
Private	30.6	51.4		
	100%	100%		
	(N=248)	(N=525)		
Chi-square	29.4252	% Difference	20.8	
Degrees Freedom	1	Phi	0.195	
Significance	0.0000	Non-response	0	

d. Cross Country Skiing

Provider Sector	Residence			
	Urban	Nonurban		
Public	53.8%	40.9%		
Private	46.2	59.1		
	100%	100%		
	(N=13)	(N=44)		
Chi-square	0.6821	% Difference	12.9	
Degrees Freedom	1	Phi	0.109	
Significance	0.4089	Non-response	0	

e. Swimming

Provider Sector	Residence			
	Urban	Nonurban		
Public	55.4%	46%		
Private	44.6	54		
	100%	100%		
	(N=466)	(N=981)		
Chi-square	11.1500	% Difference	9.4	
Degrees Freedom	1	Phi	0.0878	
Significance	0.0008	Non-response	1	

Table 14.--Continued

f. Off-Road Vehicle

Provider Sector	Residence			
	Urban	Nonurban		
Public	60.9%	17%		
Private	39.1	83		
	100%	100%		
	(N=64)	(N=347)		
Chi-square	57.4374	% Difference	43.9	
Degrees Freedom	1	Phi	0.374	
Significance	0.0000	Non-response	0	

g. Snowmobiling

Provider Sector	Residence			
	Urban	Nonurban		
Public	52.5%	25.8%		
Private	47.5	74.2		
	100%	100%		
	(N=120)	(N=484)		
Chi-square	31.9135	% Difference	26.7	
Degrees Freedom	1	Phi	0.230	
Significance	0.0000	Non-response	0	

h. Picnicking

Provider Sector	Residence			
	Urban	Nonurban		
Public	75.3%	63.2%		
Private	24.7	36.8		
	100%	100%		
	(N=154)	(N=239)		
Chi-square	6.3417	% Difference	12.1	
Degrees Freedom	1	Phi	0.127	
Significance	0.0118	Non-response	0	

Table 14.--Continued

i. Camping-Tent

Provider Sector	Residence			
	Urban	Nonurban		
Public	80.9%	44%		
Private	19.1	56		
	100%	100%		
	(N=152)	(N=134)		
Chi-square	41.8847	% Difference	36.9	
Degrees Freedom	1	Phi	0.383	
Significance	0.0000	Non-response	0	

j. Camping-Vehicle

Provider Sector	Residence			
	Urban	Nonurban		
Public	38%	49.1%		
Private	62	50.9		
	100%	100%		
	(N=184)	(N=403)		
Chi-square	6.2596	% Difference	-11.1	
Degrees Freedom	1	Phi	0.103	
Significance	0.124	Non-response	0	

snowmobiling, picnicking, and tent camping. The null hypothesis was rejected and the alternative hypothesis accepted for these activities. Only cross country skiing and camping-vehicle reveal insignificant relationships. The relatively small sample size for cross country skiing participations may have influenced the statistical findings for this activity.

The strength of the findings is indicated by Phi and the percentage difference between the independent variable (residence). Phi ranges from zero when no relationship exists to a value of +1 when the values are perfectly related. For the activities and variables analyzed, Phi ranges from weak (0.0878 for swimming) to somewhat strong (0.383 for tenting). In a two by two variable crosstabulation table as in this test, the percentage difference is a simple but good indication of the relative degree of relationship between two dichotomized variables (Blalock, 1972). This ranges from over 9 percent for hunting and swimming to more than 43 percent for off-road vehicles.

Hypothesis 2 Results: This hypothesis is supported at the .05 significance level for many outdoor recreation activities, including, hunting, fishing, hiking, swimming, off-road vehicle, snowmobiling, picnicking, and camping-tent. It is not supported for cross country skiing and camping-vehicle.

Hypothesis 3: Travel Time and Use of
the Public or Private Sector

Hypothesis 3: Travel time to outdoor recreation sites is higher for participants at public sector locations than for participants at private sector locations.

