DAY USE IN MICHIGAN STATE FOREST CAMPGROUNDS: CHARACTERISTICS OF USE AND USERS

BY

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ABSTRACT

DAY USE IN MICHIGAN'S STATE FOREST CAMPGROUNDS:
CHARACTERISTICS OF USE AND USERS

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This pilot study focuses on day use in Michigan's State Forest Campgrounds. Data were collected from randomly selected day use visitors in 57 selected campgrounds via a post card sized questionnaire left on vehicles parked in day use areas of the campgrounds. Data were analyzed for the entire system and were grouped and analyzed by forest region and by the type of water body (i.e. lake, river, lake/river). Some key findings include the following: 1) most day use parties came from Michigan, 2) average distance traveled was 76.7 miles, 3) fishing, swimming and nature observation were the three most popular activities, 4) the Pere Marquette and Lake Superior forest regions were statistically different in distance traveled and in average number of different activities pursued, 5) nature of water body present had a significant influence on activities pursued, 6) differences for day of the week, week within the season were slight and generally not statistically significant.

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CHAPTER I
INTRODUCTION

In planning the use of natural resources for recreational purposes, it is essential that all those factors which influence growth in recreation demand for specific recreation areas be taken into consideration. Two of the most significant groups of influencing factors are those which influence recreation preferences and characteristics of the site (i.e. location factors and various types of recreation activity opportunities available). In order to detect the statistical relationships between these two groups of factors, it is necessary to study these phenomena periodically by surveying recreation users. Information gathered in this manner is useful to recreation planners and also to those who are charged with recreation area management. Recreation resource managers confronted with shortages of funds and growing demands for recreation opportunities can not afford to build unattractive facilities in undesirable locations. As Wagar (1966; p. 667) has pointed out, "If outdoor recreation is to be managed with effectiveness in proportion to its apparent importance, then simple, readily employed comparisons and outlines are needed to guide both managers and participants".

This investigation focuses on Michigan's State Forest Campgrounds and the day use which occurs on these sites. It does not address use of these areas by people who camp in

there. For reasons which will soon become obvious, this study might best be characterized as being an exploratory or pilot effort. The background of this study and the methodology employed are presented in the first section, Chapter 1,2 and 3. The analyses of the nature of day use and characteristics of day users and a discussion of the conclusions reached and their implementations are presented in the second section, Chapter 4 and 5.

The present study was undertaken with the cooperation and financial assistance of the Forest Management Division of Michigan's Department of Natural Resources and the Department of Park and Recreation Resources at Michigan State University. The field work was carried out by twelves student interns during the summer season of 1982. The author was not involved in the study design, research instrument development, or supervising of data collection. These tasks were performed primarily by Charles Nelson the Project Coordinator. The author is responsible for the analyses of the data which appear herein. Finally, this study was a part of and secondary to a larger project. Hence, it was necessary to design this study around the multiple objectives of the parent project which severely limited the methods employed.

Significance

With the ever increasing number of people using the

forest for leisure, it is becoming evident that the forest land manager's greatest task will be to develop his ability to relate to needs of an increasing number of people using the forest. Only by understanding the public he serves, through the knowledge of their needs, desires, characteristics and recreation behavior, can the forester provide a more enjoyable experience while maintaining a natural forest environment.

Thus, to develop a suitable and adequate operation and management policy for the state forest campgrounds becomes a critical problem facing administrators and recreation researchers and is one of the most promising means of maintaining recreation quality and at the same time increasing output. But, to make such development efficient and effective, it is essential to understand : Who users are, What they are seeking when they come to the forest, What their needs and desires are, Where they are from, What types or packages of recreation activities cause peaking of demand, Where and When it is most likely to occur and What location factors are involved.

To provide some answers to the above questions, a ten week study was conducted from June 26 to September 8 of 1982 at 57 selected state forest campgrounds. This study, as will be demonstrated, has contributed to a better understanding of peaking and how it relates to the distribution of summer day use patterns of the state forest campgrounds. It also pro-

vides greater understanding of what causes various day use patterns and the distribution of state forest campground use during the summer season of 1982. The results of this study will help to explain the nature of day use and users and what attracts people to state forest campgrounds.

As noted, this is a pilot study whose purpose is to explore the potential of alternative strategies with sufficient latitude and flexibility to allow any positive effects to surface (Poister, 1978; p. 315). Thus, the present study may provide a model or direction for future more in depth research investigations of the nature of day use and users in the state forest campgrounds.

Definition of Terms

The following list of definitions is included since at present there is no commonly accepted glossary of terms in the recreation field. These definitions are given in order to clarify the author's meaning in using the terms in this thesis.

Types of Campgrounds. Types of campgrounds are classified by the types of recreational water which the campgrounds are adjacent to. Three types of campgrounds were included in this study : Lake, River and Lake/River campgrounds.

State Forests. State forests are classified by the geographical locations of state forests which the campgrounds

are located in. There are four state forests included in this study : Lake Superior, Mackinaw, Pere Marquette, and Au Sable State Forests.

Location Factors. For convenience, the term "location factors" will be used as a collective term which includes the four state forests and the three campground types.

Market Areas. Market areas as used in this study relate to the geographical regions from which day use visitors to State Forest Campgrounds are drawn. In the survey used in this study, respondents were requested to indicate their county of residence. Because of the small sample available, it was necessary to develop multiple county origin zones to facilitate market area analysis.

Study Objectives

(1). To profile the nature of day use and users of the State Forest Campground System.

(2). To identify any differences in the nature of day use and characteristics of day users which exist between the four state forests.

(3). To identify any differences in the nature of day use and characteristics of day users which exist between the following three types of campgrounds : those located on lakes, those located on rivers, and those located on both a lake and a river.

Limitations

The present study is limited in the following ways :

(1). Data was collected for day use parties only during one summer season (1982).

(2). Only 57 (33.7%) out of 169 state forest campgrounds were selected and surveyed in this study. These 57 campgrounds were not selected entirely at random. The following three criteria were used to select campgrounds :

a). Preference was given to the most heavily used campgrounds.
b). Campgrounds were grouped to minimize travel cost and time.
c). Campgrounds located in close proximity to student interns' living quarters were also selected more frequently.

(3). The sample size achieved was too small to support some potential analyses and limits the confidence that can be placed on most of this study's results.

(4). Post card surveys were distributed between 10:00 a.m. - 5:00 p.m., but they were distributed in individual campgrounds at approximately the same time each day since interns followed a similar route each day. Thus, users visiting campgrounds for only a few hours early or late in the day (e.g. fishermen) are under-represented in the population responding to this survey. The existence of this variation should be kept in mind as it may affect the generalizability of the information obtained.

Aggregation of day use data to systemwide and location-wide totals was employed in an attempt to average out some of this variation but the results which follow are nonetheless more representative of the day user typically present in campgrounds between 10:00 a.m. and 5:00 p.m.

(5). Only information concerning recreation behavior of day use parties was gathered and analyzed. Therefore, an investigation of the pattern of recreation behavior for individual persons was not conducted.

(6). Information was not collected to examine whether the visit to the campground was the primary purpose of the travel or incidental to it. It appears for some clues in the data base that both cases are present in these data.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

The following review of selected literature includes only those reports and articles that the author feels are pertinent to the main areas of investigation in this study. Particular emphasis has been given to reports concerning the use of the post-card questionnaire investigation technique for the recreational area day-use survey.

One of the first studies that probed the field of day user characteristics and preferences was the report by Crapo and Chubb, entitled, Recreation Area Day-Use Investigation Techiniques (Crapo & Chubb, 1969). This study developed an acceptable day-use investigation technique through the testing of a series of self-administered questionnaires. One of the purposes of this study was to provide base information collected by using handback questionnaires in card form continuously through the summer season.

The systematic random sampling method was chosen and employed in this study because it could be implemented with the least interference to normal area management operations. Every fourth vehicle parked at a park was selected as a sample. To ensure that every vehicle in the population had an equal opportunity of being chosen, the first sample vehicle was designated through the use of a random choice method such as the use of random number tables or "drawing" from the

sample space. After the initial vehicle was identified, every fourth vehicle was automatically included in the sample. Retrieval of cards was accomplished by voluntary deposit in collection boxes placed near the exit gates. The overall return rate was 61.7 percent.

Information on the questionnaire included: 1) patterns of day-use, chiefly purpose of trip, length of stay and various recreation activities participated in, 2) socio-economic data, such as age, income and origin of residence. Crapo and Chubb used open-ended, close-ended and multiple choice questions in the questionnaire.

The information obtained would be of value in several ways. First, it would give an indication of seasonal fluctuations in park user characteristics and use patterns which would be significant in designing year round sampling procedures. Second, it would give an impression of variations in response to a self-administered questionnaire over an extended period; this too could influence sample sizes. Third, it would indicate some of the practical problems that would have to be faced in implementing a year round inventory of a recreation area's use and users.