A t-test was used to test hypothesis 3 because travel time was recorded on an interval scale and the sample sizes for most activities were large. Differences in the mean travel times of recreation participants in the public and private sector were compared. The null hypothesis is that there are no differences in travel time between outdoor recreation participants in the public and private sector.

The results for the ten outdoor recreation activities in Table 15 provide strong evidence to reject the null hypothesis and accept the hypothesis that a relationship between the two variables exists. Statistically, more travel time was expended to reach public sector recreation locations than private sector recreation locations for hunting, fishing, hiking, cross country skiing, swimming, off-road vehicles, snowmobiling, and camping-tent.

Picnicking is the only activity revealing an insignificant relationship. Camping-vehicle reveals a significant statistical relationship indicating more travel time is expended on the average to reach private sector locations.

The reason for a difference in camping-vehicle and the other activities is not readily apparent from these

Table 15.--T-test Showing the Travel Time Differences
Between Users of the Public and Private Sectors
for Ten Outdoor Recreation Activities

<u>Activity</u>	<u>Provider</u>	<u>Mean Travel Time (Minutes)</u>	<u>T Value</u>	<u>Signif- icance</u>
Hunting	Public (N=198)	79	2.41	<.01
	Private (N=626)	53		
Fishing	Public (N=627)	80	2.70	<.01
	Private (N=749)	58		
Hiking	Public (N=427)	345	6.80	<.01
	Private (N=346)	67		
Cross Country Skiing	Public (N=25)	80	2.82	<.01
	Private (N=32)	9		
Swimming	Public (N=709)	84	3.95	<.01
	Private (N=738)	54		
Off-Road Vehicle	Public (N=98)	90	4.52	<.01
	Private (N=313)	33		
Snowmobiling	Public (N=188)	127	4.15	<.01
	Private (N=416)	32		
Picnicking	Public (N=267)	193	-1.38	N.S. ¹
	Private (N=126)	334		
Camping-Tent	Public (N=182)	351	4.31	<.01
	Private (N=104)	178		
Camping- Vehicle	Public (N=268)	261	-4.72	<.01 ²
	Private (N=319)	539		

¹Not Significant

²This activity is significant in showing more travel time is required to reach private sector locations than public.

results. A possible explanation might be that, since the private market for this type of camping experience is likely the most developed of any of the study activities, consumers may be willing to travel long distances to receive the benefits of private facilities. Winter camping at private campgrounds in the South may also explain the relationship. Furthermore, the mean travel time results may be skewed by a small proportion of long distance trips. Vehicle camping trips usually require more travel time to destinations for both public and private opportunities.

Hypothesis 3 Results: The hypothesis is supported at the .05 significance level for hunting, fishing, hiking, cross country skiing, swimming, off-road vehicle, snowmobiling, and camping-tent. Picnicking is not supported. Travel time was higher for camping-vehicle participants at private sector locations than public locations, and this is supported at the .05 significance level.

Hypothesis 4: Travel Time and Residence

Hypothesis 4: Urban residents spend more time traveling than nonurbanites to reach outdoor recreation activity locations.

The t-test was used to test this hypothesis. The null hypothesis states there is no difference in travel time to

recreation activity locations between urban and nonurban residents.

The results are summarized in Table 16, and they reveal somewhat consistent findings. Four activities, hunting, fishing, hiking, and cross country skiing reveal no significant statistical relationships. The remaining six activities are significant at the .05 level of significance. On an individual activity basis, these findings may have some notable policy implications. The urban resident picnicking travel time should be viewed with the previously stated explanations. The unusually high travel time may have resulted from definitional problems or picnicking being part of other activity packages.

The results indicate travel time is greater for urbanites than nonurbanites in every activity, although this is not statistically significant in four activities. Excessive travel time, accessibility limitations, or other constraints may have prevented greater use by urbanites and thus resulted in a lower mean travel time. The survey instrument was limited to measuring actual recreation use and not potential or latent use, but these important factors should be addressed in future studies.

Hypothesis 4 Results: The hypothesis is supported at the .05 significance level for swimming, off-road vehicle, snowmobiling, picnicking, camping-tent, and camping-vehicle. The results from hunting, fishing, hiking, and

**Table 16.--T-test Showing the Travel Time Differences
Between Urban and Nonurban Residents for Ten
Outdoor Recreation Activities**

<u>Activity</u>	<u>Residence</u>	<u>Mean Travel Time (Minutes)</u>	<u>T Value</u>	<u>Signif- icance</u>
Hunting	Urban (N=175)	71	1.53	N.S. ¹
	Nonurban (N=649)	56		
Fishing	Urban (N=377)	75	1.53	N.S. ¹
	Nonurban (N=999)	65		
Hiking	Urban (N=248)	256	1.12	N.S. ¹
	Nonurban (N=525)	204		
Cross Country Skiing	Urban (N=13)	46	0.25	N.S. ¹
	Nonurban (N=44)	39		
Swimming	Urban (N=467)	95	4.87	<.01
	Nonurban (N=981)	56		
Off-Road Vehicle	Urban (N=64)	134	4.94	<.01
	Nonurban (N=347)	30		
Snowmobiling	Urban (N=120)	88	2.00	<.05
	Nonurban (N=484)	55		
Picnicking	Urban (N=154)	497	4.11	<.01
	Nonurban (N=239)	72		
Camping-Tent	Urban (N=152)	324	1.73	<.05
	Nonurban (N=134)	248		
Camping- Vehicle	Urban (N=184)	581	2.64	<.01
	Nonurban (N=403)	335		

¹Not Significant

cross country skiing participants do not support the hypothesis.

CHAPTER VI

SUMMARY AND CONCLUSIONS

In this chapter, the principal findings from this study are reviewed and discussed together with their significant policy implications. The chapter includes recommendations for further research and suggests the direction additional study could take in addressing public and private sector recreation resources.

This study provides an examination of participants' use of public and private sector outdoor recreation resources for individual recreation activities. The conclusions drawn are given with the assumption that the sample data accurately represents the Michigan resident population. Limitations in the study also should be understood when interpreting the results. One of the key limitations, due to financial constraints, was the use of an existing data base which was not specifically developed to test the hypotheses in this study. In addition, comprehensive assessment of the reasons for many of the relationships found was not possible with the data base used.

Other limitations include the use of data collected in 1976 and recognition that user patterns may have since changed. The telephone survey design has inherent biases previously described. Furthermore, a survey completion rate of only 54.6 percent may have introduced nonrespondent bias into the results reported herein. Non-response for some individual variables examined, such as income, was even higher than 45.4 percent. Finally, aggregation of activities and survey respondents may have masked some characteristics and relationships.

Summary of Findings

One of the most significant discoveries in this study was the high use of private sector recreation resources. Assuming the data employed was representative of Michigan recreation participants, more than 50 percent of all participations in seven of the ten activities studied were recorded in the private sector. Only hiking, picnicking, and camping-tent participations occur more frequently on public than private areas. These results are indicative of a strong private sector role in our current outdoor recreation system.

When participants' selection of public or private sector resources was examined, the results indicated more exclusive use of the public sector than of the private sector in five activities. Specifically, a greater percentage of participants utilized only the public sector

than participants utilizing only the private sector for hiking, cross country skiing, picnicking, and camping-tent. The percentage difference was relatively small in most activities, but the 33 percent difference for picnicking indicates a very strong public sector role in this activity. More exclusive use of the private sector was recorded in the five activities of hunting, fishing, off-road vehicle, snowmobiling, and camping-vehicle. The percentage difference between participants using only the private sector and participants using only the public sector was very high for hunting (48%), off-road vehicle (31.8%), and snowmobiling (42.5%). These three activities exhibit a very strong private sector role.