A day-use visitor survey which included 11 provincial parks and one national park in Saskatchewan, was conducted during the summer season of 1969. The survey methodology used to obtain park day user data was similar to that described by Crapo and Chubb (1969). Handback questionnaires in

card form were distributed according to a probability formula to visitors entering parks through access gates during daylight hours. These cards were distributed by either special staff hired for that purpose or by park attendants. Retrieval of the cards was accomplished by voluntary deposit in collection boxes near the park exit gates. The overall response rate was about 56 percent.

The information gathered in this park visitor survey can be divided into three categories. The first class of data concerns users' characteristics, such as party composition, family income, occupation, and education. The second deals with facilities used. Examples of these include: the picnic ground, the bathing beach, and the hiking trails. The third pertains to travel characteristics, chiefly visitor origins, purpose of trip, and length of stay in the park. The third category of information collected was used to develop a model to explain and predict day-use visitation.

Multiple step-wise regression was used to derive a relationship between visitation figures (the dependent variable) and the explanatory variables — population, distance, alternative recreation opportunities, and attractiveness. The results of the analysis indicate that a particular combination of the variables, population and distance, explains a large amount of the variance in the day-use data that was collected. An application of the model is given to illustrate that estimated use for a proposed site with a known level of develop-

ment may be derived when given the characteristics of a population origin and the intervening opportunities surrounding it.

A study which measured the change in the quality and quantity of recreational use of wildlife research areas at times of the year besides firearm deer hunting season was conducted every other year from 1973 to 1978 by Wildlife Management Division, Michigan DNR. Sample days were selected within two strata: weekdays and weekends. A post card questionnaire was employed and left on the vehicle windshield to request name and address and recreational activities participated in. A mail questionnaire was sent to each of these individuals about 3 months after their visit to the area.

Finally, another study which measured the change in the quality and quantity of firearm deer hunting on the research areas was conducted by Wildlife Management Division, Michigan DNR, during every day of the 1972-1979 firearm deer hunting seasons. A systematic sample was drawn by sampling a random hunter in every eighth vehicle. Names and addresses were obtained from camp permits, returned post cards left on vehicle windshields, and from license plate registration checks. The individuals selected were sent mail questionnaires about 3 months after their visits to the areas.

CHAPTER III

RESEARCH METHODOLOGY

In this chapter, the technical details of this project are described. These include: the study population, study areas, collection of data by the means of a post card survey, coding and programming of data, checking of data, and the methods used to analyze the data.

Study Population

Due to the limited research resources available and the large area of the state forests and the correspondingly large number of state forest campgrounds scattered throughout the United States, it was necessary to limit the scope of this study to Michigan State Forest Campgrounds.

The day-use post card survey was administered by student interns/hosts. The target population was systematically chosen from state forest campground day users, i.e. every fifth day user encountered as soon as the intern entered the campground. In practice, a post card questionnaire was administered to a systematic sample of vehicles parked in hosted campgrounds in locations not associated with a campsite, i.e. day use parking area. The intern put a post card questionnaire on vehicles which were systematically selected.

However, since most sampling took place during 10:00 a.m.

and 5:00 p.m. some bias was likely introduced. For example, most fishing activity occurs either in the early morning or late afternoon and not during the sampling time. Thus, those day use parties who only participated in fishing might not receive the post cards distributed by student interns, and these users are under-represented in the results which follow.

Since there are no mechanical counters in the campgrounds and since no intern stayed from 11:00 a.m. to 5:00 p.m. in one single campground, it is not possible to determine the total number of day use parties. Furthermore, response rate can not be considered as a criterion to estimate the total visits, because one day use party might use more than one vehicle to travel to that campground and uneven response rates between the four state forests were observed and, as noted earlier, those users visiting campgrounds for only a few hours early or late in the day (e.g. fishermen) are under-represented in the population responding to this survey.

Study Areas

Fifty-seven state forest campgrounds were selected as study sample areas. These campgrounds are areas to be used for day use and camping purposes. Three criteria were used to choose campgrounds, 1) preference was given to most used

campgrounds, 2) campgrounds located together were also prefered to reduce travel costs, 3) proximity to student living quarters was also important. Selection was accomplished jointly by DNR staff, field officers, and MSU personnel.

Table 1 lists these campgrounds by the State Forest in which they are located, and the type of water body which it is adjacent to is also provided. These 57 campgrounds were grouped into 12 clusters in order to keep travel time between campgrounds to a minimun. One intern was assigned to each cluster to perform minor maintenance, to serve as hosts, and to perform research tasks. These 12 student interns worked on every Friday, Saturday and Sunday, and two other days randomly selected from the remaining four days of the week.

Data Collection

The project was completed in several phases. The first phase was to compile information about summer day use parties' recreation behavior collected via a post card survey administered by 12 interns over ten weeks from June 26 to September 8, 1982. From the 57 campgrounds selected in this study, responses were obtained from 196 day use parties. A total of 490 post cards were placed on vehicles, thus 40% were mailed back as requested. Data was punched onto computer cards for subsequent analysis.

Table 1.-- List of 57 State Forest Campgrounds by Forest.

Lake Superior State Forest

Campground	Water Type	Campground	Water Type
Kinston L.	Lake	Holland	Lake
N. Gemini L.	Lake	Pretty L.	Lake
Ross L.	Lake	Perch L.	Lake
S. Gemini L.	Lake	High Bridge	River
Canoe L.	Lake	Mouth of 2	
Cusino L.	Lake	Hearted R.	Lake & River
Stanely L.	Lake	Pike L.	Lake
L. Superior	Lake	Bodi L.	Lake
Blind Sucker #1		Culhane L.	Lake
Blind Sucker #2	Lake & River	Andrus L.	Lake
		Shellgrake Dam	Lake & River

Mackinaw State Forest

Campground	Water Type	Campground	Water Type
Big Bear L.	Lake	Maple Bay	Lake
Little Wolf L.	Lake	Haakwood	River
McCormick L.	Lake	Pine Grove	River
Big Oaks	Lake	Pickerel L.	Lake
Avery L.	Lake	Pigeon R.	River
L. 15	Lake	Round Lake	Lake
Weber L.	Lake	Pigeon Bridge	River

Pere Marquett State Forest

Campground	Water Type	Campground	Water Type
L. Ann	Lake	Arbutus #4	Lake
L. Dubonnet	Lake	Shecks P1.	River
Veteran's Park	River	Forks	River
Platte River	River	Guernsey L.	Lake
Grass L.	Lake & River	Spring L.	Lake
Healy L.	Lake	Baxter Br.	River
		Old 131	River

AuSable State Forest

Campground	Water Type	Campground	Water Type
Reedsburg Dam	Lake & River	LaMargrethe	Lake
Houghton L.	Lake	AuSable R.	River
CCC Bridge	River	Burton's	
Upper Manistee		Landing	River
R.	River	Keystone	
Manistee R. Br.	River	Lansing	River
Canoe Harbor	River	White Pine	
		Canoe C	River

Analysis of Possible Related Factors

The second phase made use of these patterns to determine what factors might encourage or discourage summer day use at state forest campgrounds. Site characteristics such as recreation activities available and location factors such as the four forest regions in which the campgrounds were located and types of adjacent recreational waters were examined for their effect on summer day use.

Hypotheses

The specific hypotheses to be tested in the study were formulated. They are stated in the null form as follows:

State Forest Campground System

Ho - 1: There is no significant difference in the frequency of participations in individual recreation activities.

There is no significant difference in the number of different activities which day use parties participate in

Ho - 2: by day of the week.

Ho - 3: by week within the season.

Ho - 4: by distance traveled to reach the campground.

Ho - 5: There is no significant difference in the average number of party viists between weekday and weekend.

Four State Forests

Ho - 6-A: There is no significant difference in distance traveled to participate in day use activities among the four state forests.

Ho - 6-B: There is no significant difference in distance traveled to participate in day use activities between individual paired state forests.

Ho - 7-A: There is no significant difference in the number of different activities which day use parties participate in among the four state forests.

Ho - 7-B: There is no significant difference in the number of different activities which day use parties participated in between individual paired state forests.

Three Types of Campgrounds

Ho - 8-A: There is no significant difference in distance traveled to visit them among the three types of campgrounds.

Ho - 8-B: There is no significant difference in distance traveled to participate in day use activities between individual paired campground types.

Ho - 9-A: There is no significant difference in the number of different activities which day use parties participate in among the three types of campgrounds.

Ho - 9-B: There is no significant difference in the number of different activities which day use parties participate in between individual paired campground types.

Analysis of Results

Data from all completed questionnaires was measured in dichotomous or nominal or interval scales depending on the nature of these data. Therefore, the data were classified into either continuous or categorical classes. Due to the different characteristics and basic assumptions of the two classes of information, the test statistics for each were selected carefully. Non-parametric statistical procedures,

Chi-Square test of independence, were used to analyze and test categorical data, while the parametric statistical procedures, analysis of variance and Student's t test, were used to analyze and test continuous data. Hypothesis 1 was tested by using the Cochran Q test. A one-way fixed model of analysis of variance was performed on hypotheses 2 to 9.