It was found that only a small percentage of participants (less than 10%) used both the public and private sector for outdoor recreation activities. Since the average participation rate during the two week recall period of respondents was between two and four participations per participant, ample opportunity to utilize different provider sectors was evident. Most participants apparently chose to remain with one sector or the other indicating limited use of alternative sectors. This should not be construed to imply that participants using only one sector never substitute between the public and private sectors or never will substitute in the future.

The relationships between the socioeconomic characteristics of recreation participants and selection of provider sector was demonstrated to be statistically insignificant in most tests. Specifically, no statistical relationship was found between income and participants' selection of public or private opportunities. Perhaps income is not as much of a constraint to use of the private sector for outdoor recreation as formerly thought, but these results are not conclusive. Other factors, such as quality of the experience, could not be addressed in this study and may be important elements to an existing relationship. The data does indicate less overall participation in both the public and private sector for low and high income earners. Middle income earners recorded the most participation in outdoor recreation activities. The other socioeconomic characteristics examined, age, sex, and education, also did not reveal any specific patterns between participants in the public and private sector, although a few relationships were statistically significant.

An examination of residence and selection of the public or private sector for recreation was included in this study to identify usage patterns. It was found that nonurbanites use private outdoor recreation resources more than urbanites, and urbanites use more public resources than nonurbanites. Many potential factors could account

for these results, including, accessibility constraints on urbanites imposed by landowners, limited knowledge or information on the availability or location of accessible private land, or preferences for public resources.

The travel profiles developed indicate Southern Lower Michigan is used extensively by both urbanites and nonurbanites. Nonurban residents exhibited very high use of resources within a thirty minute travel time zone. Urbanites indicated a high percentage of use within this same travel time zone, but it was less than the nonurbanite percentage. It was found that a higher percentage of urban residents travel outside of Michigan when compared to nonurbanites. This travel profile information may be useful in recreation marketing efforts.

It was found that urban participants travel further on the average than nonurbanites to partake in swimming, off-road vehicle, snowmobiling, picnicking, camping-tent, and camping-vehicle activities. There was no statistical difference in travel time between urban and nonurban residents for hunting, fishing, hiking, and cross country skiing, although an actual difference was noted.

Finally, it was statistically shown that outdoor recreation participants expend more travel time to partake in public than private opportunities for most activities. Only participants in camping-vehicle exhibited a completely opposite relationship--more travel time was required to

reach private sector locations than public sector locations.

Research Recommendations and Conclusions

Research into the use of the public and private sector with respect to outdoor recreation has been relatively limited, and it is an important area for additional research. Among the issues that could be addressed are: the differences between public and private facilities; the availability and accessibility of opportunities to all residents; if preferences exist by recreation participants for one sector over another; economic relationships and social issues; and the degree to which other factors (e.g., public lands, regulations, liability laws, etc.) have an impact on public and private outdoor recreation opportunities.

To begin with, the reasons behind some of the relationships found in this study could be addressed. For instance, why do nonurban residents use more private sector resources than urban residents for many activities? Substitution relationships between the public and private sector need more examination. With changes in price levels or other factors, will an actual substitution relationship be evident? Unfortunately, this study could not ascertain some of the important reasons behind the relationships found. Finally, comparison of the findings in this study

with public managers and private landowners perspectives would provide useful information.

This study provides an assessment of participants' use of the public and private sector for outdoor recreation activities. It provides one measure of the relative importance of the public and private sectors and examines some of the relationships between the two sectors as expressed by participant usage patterns. It was found that the private sector is an important element in our outdoor recreation system, perhaps more than previously understood. The public sector also has a significant role in some recreation activities.

This study has examined various aspects of how public and private recreation markets are working. The results may provide useful guidance to future allocation decisions between different markets for our recreation resources. Moreover, it raises many questions and issues which need more detailed research before any broad generalizations can be made with certainty.

APPENDICES

APPENDIX A

Sampling Rates by Michigan County Population

<u>1975 "County"^a Population</u>	<u>Samples/Week</u>	<u>Number of "Counties"^a In Group</u>
Over 500,000		
Wayne County	40	1
Oakland County	14	1
Macomb County	12	1
250,000-500,000	9	3
200,000-250,000	8	3
100,000-200,000	7	8
25,000-100,000	6	33
Less than 25,000	<u>5</u>	<u>22</u>
TOTAL	481	72

^aTwenty of the least populous Michigan counties were combined with adjacent counties to form nine groups of counties. These county groups were not part of the study area analyzed.

Source: MDNR, 1977a.

APPENDIX B

Classification of Recreation Areas Into Public or Private Sector Recreation Providers

Public Sector Recreation Providers

- Michigan County (recreation site)
- Michigan Township (recreation site)
- Michigan Town or City (recreation site)
- Michigan School District or Other Public Educational (recreation site)
- Michigan Regional Recreation Authority (HCMA)
- Michigan DNR State Parks (state park and recreation areas)
- Michigan DNR Mackinac Island State Park Commission
- Michigan DNR Forestry (state forests)
- Michigan DNR Wildlife (state game & wildlife areas)
- Michigan DNR Waterways (public access sites)
- *National Park Service
- *U.S. Forest Service
- *U.S. Fish & Wildlife Service
- Other Public Agency Within Michigan
- **Other Public Agency In Another State or County
- Public Land But Not Designated For Recreation

Private Sector Recreation Providers

- *Commercial Enterprise
- *Private Organization (non-profit but includes private educational)
- *Private Individual(s) - land not officially designated for recreation
- *Household Member - land owned or rented
- *Other Land Not Designated For Recreation

- *In or out of Michigan
- **Outside of Michigan only

APPENDIX C

U.S. Census Bureau Criteria for Delineation of Urban and Nonurban Areas

I. URBAN AREAS

A. Central Cities

1. A central city of 50,000 inhabitants or more in 1960, in a special census conducted by the Census Bureau since 1960, or in the 1970 census; or
2. Twin cities, i.e., cities with contiguous boundaries and constitution, for general social and economic purposes, a single community with a combined population of at least 50,000, and with the smaller of the twin cities having a population of at least 15,000.
3. In addition Highland Park and Hamtramck were included due to their social and economic similarity to the surrounding central city of Detroit.

B. Suburban Areas - Surrounding closely settled territory, including the following (but excluding the rural portions of extended cities):

1. Incorporated places of 2,500 inhabitants or more.
2. Incorporated places with fewer than 2,500 inhabitants, provided that each has a closely settled area of 100 housing units or more.

3. Small parcels of land normally less than one square mile in area having a population density of 1,000 inhabitants or more per square mile. The area of large nonresidential tracts devoted to such urban land uses as railroad yards, airports, factories, parks, golf courses, and cemeteries are excluded in computing the population density.
4. Other similar small areas in unincorporated territory with lower population density provided that they serve
 - to eliminate enclaves, or
 - to close indentations in the urbanized areas of one mile or less across the open end, or
 - to link outlying enumeration districts of qualifying density that are not more than 1-1/2 miles from the main body of the urbanized area.
5. In addition other large cities not totally conforming to the census definition were included based on their close proximity to nonurban areas and resources. These were Holland, Monroe, Port Huron, and Benton Harbor/St. Joseph.

II. NONURBAN AREAS

- A. All areas not covered by the above criteria for Urban and Suburban areas in Region III are included.

APPENDIX D

Listing of Urban Areas in Southern Lower Michigan

A. Central Cities

Detroit - Hamtramck - Highland Park
Ann Arbor
Jackson
Lansing - East Lansing
Battle Creek
Kalamazoo - Portage
Muskegon - Muskegon Heights - Norton Shores
Grand Rapids
Flint
Saginaw