A .05 level of confidence, which is most commonly employed in social science research for rejecting or accepting the null hypothesis, was used throughout the study. The analysis was accomplished by using the Statistical Package for Social Science (Nie, Hull, et al., 1975) on the CDC 6500 computer at Michigan State University.

Method used to Analyze Site Characteristics

The final phase of the project sought to identify factors which might influence the nature of summer day use at the 57 selected state forest campgrounds. For each hypothesized related variable (characteristic), the 57 campgrounds were divided into 4 categories according to the 4 different state forest areas, and into 3 categories according to the 3 different types of recreational waters which campgrounds are adjacent to. The comparison of summer day use levels of FMD campgrounds in each of those two sets of categories give an indication that the factor being tested either promotes or discourages summer day use of FMD campgrounds.

For example, the state forest campgrounds are divided into the Lake, River and Lake/River campgrounds. If it was most popular to canoe in the rivers, compared with the other two types of campgrounds, then it could lead to a conclusion that the geographical characteristics a type of campgrounds has had significant influence on the nature of day use in that type of campground.

Chapter IV

Results

This chapter consists of three major sections, one for each of the three study objectives. The first section deals with the profile of the nature of day use and users of the State Forest Campground System. In the second section, the nature of day use and users of the four state forests are examined. The third section deals with the nature of day use and users of the three types of campgrounds.

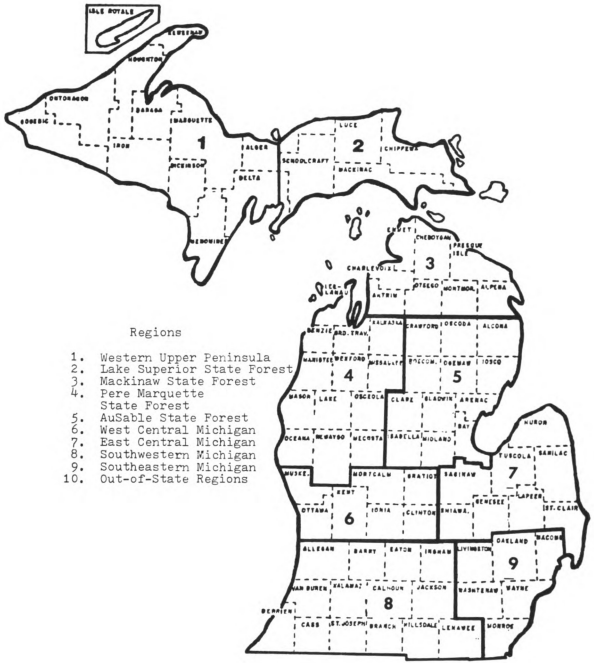
State Forest Campground System

Characteristics of Day Use Parties

The Origins of Day Use Parties

Before presenting the origin of day use parties, the regionalization for SFC System day use parties to be used in this study will be described. For the validity and convenience of the analysis, 10 regions where day use parties were from were subjectively created. These regions are illustrated in Figure 1. Note that each of the four study forests are designated as separate regions.

Most of the day use parties came from Michigan. Detailed number and percentage of day use parties by region of residence and percentage of State's Population in each county are presented in Table 2. The investigation showed that 33.8 percent of all the day use parties who visited the SFC System came



Regions

1. Western Upper Peninsula
2. Lake Superior State Forest
3. Mackinaw State Forest
4. Pere Marquette State Forest
5. AuSable State Forest
6. West Central Michigan
7. East Central Michigan
8. Southwestern Michigan
9. Southeastern Michigan
10. Out-of-State Regions

Region 10
Out -of-State

Figure 1.-- Michigan State forest Campground System Day Use Regions

Table 2.-- Distribution of Party Visits to State Forest Campground System by Region of Day Use Parties' Origins

Region	Number of Visits	Visits	Percent of State's Population Residing in the Region
1. Western Upper Peninsula	2	1.0	3.0
2. Lake Superior Forest	6	3.1	0.6
3. Mackinaw Forest	18	9.3	1.5
4. Pere Marquette Forest	33	16.9	3.3
5. Au Sable Forest	19	9.9	4.4
6. West Central Michigan	22	11.0	6.3
7. East Central Michigan	21	10.0	12.3
8. Southwestern Michigan	23	12.1	17.1
9. Southeastern Michigan	33	16.9	51.4
10. Out-of-State Regions	19	9.8	
Total	196	100.0	99.9*

* This does not add to 100 percent due to rounding.

Note : Region 10 includes Illinois, Indiana, Ohio, Wisconsin and Other States.

Source: Michigan Statistical Abstract 1981.

from the Pere Marquette state forest area and the areas in the southeastern corner of lower Michigan. Ohio was the highest out-of-state origin area with 3.6 percent of day use parties coming from that area. On an individual county basis, it was interesting to find that 12.5 percent of the respondents were from Grand Traverse county, 5.4 percent were from Wayne county and 4.9 percent from Kent county, thus nearly 23 percent of the respondents to the day use survey came from only three counties. In general the origins of Michigan day users of the SFC System were distributed throughout the whole state and not clustered into a comparatively small area in the southeastern corner of lower Michigan. Whereas 51.4 percent of Michigan's population resides in Region 9, it produced only 16.9 percent of day use visitors to State Forest Campgrounds.

By region of residence, the percentage of day use parties participating in five selected individual activities: fishing, boating, swimming, nature observation and picnicking, are presented in Table 3. For the fishing activity, east central Michigan (Region 7) generated the largest percentage of State Forest Campground fishing (16.0%) followed by Region 6 (14.9%), Region 9 (14.9%), and Region 4 (12.9%). Out-of-state origins accounted for about 11.7 percent of State Forest Campground fishing days in Michigan.

Further investigation of these five recreation activities shows that the Western Upper Peninsula (Region 1) and the

Table 3.-- Distribution of Participations in 5 Individual Selected Recreation Activities by Region of Day Use Parties' Origins.

Region	Recreation Activities				
	Fishing N=194	Boating N=56	Swimming N=90	Natrobs N=71	Picnic N=56
	Percent				
1	1.1	0.0	1.1	1.4	0.0
2	2.1	1.8	2.2	4.2	3.6
3	5.4	9.0	11.1	9.8	14.4
4	12.9	19.7	20.0	1.4	21.4
5	9.8	3.6	13.2	16.9	12.6
6	14.9	17.9	7.7	11.2	1.8
7	16.0	12.6	5.5	7.0	12.6
8	11.8	7.2	11.1	15.5	9.0
9	14.9	17.9	17.7	19.6	21.6
10	11.7	10.7	10.4	12.7	3.6
Total	100.6*	100.4*	100.0	99.7*	100.6*

* This does not add to 100 percent due to rounding.

Note : Region 10 includes Illinois, Indiana, Ohio, Wisconsin and other states.

Region 1: Western Upper Peninsula
Region 2: Lake Superior State Forest
Region 3: Mackinaw State Forest
Region 4: Pere Marquette State Forest
Region 5: Au Sable State Forest
Region 6: West Central Michigan
Region 7: East Central Michigan
Region 8: Southwestern Michigan
Region 9: Southeastern Michigan
Region 10: Out-of-State Regions

Superior state forest area (region 2) did not generate a significant number of day use parties. Region 7 while leading in fishing ranks low for the other four activities. Region 4 is among the leaders in all but Nature Observation while the popular Region 9 is among the leaders in all five activities.

Day Use Party Size

Seventy-six percent of day use parties were composed of one to five persons. Two persons in one party was most common. There were an average of 4.7 members and a median of 3.6 members to a party. The number of day use parties in the various size of classes is shown in Table 4. Unfortunately, there was no other information concerning socio-economic characteristics, such as age, income and education levels collected in this survey. The cumulative percentage of day use parties in the various size of classes is presented in Figure 2.

Frequency of Party Visits to Campgrounds
By Week within the Season

The distribution of party visits to SFC System by week within the season is presented in Table 5. The largest percentage of party visits occurred in the 2nd week (July 4-10) followed by the 5th week (14.7%), the 6th week (13.7%) and the 4th week (12.1%). It seems that Independence Day (July

Table 4.-- Distribution of Day Use Party Size.

Party Size	Number of Parties	Percent
1	10	6.1
2	49	29.7
3	19	11.5
4	34	20.6
5	13	7.9
6	9	5.5
7	7	4.2
8	2	1.2
9	4	2.4
10	5	3.0
11	3	1.8
12	3	1.8
14	3	1.8
16	2	1.2
25	1	.6
30	1	.6
Total	165	100.0

196 cases were processed.
3 cases (1.53 PCT) were missing.