B. Suburban Areas

Holland	Grand Blanc Twp.	Kalamazoo Twp.
Benton Harbor	Mount Morris Twp.	Oshtemo Twp.
St. Joseph	Mundy Twp.	Ada Twp.
Battle Creek Twp.	Thetford Twp.	Alpine Twp.
Bedford Twp.	Flushing	Bryon Twp.
Emmett Twp.	Grand Blanc	Gaines Twp.
Pennfield Twp.	Mount Morris	Grand Rapids Twp.
Springfield	Swartz Creek	Plainfield Twp.
Dewitt Twp.	Delhi Twp.	E. Grand Rapids
Delta Twp.	Lansing Twp.	Grandville
Windsor Twp.	Meridian Twp.	Kentwood
Barton Twp.	Blackman Twp.	Walker
Davison Twp.	Leonida Twp.	Wyoming
Flint Twp.	Summit Twp.	Clinton Twp.
Flushing Twp.	Comstock Twp.	Harrison Twp.
Genessee Twp.	Cooper Twp.	Macomb Twp.
Shelby Twp.	Wolverine Lake	Spaulding Twp.
Center Line	Farmington	Thomas Twp.
East Detroit	Quaker-Town	Zilwaukee
Fraser	Wood Creek Farms	Port Huron
Mount Clemens	Ferndale	Ann Arbor Twp.
Roseville	Hazel Park	Pittsfield Twp.
St. Clair Shores	Huntington Woods	Scio Twp.
Sterling Hgts.	Clarkston	Superior Twp.
Utica	Keego Harbor	Ypsilanti Twp.
Warren	Lathrup Village	Ypsilanti
Bedford Twp.	Madison Heights	Brownstown Twp.
Berling Twp.	Novi	Canton Twp.

South Rockwood
 Monroe
 Fruitport Twp.
 Laketon Twp.
 Muskegon Twp.
 North Muskegon
 Roosevelt Park
 Avon Twp.
 Bloomfield Twp.
 Commerce Twp.
 Farmington Twp.
 Indendence Twp.
 Novi Twp.
 Pontiac Twp.
 Royal Oak Twp.
 Southfield Twp.
 Waterford Twp.
 W. Bloomfield Twp.
 White Lake Twp.
 Berkley
 Birmingham
 Bloomfield Hills
 Clawson
 Northville
 Plymouth
 River Rouge
 Riverview

Oak Park
 Orchard Lake
 Pleasant Ridge
 Pontiac
 Lake Angelus
 Rochester
 Royal Oak
 Southfield
 Beverly Hills
 Bingham Farms
 Franklin
 Sylvan Lake
 Troy
 Walled Lake
 Wixom
 Georgetown Twp.
 Holland
 Hudsonville
 Bridgeport Twp.
 Buena Vista Twp.
 Carrollton Twp.
 James Twp.
 Saginaw Twp.
 Rockwood
 Southgate
 Taylor
 Trenton

Northville Twp.
 Redford Twp.
 Romulus Twp.
 Van Buren Twp.
 Plymouth Twp.
 Allen Park
 Bellville
 Dearborn
 Dearborn Hgts.
 Ecorse
 Flat Rock
 Garden City
 Gibraltar
 Grosse Pointe
 Grosse Pointe Fm.
 Grosse Pointe Pk.
 Grosse Pointe Sh.
 Grosse Pointe Wd.
 Harper Woods
 Inkster
 Lincoln Park
 Livonia
 Melvindale
 Wayne
 Westland
 Woodhaven
 Wyandotte