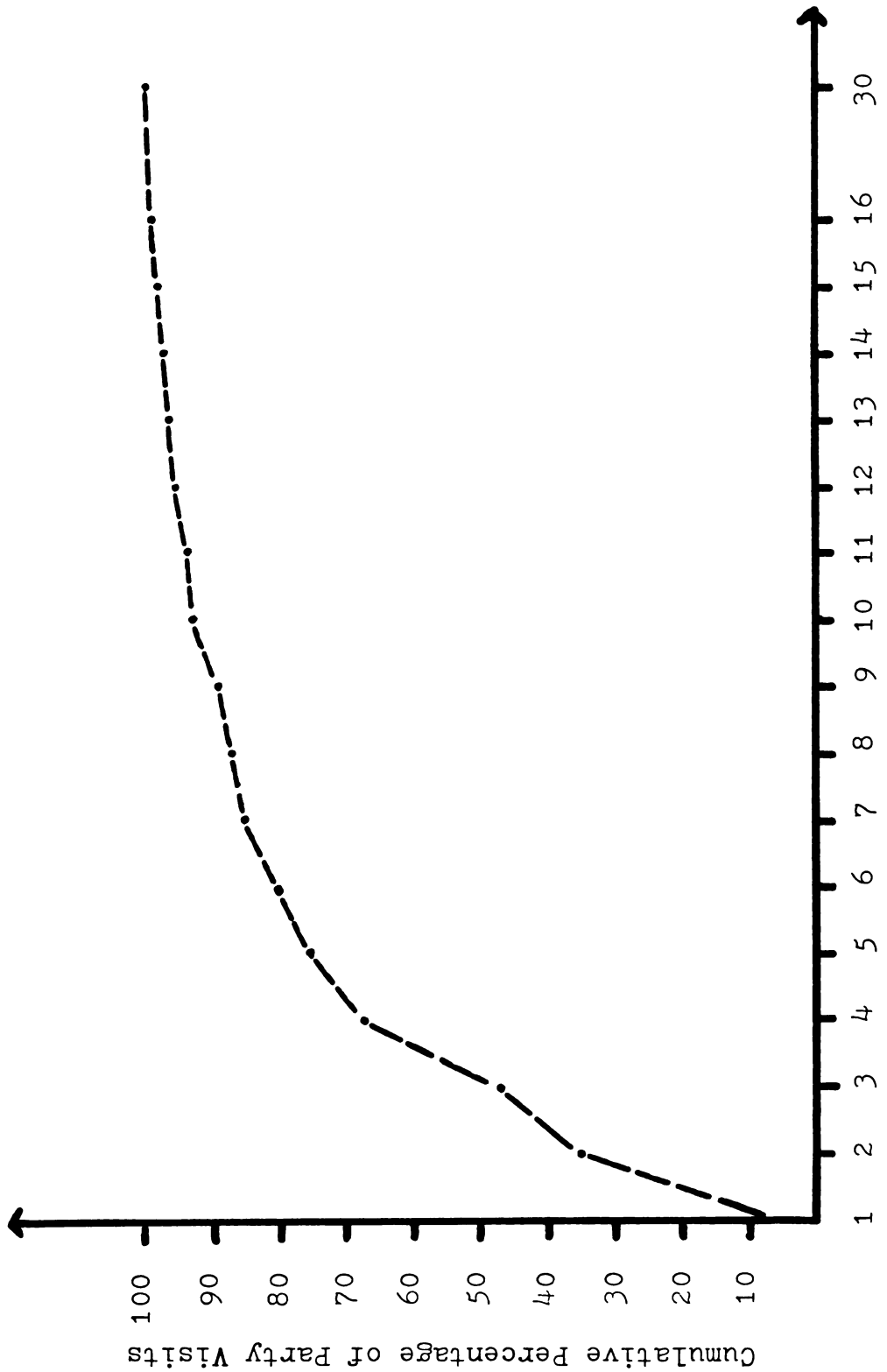


Figure 2.-- Cumulative Percentage of Day Use Parties by Party Size.

Table 5.-- Frequency of Party Visits to State Forest Campground System by Week within the Season.

Week within the Season	Number of Party Visits	Percent
June 26 - July 3	16	8.4
July 4 - 10	32	16.9
July 11 - 17	13	6.8
July 18 - 24	23	12.1
July 25 - 31	28	14.7
August 1 - 7	26	13.7
August 8 - 14	21	11.5
August 15 - 21	15	7.9
August 22 - 28	5	2.6
Aug. 29 - Sept. 8	11	5.8
Total	190	100.0

4) had a positive influencing effect on the attendance figure of that week (July 4-10); however, the Labor Day (September 6) did not have significant effect on the attendance figure of the 10th week.

For the further analysis of campground use variation by day of the week and by week within the season, three important factors should be taken into account. First, the sample for each day and for each week is quite small which may be the primary reason for the lack of uniformity in campground use variation by day of the week and by week within the season. Secondly, weather conditions can greatly influence the amount of use which occurs at a campsite. And thirdly, time of the day to survey for the twelve student interns likewise has a significant bearing upon the amount of campground use reported and recorded.

By Distance Traveled to Reach the Campground

The investigation showed that 65.9 percent of the day use parties traveled a distance of 1 - 50 miles. This indicates that day use parties prefered to go to a campground near their place of residence or temporary residence for enjoying a one-day recreation pursuit. The distribution of party visits to the SFC System by distance traveled to reach the campground is shown in Table 6. One important finding is that there were 37 (20.3%) of day use parties willing to travel more than 150 miles to the SFC System for a one-day visit. Interestingly, 36(97.3%) out of these 37 day use

Table 6.-- Frequency of Party Visits to State Forest Campground by Distance Traveled to Reach the Campground.

Miles Traveled from Origin	Number of Party Visits	Percent
1 - 25 miles	100	54.9
26 - 50 miles	20	11.0
51 - 100 miles	14	7.7
101 - 150 miles	11	6.1
151 - 200 miles	17	9.3
200 - more miles	20	11.0
Total	192	100.0

parties were from Michigan. On the other hand, only 1 (2.7%) out of 37 was from out-of-state. Furthermore, all of these 36 day use parties were from Southern Lower Peninsula, i.e. Region 6, 7, 8 and 9, and 14 (38.9%) out of the 36 were from southeastern Michigan (Region 9). It seems that state forest campgrounds can attract people to travel a long way in spite of higher energy costs. Also, it was found that 18 (94.7%) out of 19 out-of-state day use parties traveled only 40 miles or less. This could be explained by either one of the following : first, these out-of-state day use parties have a second home in Michigan which is close to the campgrounds visited by them; secondly, the campground they visited was just one of several recreation areas they used on long multiple destination trips.

Participation Characteristics of Individual Activities

The most popular activities in the SFC System during the summer season of 1982, fishing and swimming, are water-related and emphasize the importance of public access to water resources (Nelson, 1983). The recreational activities which day users were involved in while their cars were parked at a state forest campground are presented in Table 7. "Nature observation", "picnicking", "just looking" and "boating" proved to be the next four most popular recreation activities. In the "other" category backpacking was most popular.

Table 7.-- Frequency of Participations in Individual Recreation Activities in State Forest Campground System.

Recreation Activity	Number of Participations	Percent of Parties Participating in the Activity	Percent of Total Participation
Fishing	101	51.5	14.4
Boating	60	30.6	8.6
Just Looking	61	31.1	8.7
Picnicking	61	31.1	8.7
Picking	24	12.2	3.4
Visit Campers	17	8.7	2.4
Swimming	96	49.0	13.7
Hiking	33	16.8	4.7
Canoeing	36	18.4	5.1
Photography	46	23.5	6.6
Nature Observation	77	39.3	11.0
Camping	49	25.0	7.0
Rock Hounding	16	8.2	2.3
ORV use	5	2.6	0.7
Other	18	9.2	2.6
Total	700		99.9*

* This does not add to 100 percent due to rounding.

By Day of the Week

Relative frequency of participation in individual recreation activities by each day of the week is presented in Table 8. On Mondays, Tuesdays and Wednesdays, the most popular activity is fishing followed by swimming and nature observation. On Thursdays fishing is also the most popular activity followed by swimming, boating and picnicking. On Fridays the most popular activity is picnicking followed by swimming, boating and nature observation. Swimming is the most popular activity on Saturdays followed by fishing and boating. On Sundays swimming is still observed to be the most popular activity followed by nature observation and just looking.

By Week within the Season

Table 9 shows percentage of participations in individual recreation activities by week within the season. In the 1st, 5th, 9th and 10th weeks the most popular activity is fishing. Swimming is the most popular activity in the 2nd, 3rd, 4th, 6th and 8th weeks. However, in the 7th week the most popular activity is nature observation.

How participations in individual recreation activities are distributed across the ten weeks study period is

Table 8.-- Relative Frequency of Participations in Individual Activities by Day of the Week.

Recreation Activity	Day of the Week						
	Mon. P=42	Tue. P=75	Wed. P=87	Thu. P=90	Fri. P=108	Sat. P=174	Sun. P=98
Fishing	19.0	14.7	17.2	21.1	11.1	12.6	12.2
Boating	9.5	6.6	10.3	8.9	6.5	11.5	5.1
Justlook	7.1	8.0	8.0	7.8	8.3	9.2	11.2
Picking	2.4	2.7	1.2	5.5	3.7	2.9	4.1
Visit Camper	2.4	6.6	1.2	1.1	3.7	1.7	0.0
Swimming	14.3	13.3	12.6	13.5	12.9	13.3	16.3
Hiking	7.1	4.0	3.4	3.3	6.5	4.0	6.1
Canoeing	2.4	4.0	1.2	5.5	3.7	7.5	9.2
Photograph	2.4	8.0	9.2	7.8	8.3	4.6	6.1
Picnicking	2.4	8.0	6.9	8.9	14.0	7.5	9.2
Rockhunt	4.8	2.7	3.4	2.2	2.8	1.7	1.0
Camping	7.1	2.7	6.9	4.4	7.4	10.9	5.1
ORVuse	0.0	0.0	2.3	1.1	0.0	0.5	0.0
Nature Observation	14.3	14.7	11.6	7.8	11.1	9.2	13.3
Other	4.8	4.0	4.6	1.1	0.0	2.9	3.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* P indicates the number of participations in individual recreation activities.

Table 9.-- Percentage of Participations in Individual Recreation Activities by Week within the Season.

Recreation Activity	Week within the Season									
	June 26 to July 3 P=42	July 4 to July 10 P=105	July 11 to July 17 P=46	July 18 to July 24 P=95	July 25 to July 31 P=90	Aug. 1 to Aug. 7 P=96	Aug. 8 to Aug. 14 P=84	Aug. 15 to Aug. 21 P=46	Aug. 22 to Aug. 28 P=18	Aug. 29 to Sept. 8 P=52
	Percent									
Fishing	26.2	14.3	8.7	8.4	21.1	10.4	11.9	21.7	16.7	13.5
Boating	9.5	8.6	8.7	10.5	7.8	12.5	3.6	4.3	16.7	7.7
Just Looking	11.9	10.5	8.7	5.3	10.0	5.2	10.7	8.7	5.6	11.5
Picking	0.0	0.0	2.2	3.2	4.4	5.2	5.9	2.2	0.0	5.8
Visit Camper	0.0	0.0	2.2	4.2	4.4	4.2	1.2	0.0	0.0	1.9
Swimming	9.5	16.2	15.2	16.8	13.3	16.7	8.3	15.2	11.1	7.7
Hiking	2.4	2.8	10.8	3.2	1.1	4.2	8.3	2.2	11.1	9.6
Canoeing	2.4	5.7	0.0	2.1	4.4	7.3	8.3	8.7	5.6	7.7
Photography	9.5	4.7	2.2	10.5	6.7	6.3	5.9	6.5	11.1	5.8
Picnicking	4.8	12.4	10.8	11.6	6.7	10.4	3.6	8.7	5.6	5.8

(Continued on next page)

Table 9.-- Percentage of Participations in Individual Recreation Activities by Week within the Season. (Cont.)

Recreation Activity	Week within the Season									
	June 26 to July 3 P=42	July 4 to July 10 P=105	July 11 to July 17 P=46	July 18 to July 24 P=95	July 25 to July 31 P=90	Aug. 1 to Aug. 8 P=96	Aug. 8 to Aug. 14 P=84	Aug. 15 to Aug. 21 P=46	Aug. 22 to Aug. 28 P=18	Aug. 29 to Sept. 8 P=52
	Percent									
Rockhunt	4.8	1.9	4.3	1.0	3.3	1.0	3.6	4.3	0.0	0.0
Camping	4.8	5.7	8.7	9.5	5.6	7.3	7.1	6.5	5.6	7.7
ORV use	0.0	0.9	0.0	0.0	1.1	1.0	1.2	0.0	0.0	0.0
Nature Observation	11.9	12.4	13.1	10.5	8.9	7.3	15.5	8.7	11.1	13.4
Other	2.4	3.8	4.3	3.2	1.1	1.0	4.8	2.2	0.0	1.9
Total	100.1*	99.9*	99.9*	100.0	99.9*	100.0	99.9*	99.9*	100.2*	100.0

*This does not add to 100 percent due to rounding.

Note: P indicates the number of participations in individual weeks within the season.

presented in Table 10. Compared with other weeks, the 7th week (August 8-14) was the most popular week to participate in most kinds of recreation activities except that of just looking, picnicking, swimming and nature observation were more popular activities in the 2nd week; photography, boating and camping in the 4th week; fishing in the 5th week.

By Distance Traveled to Reach the Campground

Average distance traveled to participate in individual activities is presented in Table 11. The "picking" activity involved the longest distance traveled by day use parties, an average of 156.09 miles followed by hiking (152.40 miles), camping (140.66 miles) and rock hounding (123.60 miles). Also, it is interesting to find that water-related activities such as fishing, boating, swimming and canoeing, did not involve travel on average of more than 90 miles.

These findings might be explained by the information contained in Table 12. There was a substantial proportion of day use parties who participated in one of following four activities: picking, hiking, camping and rock hounding and who were willing to travel more than 150 miles. For example, 45.5 percent of day use parties who participated in picking activity traveled more than 150 miles on an average. In addition, day use parties prefered to travel a distance of

Table 10.-- Percentage of Participations in Individual Recreation Activities across Week within the Season.

Recreation Activity	Week within the Season										Total	
	1st week	2nd week	3rd week	4th week	5th week	6th week	7th week	8th week	9th week	10th week	%	N
	Percent											
Fishing	11.3	15.5	4.1	8.2	19.6	10.3	10.3	10.3	3.1	7.2	99.9	97
Boating	6.9	15.5	6.9	17.2	12.1	20.7	5.2	3.4	5.2	6.9	100.0	58
Just Looking	8.5	18.6	6.8	8.5	15.3	8.5	15.3	6.8	1.7	10.1	100.1	59
Picking	0.0	0.0	4.5	13.6	18.2	22.8	22.8	4.5	0.0	13.6	100.0	22
Visit Camper	0.0	0.0	6.7	26.7	26.7	26.7	6.7	0.0	0.0	6.7	100.2	15
Swimming	4.3	18.5	7.6	17.4	13.0	17.4	7.6	7.6	2.3	4.3	100.0	92
Hiking	3.1	9.4	15.6	9.4	3.1	12.5	21.8	3.1	6.3	15.6	99.9	32
Canoeing	2.8	16.7	0.0	5.6	11.1	19.4	19.4	11.1	2.8	11.1	100.0	36
Photography	8.9	11.1	2.2	22.2	13.3	13.3	11.1	6.7	4.4	6.7	99.9	45
Picnicking	3.4	22.4	8.6	18.9	10.3	17.4	5.2	6.9	1.7	5.2	100.0	58

(Continued on next page)

Table 10.-- Percentage of Participations in Individual Recreation Activities across Week within the Season. (Cont.)

Recreation Activity	Week within the Season										Total	
	1st week	2nd week	3rd week	4th week	5th week	6th week	7th week	8th week	9th week	10th week	%	N
	Percent											
Rockhunt	12.5	12.5	12.5	6.2	18.8	6.2	18.8	12.5	0.0	0.0	100.0	16
Camping	4.2	12.8	8.5	19.1	10.6	14.9	12.8	6.4	2.1	8.5	99.9	47
ORV use	0.0	25.0	0.0	0.0	25.0	25.0	25.0	0.0	0.0	0.0	100.0	4
Nature Observation	6.7	17.3	8.0	13.3	10.7	9.3	17.3	5.3	2.7	9.3	99.9	75
Other	5.6	22.2	11.1	16.7	5.6	5.6	22.2	5.6	0.0	5.6	100.2	18

Note:Some rows do not add to 100 percent due to rounding.

Table 11.-- Distance Traveled to Participate in Individual Recreation Activities in State Forest Campground System.

Recreation Activity	Count	Mean	Standard Deviation	Percent
Fishing	92	87.26	118.1166	13.7
Boating	56	81.51	102.2451	7.8
Justlook	55	104.25	132.8300	9.8
Picking	22	156.09	161.0681	5.8
Visit Camper	12	118.25	141.6006	2.4
Swimming	84	68.78	96.6571	9.9
Hiking	30	152.40	161.6589	7.8
Canoeing	30	64.6	87.8618	3.3
Photograph	40	115.45	159.8321	7.9
Nature Observation	66	85.28	126.4163	9.6
Camping	41	140.66	133.5855	9.8
Picnicking	54	61.29	97.7459	5.6
Rockhunt	15	123.60	177.7602	3.2
ORVuse	5	94.00	112.1695	0.8
Other	16	92.31	112.4863	2.5
Total	638	91.83		99.9*

* This does not add to 100 percent due to rounding.

Table 12.-- Percentage of Participations in Individual Recreation Activities by Distance Traveled to Reach the Campground.