LIST OF REFERENCES

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- Babbie, Earl R. 1973. Survey Research Methods. Belmont, California: Wadsworth Publishing Company.
- Blalock, Hubert M. 1972. Social Statistics, 2nd ed. New York: McGraw Hill.
- Brazer, Harvey E. 1974. Outdoor Recreation as a Public Good and Some Problems of Financing. Elements of Outdoor Recreation Planning. Edited by B. L. Driver. Ann Arbor, Michigan: The University of Michigan Press.
- Browning, Edgar K. and Jacqueline M. Browning. 1979. Public Finance and the Price System. New York: MacMillan Publishing Co., Inc.
- Burdge, Rabel J. and Donald R. Field. 1972. Methodological Perspectives for the Study of Outdoor Recreation. Journal of Leisure Research. 4(4):63-72.
- Cheek, Neil H., Donald R. Field, and Rabel J. Burdge. 1976. Leisure and Recreation Places. Ann Arbor, Michigan: Ann Arbor Science Publishers, Inc.
- Christenson, James E. and Dean R. Yoesting. 1977. The Substitutability Concept: a Need for Further Development. Journal of Leisure Research. 9(3):188-206.
- Cordell, Harold K. 1976. Substitution Between Privately and Publicly Supplied Urban Recreational Open Space. Journal of Leisure Research. 8(3):160-174.
- Driver, B. L., Donald Rosenthal, and George Peterson. 1978. Social Benefits of Urban Forests and Related Green Spaces in Cities. Proceedings of the First National Urban Forestry Conference. Washington, D.C.
- Epperson, Arlin F. 1980. Trends in Private and Commercial Recreation. Proceedings 1980 National Outdoor Recreation Trends Symposium. Washington, D.C.: USDA, U.S. Forest Service.

- Farnham, Paul G. 1980. Communications - A Further Comment on the Distribution of Urban Recreation Services. Journal of Leisure Research. 12(1):80-84.
- Feltus, David George. 1979. "An Evaluation of Michigan's Hunter Access Program From the Participant Landowner's Perspective." M.S. thesis, Michigan State University.
- Field, Donald R. 1973. The Telephone Interview in Leisure Research. Journal of Leisure Research. 5(1):51-59.
- Field, Donald R. and Joseph T. O'Leary. 1973. Social Groups as a Basis for Assessing Participation in Selected Water Activities. Journal of Leisure Research. 5(2):16-25.
- Hendee, John C. 1969. Rural-Urban Differences Reflected in Outdoor Recreation Participation. Journal of Leisure Research. 1(4):333-341.
- Hendee, John C. and Rabel J. Burdge. 1974. The Substitutability Concept: Implications for Recreation Research and Management. Journal of Leisure Research. 6(2):157-162.
- Hendee, John C. and H. Ken Cordell. 1980. Renewable Resource Recreation in the United States: Supply, Demand, and Critical Policy Issues. Prepared for the National Conference on Renewable Natural Resources.
- Hirshleifer, Jack. 1976. Price Theory and Applications. Englewood Cliffs, N.J.: Prentice Hall.
- Holecek, Donald F., Steve Willis, and David J. Allen. 1980. Recreation Use of Private Resources by Michigan's Urban Residents. Report to Michigan Department of Natural Resources, Recreation Services Division, Lansing, Michigan.
- Howard, Dennis R. and John R. Crompton. 1980. Financing, Managing and Marketing Recreation & Park Resources. Dubuque, Iowa: Wm. C. Brown Company Publishers.
- Kalter, Robert J. and Lois E. Gosse. Recreation Demand Functions and the Identification Problem. Journal of Leisure Research. 2(1):43-53.
- Knetsch, Jack L. 1974. Assessing the Demands for Outdoor Recreation. Elements of Outdoor Recreation Planning. Edited by B. L. Driver. Ann Arbor, Michigan: The University of Michigan Press.