Recreation Activity	Distance Traveled (Miles) 1 to 25	26 to 50	51 to 100	101 to 150	151 to 200	201 to More	Total %	N
Fishing	50.0	10.4	8.3	9.4	9.4	12.5	100.0	96
Boating	54.4	8.8	5.3	7.0	12.3	12.3	100.1	57
Justlook	48.2	7.1	8.9	7.1	7.1	21.4	99.8	56
Picking	27.3	13.6	13.6	0.0	9.1	36.4	100.0	22
Visit Camper	56.3	0.0	6.3	0.0	18.8	18.8	100.2	16
Swimming	58.9	8.9	7.8	4.4	5.6	14.4	100.2	90
Hiking	32.3	6.5	12.9	3.2	12.9	32.3	100.1	31
Canoeing	51.5	15.2	15.2	6.1	9.1	3.0	100.1	33
Photograph	51.2	7.3	7.3	0.0	9.8	24.4	100.0	41
Nature Observation	57.1	10.0	7.1	4.3	4.3	17.1	99.9	70
Camping	25.0	9.1	13.6	6.8	22.7	22.7	99.9	44
Picnicking	57.9	14.0	8.8	1.8	7.0	10.5	100.0	57
Rockhunt	46.7	20.0	0.0	0.0	6.7	26.7	100.1	15
ORVuse	40.0	0.0	20.0	20.0	0.0	20.0	100.0	5
Other	56.3	6.3	0.0	6.3	12.5	18.8	99.9	16

Note : Some rows do not add to 100 percent due to rounding.

1 - 25 miles to participate in most kinds of recreation activities, for example, 50 percent or more of day use parties involved in either one of these four water-related activities only traveled a distance of 1 - 25 miles.

Figure 3 and 4 show the comparison of participations in five selected individual recreation activities: fishing, boating, swimming, nature observation and picnicking, by distance traveled to reach the campground. Table 13 shows the distribution of total participations in the 15 activities by the distance zones of parties' origins. For example, 7.4 percent of the 646 total participations involved fishing and less than 25 miles of travel. Note that 50% of all participations were registered by visitors traveling less than 25 miles while about 55% (see Table 6) of all parties responding reported traveling this same distance. Further comparisons by travel zones, suggests little relationship exists between distance traveled and share of total participations.

Frequency of Participations in Different Activities Packages of Recreation Activities

Most day use parties participated in more than one recreation activity during their visit to a campground. Thirty-one (15.7%) respondents participated in only one recreation activity, 34 (17.2%) in two recreation activities, 29 (14.7%) in three recreation activities, and 103 (51.4%) in more than three activities. Parties participating in only

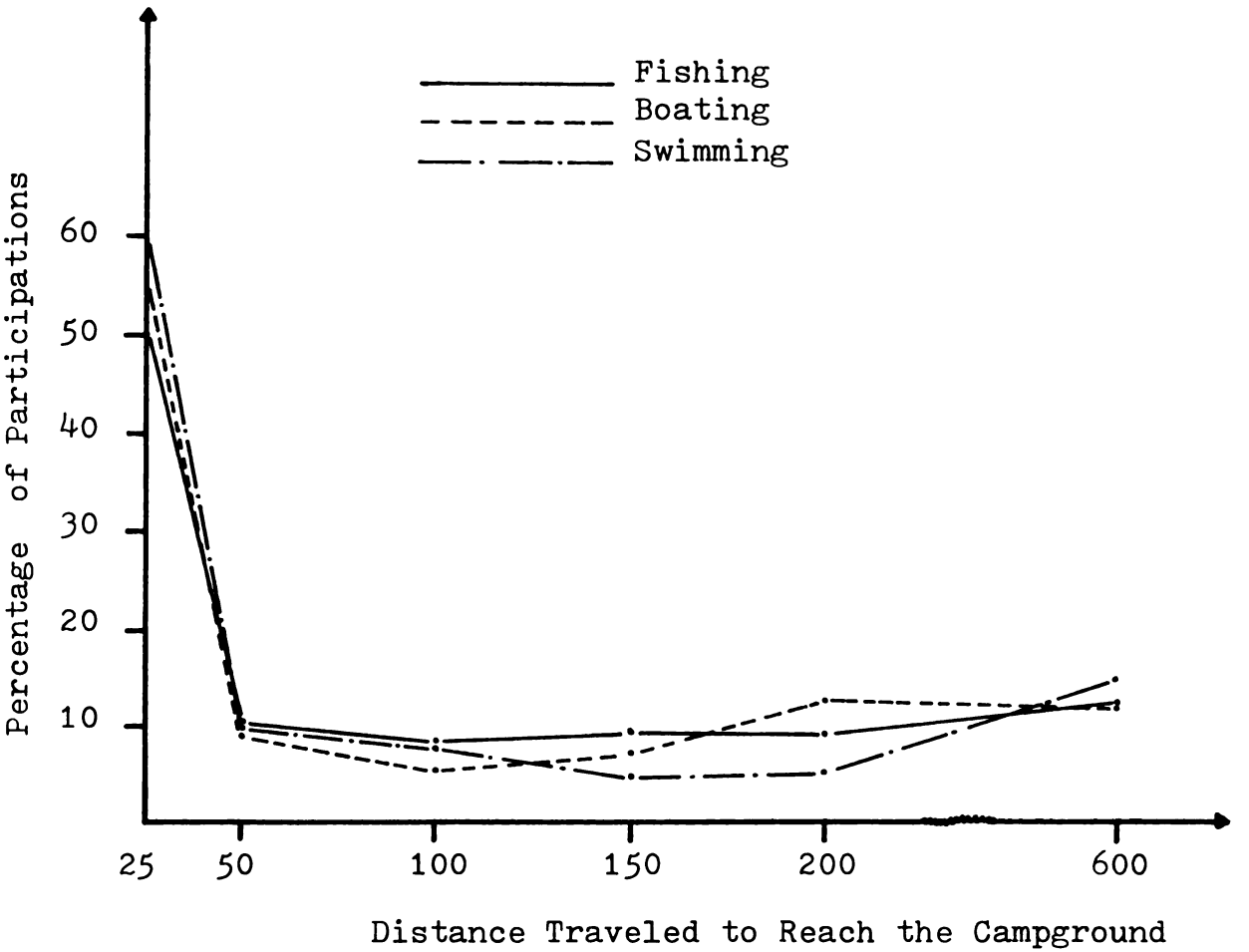


Figure 3.-- Comparison of Participations in Individual Activities — Fishing, Boating and Swimming — by Distance Traveled to Reach the Campground.

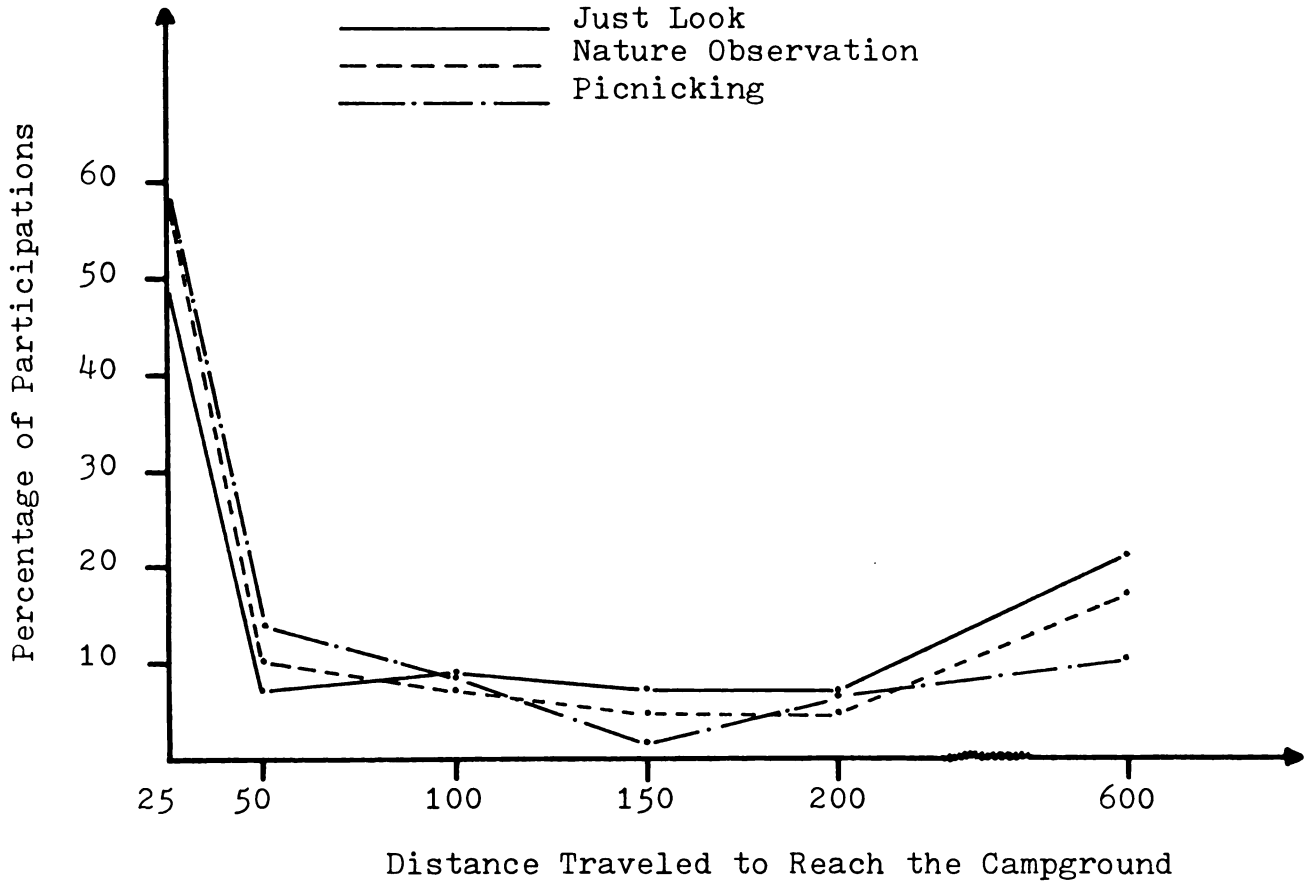


Figure 4.-- Comparison of Participations in Individual Activities — Just Look, Picnicking and Nature Observation — by Distance Traveled to Reach the Campground.