- Kotler, Philip. 1975. Marketing for Nonprofit Organizations. Englewood Cliffs, N.J.: Prentice Hall, Inc.
- LaPage, W. F. 1977. Market Analysis for Recreation Managers. Outdoor Recreation Advances in Application of Economics. Washington, D.C.: USDA, U.S. Forest Service.
- Lineback, Patrick. 1980. "An Evaluation of Public Access Stamp Program Impacts on Adjacent Lands." M.S. research project, Michigan State University.
- Lovingood, Paul E. and Lisle S. Mitchell. 1978. The Structure of Public and Private Recreational Systems: Columbia, South Carolina. Journal of Leisure Research. 10(1):21-36.
- Michigan Department of Natural Resources. 1977a. "Michigan 1976 Recreation Survey Design and Application." Recreation Services Division, Lansing, Michigan.
- Michigan Department of Natural Resources. 1977b. "Michigan Resident Recreation Activities and Providers." Survey Report No. 6. Recreation Services Division, Lansing, Michigan.
- Michigan Department of Natural Resources. 1979a. Michigan Recreation Plan. Recreation Services Division, Lansing, Michigan.
- Michigan Department of Natural Resources. 1979b. Michigan's Forest Resources 1979 An Assessment. Forest Management Division, Lansing, Michigan.
- Mitchell, Lisle S. and Paul E. Lovingood, Jr. 1980. A Further Comment on the Distribution of Urban Recreation Services--A Response. Journal of Leisure Research. 12(1):85-86.
- National Academy of Sciences. 1975. Assessing Demand for Outdoor Recreation. Washington, D.C.: U.S. Government Printing Office.
- Nie, Norman H. et al. 1975. Statistical Package for the Social Sciences. Second Edition. New York: McGraw Hill Book Company.
- Outdoor Recreation Resources Review Commission. 1962a. Outdoor Recreation for America. Washington, D.C.: U.S. Government Printing Office.

- Outdoor Recreation Resources Review Commission. 1962b. National Recreation Survey, Study Report No. 19. Washington, D.C.: U.S. Government Printing Office.
- Outdoor Recreation Resources Review Commission. 1962c. Participation in Outdoor Recreation: Factors Affecting Demand Among American Adults, Study Report No. 20. Washington, D.C.: U.S. Government Printing Office.
- Owens, Gerald P. 1970. Outdoor Recreation: Participation, Characteristics of Users, Distances Traveled, and Expenditures. Ohio Agricultural Bulletin 1033. Wooster, Ohio: Ohio Agricultural Research and Development Center.
- Romsa, G. and Sydney Girling. 1976. The Identification of Outdoor Recreation Market Segments on the Basis of Frequency of Participation. Journal of Leisure Research. 8(4):247-255.
- Samuelson, Paul A. 1980. Economics An Introductory Analysis. New York: McGraw Hill.
- Styles, Frederick G. 1974. Variables Which Must Be Considered In Outdoor Recreation Planning. Elements of Outdoor Recreation Planning. Edited by B. L. Driver. Ann Arbor, Michigan: The University of Michigan Press.
- Stynes, Daniel J. 1980. Personal Memorandum. Recreation Services File of Donald F. Holecek, Michigan State University.
- U.S. Bureau of the Census. 1980. Statistical Abstract of the United States: 1980, 101st. edition. Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of the Interior. 1978. National Urban Recreation Study: Executive Report. Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of the Interior, Heritage Conservation Recreation Service. 1979a. The Third Nationwide Outdoor Recreation Plan: The Executive Report. Washington, D.C.: U.S. Government Printing Office.
- U.S. Department of the Interior, Heritage Conservation Recreation Service. 1979b. The Third Nationwide Outdoor Recreation Plan, Appendix III. Task Force Reports. Washington, D.C.: U.S. Government Printing Office.

U.S. News and World Report. "The Boom in Leisure--Where Americans Spend 160 Billions." May 23, 1977, pp. 62-63.

West, Patrick C. 1977. A Status Group Dynamics Approach to Predicting Participation Rates in Regional Recreation Demand Studies. Land Economics. 53(2):196-211.

Westfall, Richard D. 1975. "Landowner Willingness to Allow Public Access for Three Recreational Activities: A Case Study of Rural Landowners in Kent County, Michigan." M.S. thesis, Michigan State University.

Westfall, Richard D. 1980. "Hunting Site Selection: A Preliminary Investigation With Application To Michigan's Public Access Stamp Program." Ph.D. dissertation, Michigan State University.

Whitaker, Ben and Kenneth Browne. 1971. Parks and People. London: Seeley Service and Company.

Young, Cyrus W. and Richard V. Smith. 1979. Aggregated and Disaggregated Outdoor Recreation Participation Models. Leisure Sciences. 2(2):143-154.