Table 13.-- Percentage of Total Participations in 15 Recreation Activities in State Forest Campground by Individual Recreation Activity and by Distance Traveled to Reach the Campground.

Recreation Activity	Distance Traveled (Miles)						Total	
	1 to 25	26 to 50	51 to 100	101 to 150	151 to 200	201 to More	%	N
Fishing	7.4	1.5	1.2	1.4	1.4	1.8	14.7	96
Boating	4.8	0.8	0.5	0.6	1.1	1.1	8.9	57
Justlook	4.2	0.6	0.8	0.6	0.6	1.8	8.6	56
Picking	0.9	0.4	0.4	0.0	0.3	1.2	3.2	22
Visit Camper	1.4	0.0	0.1	0.0	0.4	0.4	2.3	16
Swimming	8.2	1.2	1.1	0.6	0.8	2.0	13.9	90
Hiking	1.5	0.3	0.6	0.1	0.6	1.5	4.6	31
Canoeing	2.6	0.8	0.8	0.3	0.4	0.1	5.0	33
Photograph	3.2	0.4	0.4	0.0	0.6	1.5	6.1	41
Nature Observation	6.2	1.1	0.8	0.4	0.4	1.8	10.7	70
Camping	1.7	0.6	0.9	0.4	1.5	1.5	6.6	44
Picnicking	5.1	1.1	0.8	0.1	0.6	0.9	8.6	57
Rockhunt	1.1	0.4	0.0	0.0	0.1	0.6	2.2	15
ORVuse	0.3	0.0	0.1	0.1	0.0	0.1	0.6	5
Other	1.4	0.1	0.0	0.1	0.3	0.4	2.3	16
Total	50.0	9.3	8.5	4.7	9.1	16.7	98.3*	646

* This does not add to 100 percent due to rounding.

one activity tended to be those fishing or swimming or canoeing. In the two recreation activity packages, swimming with picnicking and fishing with boating were most popular. The fishing-swimming-picnicking was the most popular three activity package. Table 14 shows two recreation activity packages which occur most or least frequently suggesting a positive or negative relationship exists between them. In examining the numerical value of the differences between any pairs of recreation activities at the 95% confidence level, it is statistically significant to show that fishing occurred together with boating most frequently but with swimming least frequently. Thus it leads to a conclusion that there was a positive relationship between fishing and boating but a negative relationship between fishing and swimming.

Tests of Hypotheses

Null Hypothesis 1: Day use visitors participate in the 15 individual recreation activities with equal frequency.
Decision: Reject.

Cochran's Q test, a non-parametric statistical procedure was employed to test this hypothesis. It involves comparing the proportions of parties participating in each activity to the proportions participating in the other activities.

Refering back to Table 8, it can be seen that fishing received the largest percentage of participations by day use parties (51.5%) followed by swimming (49.0%). In contrast,

Table 14.-- Pearson Correlation Test for Significance of Relationship between Individual Recreation Activities.

Coefficient Cases Significance	Pearson Correlation Coefficients			
Variable Pair	Variable Pair	Variable Pair	Variable Pair	Variable Pair
Fishing .2233 with N(196) Boating P=.001	Fishing -.2546 with N(196) SwimmingP=.001	Fishing -.1860 with N(196) Picnic P=.005	Boating .1464 with N(196) SwimmingP=.020	Boating .2045 with N(196) Camping P=.002
Justlook .2276 with N(196) Hiking P=.001	Justlook .2941 with N(196) Natrobs P=.001	Justlook .1463 with N(196) Camping P=.020	Swimming .1592 with N(196) Hiking P=.013	Swimming .1558 with N(196) Photo P=.015
Swimming .3774 with N(196) Picnic P=.004	Hiking .3299 with N(196) Photo P=.001	Hiking .3639 with N(196) Natrobs P=.001	Hiking .2442 with N(196) Camping P=.001	Canoeing .1310 with N(196) Natrobs P=.034
Canoeing-.1766 with N(196) Picnic P=.007	Photo ..2940 with N(196) Natrobs P=.001	Photo .1807 with N(196) Camping P=.006	Photo .2778 with N(196) Picnic P=.001	

Note: Natrobs indicates Nature Observations; Photo indicates Photography.

only 2.6% of visitors took part in the ORV activity. The Cochran's statistic, presented in Table 15, confirms that these differences are significant. Therefore, the null hypothesis was rejected. Day users of state forest campgrounds do have clear preferences for some activities available such as fishing and swimming over others such as driving ORVs.

Null Hypothesis 2: There is no significant difference in the number of different activities which day use parties participated in by day of the week.

Decision: Fail to Reject.

As indicated in Table 16, day use parties arriving Mondays participated in 3.23 activities on an average which is lower than Sundays (3.92 activities). Friday visitors participate in 4.0 activities on average. However, when these differences are subjected to statistical evaluation employing analysis of variance, they did not prove to be statistically significant. Results are presented in Table 17. Thus, the slight differences observed in Table 16 could occur by mere chance, and it is concluded that day of the week has no influence on average number of individual activities visiting parties elect to pursue.

Null Hypothesis 3: There is no significant difference in the number of different activities which day use parties participated in by week within the season.

Decision: Fail to Reject.

Table 18 shows that day use parties in the 10th week (August 29 - September 8) participated in 4.72 activities on

Table 15.-- Cochran Q Test for Frequencies of Participations in Individual Recreation Activity in the State Forest Campground System

Frequencies of Participations						
Value	Fishing	Boating	Justlook	Picking	Visit Camper	Swimming
0	95	136	135	172	179	100
1.	101	60	61	24	17	96
Value	Picnic	Rockhunt	Canoeing	Photograph	Nature Observation	Camping
0	135	180	160	150	119	147
1.	61	16	36	46	77	49
Value	ORVuse	Other	Hiking			
0	191	178	163			
1.	5	18	33			

Cases	Cochran Q	D.F.	Significance
196	360.944	14	0.

Note : Value 0 indicates Not Participated; Value 1 indicates Participated.

Table 16.-- Number of Different Activities which Day Use Party Participate in by Day of the Week.

Day of the Week	Count	Mean	Standard Error	95% Conf. Int. for Mean
Monday	13	3.23	.6114	1.8987 to 4.5628
Tuesday	28	2.68	.3775	1.9861 to 3.3710
Wednesday	22	3.91	.4601	2.9522 to 4.8660
Thursday	27	3.33	.4065	2.4978 to 4.1689
Friday	27	4.00	.4369	3.1019 to 4.8981
Saturday	48	3.79	.3560	3.0755 to 4.5078
Sunday	25	3.92	.4616	2.9673 to 4.8727
Total	190	3.58		

Table 17.-- Analysis of Variance Test for Number of Different Activities which Day Use Party Participate in by Day of the Week.

Number of Different Activities Participated						
Group Means (Standard Deviations)						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
3.23	2.6786	3.9091	3.33	4.00	3.79	3.92
(2.2043)	(1.7858)	(2.1582)	(2.1122)	(2.2702)	(2.4664)	(2.3080)

Source	D.F.	Sum of Squares	Mean Squares	F-Ratio	F-Prob.
Between Groups	6	38.1629	6.3605	1.285	.26638
Within Groups	183	905.9897	4.9508		
Total	189	944.1526			

an average which is higher than the 4th week (4.13 activities), the 7th week (4.0 activities) and the rest of the weeks within the season. However, as can be seen from Table 18, these numeric differences are not statistically significant. Hence, there appears to be no relationships between week within the season and average number of activities day use parties pursue.

Null Hypothesis 4: There is no significant difference in the number of different activities which day use parties participated in by distance traveled.

Decision: Reject.

Compared with those in the other five distance traveled groups, day use parties who traveled more than 200 miles tended to participate in more recreation activities than other day use parties who traveled 200 miles or less and much more than the overall mean (3.59 activities). Results are presented in Table 19. Also, the statistically significant differences at the 95% confidence level were confirmed by the one-way analysis of variance test, there is really no pattern to show that the farther the day use party traveled, the more recreation activities it participated, when the 201 miles and more distance traveled group is excluded.

Null Hypothesis 5: There is no significant difference in the average number of party visits between weekday and weekend.

Decision: Fail to Reject.

Table 18.-- Analysis of Variance Test for Number of Different Activities which Day Use Party Participate in by Week within the Season.

Number of Different Activities Participated									
Group Means (Standard Deviations)									
June 26 to July 3	July 4 to July 10	July 11 to July 17	July 18 to July 24	July 25 to July 31	Aug. 1 to Aug. 7	Aug. 8 to Aug. 14	Aug. 15 to Aug. 21	Aug. 22 to Aug. 28	Aug. 29 to Sept. 8
2.62 (1.0328)	3.28 (1.8127)	3.54 (1.7898)	4.13 (1.6562)	3.21 (2.6335)	3.69 (2.4197)	4.00 (2.4436)	3.07 (2.3057)	3.60 (1.5366)	4.72 (3.1013)

Source	D.F.	Sum of Squares	Mean Squares	F- Ratio	F- Prob.
Between Groups	9	52.0848	5.7872	1.168	.3183
Within Groups	180	892.0678	4.9599		
Total	189	944.1526			

Table 19.-- Analysis of Variance Test for Number of Different Activities Which Day Use Party Participate in by Distance Traveled to Reach the Campground.

Number of Different Activities Participated					
Group Means (Standard Deviations)					
1 to 25	26 to 50	51 to 100	101 to 150	151 to 200	201 to More
3.31 (2.1588)	3.15 (2.1095)	4.00 (2.9352)	3.00 (1.6733)	3.58 (2.1523)	5.55 (2.0641)

Source	D.F.	Sum of Squares	Mean Squares	F-Ratio	F-Prob.
Between Groups	5	94.7121	18.9424	3.964	.0020
Within Groups	176	841.0076	4.7785		
Total	181	935.7197			

Since only two out of four weekdays were randomly selected as sampling days while all three days of the weekend (Friday, Saturday and Sunday) were selected as sampling days in individual weeks, to adjust for this difference in the number of sampling days and get the means of party visits for weekday and weekend in individual weeks, the number of party visits on weekday should be divided by two and the number of party visits on weekend should be divided by three (see Table 20).

To determine the significance of the difference in the average number of party visits between weekday and weekend, the combined responses were compared using the t-test. The t-test is a statistical technique that can be used when comparing the difference between two sample means to determine if the difference is significantly large (the "paired comparison" technique).

The resulting mean responses; 4.55 for weekday and 3.3 for weekend were compared. The results are presented in Table 21. It was found that there was no statistically significant difference in the number of party visits on average between weekday and weekend at the 95% confidence level.

Table 20.-- Frequency of Party Vists on Weekday and Weekend in Individual weeks within the Season.

Week	Weekday		Weekend	
	Number of Party Visits	Mean	Number of Party Visits	Mean
1	7	7/2=3.5	9	9/3=3.0
2	13	6.5	19	6.3
3	8	4.0	5	1.7
4	11	5.5	12	4.0
5	19	9.5	9	3.0
6	9	4.5	17	5.7
7	9	4.5	12	4.0
8	10	5.0	5	1.7
9	3	1.5	2	0.7
10	2	1.0	9	3.0
Total	91	4.55	99	3.3

Table 21.-- Mean Responses Comparison Results.

Paired Comparison	Mean Difference	T Value	D.F.	Sig.
Weekday with Weekend	1.24	1.63252	9	0.086

Four State Forests

Characteristics of Day Use Parties

The Origin of Day Use Parties

In order to provide a general picture of the origin of day use parties visiting individual state forests, the State was divided into nine regions. A tenth origin region was added to include all out-of-state day use parties. As noted earlier this regionalization is arbitrary and boundaries of each were outlined in Figure 1 also presented in an earlier section.

How party visits to individual state forests by region of day use parties' origins are distributed is presented in Table 22. It was found that the out-of-state region (Region 10) generates the largest percentage of day use parties to the Lake Superior state forest campgrounds (18.9%) followed by Region 9 (16.2%). Southeastern Michigan (Region 9) generated the largest percentage of day use parties for the Mackinaw state forest area (33.3%) followed by visitors from within the region , Region 3, containing the Mackinaw forest itself. Also, both the Pere Marquette and Au Sable state forests drew most heavily from within their boundaries.

Frequency of Party Visits to Campgrounds

Of the 420 questionnaires distributed, 196 (46.9%) were returned in an usable condition by the cut-off date (September 15, 1982). There were 39 (70%) respondents from the Lake Superior, 57 (38.0%) from the Mackinaw, 62 (37.0%) from

Table 22.-- Distribution of Party Visits to Individual State Forests by Region of Day Use Parties' Origins.

Region	Lake Superior N=39	Mackinaw N=57	Pere Marquette N=62	Au Sable N=37
	----------Percent----------			
1	0.0	2.0	1.7	0.0
2	13.5	0.0	0.0	0.0
3	5.4	27.4	1.7	0.0
4	2.7	2.0	41.3	10.8
5	8.1	6.0	1.7	32.4
6	13.5	6.0	17.1	2.7
7	8.1	6.0	6.8	19.9
8	13.5	11.7	10.2	13.5
9	16.2	33.3	6.8	10.8
10	18.9	5.9	12.1	8.1
Total	99.9	100.3	99.4	98.2

*
Region 1: Western Upper Peninsula
Region 2: Lake Superior State Forest
Region 3: Mackinaw State Forest
Region 4: Pere Marquette State Forest
Region 5: Au Sable State Forest
Region 6: West Central Michigan
Region 7: East Central Michigan
Region 8: Southwestern Michigan
Region 9: Southeastern Michigan
Region 10: Out-of-State Regions

the Pere Marquette and 37 (30.0%) from the Au Sable state forest area. The nonresponse rates for and uneven response rates between individual state forests should be noted, which would introduce biases into the analyses of results.

By Day of the Week

Compared with the other three state forests, the Pere Marquette's campgrounds were relatively more popular on Mondays, Tuesdays, Wednesdays and especially on Sundays, though the Lake Superior campgrounds captured the largest percentage of party visits on Wednesday because of its highest response rate and number of campgrounds surveyed among the four state forests. The Mackinaw state forest campgrounds were more popular than the other three's on Fridays and Saturdays (see Table 23).

By Week within the Season

Table 24 shows the differences in frequencies of party visits to individual state forests by week within the season. Compared with other weeks in the season, the 7th week accounted for the largest percentage of party visits in the Lake Superior state forest area (22.2%), the 2nd and 4th weeks accounted for the largest percentage of party visits to the Mackinaw (18.2%), and the 5th week accounted for the largest percentage of party visits to the Pere Marquette state forest area; the Au Sable received the most party visits (19.4%) during the 2nd week of the season.

Additional analysis comparing the four forests suggests

Table 23. -- Distribution of Party Visits in Individual Day of the Week Across Four State Forests.

Day of the Week	State Forest: Lake Superior	Mackinaw	Pere Marquette	AuSable	Total %	Total N
Monday	23.1	23.1	30.8	23.1	100.1*	13
Tuesday	21.4	25.0	35.7	17.9	100.0	28
Wednesday	36.4	22.7	27.3	13.6	100.0	22
Thursday	11.1	29.6	40.7	18.5	99.9*	27
Friday	25.9	29.6	22.2	22.2	99.9*	27
Saturday	12.8	34.0	29.8	23.4	100.0	47
Sunday	12.0	32.0	44.0	12.0	100.0	25

* This does not add to 100 percent due to rounding.

Table 24.-- Distribution of Party Visits to Individual State Forests by Week within the Season.

Week within the Season	State Forest: Lake Superior N=36	Mackinaw N=55	Pere Marquette N=62	Au Sable N=36
	Percent			
1st	11.1	7.3	4.8	13.9
2nd	13.9	18.2	16.2	19.4
3rd	5.6	5.4	8.0	8.4
4th	5.5	18.2	11.3	11.1
5th	11.1	12.7	17.8	16.6
6th	8.4	16.4	11.3	16.7
7th	22.2	9.1	11.2	2.8
8th	13.9	7.2	6.5	5.5
9th	5.5	1.9	3.2	0.0
10th	2.8	3.6	9.7	5.6
Total	100.0	100.0	100.0	100.0

Note:
1st week: June 26 - July 3
2nd week: July 4 - July 10
3rd week: July 11 - July 17
4th week: July 18 - July 24
5th week: July 25 - July 31
6th week: Aug. 1 - Aug. 7
7th week: Aug. 8 - Aug. 14
8th week: Aug. 15 - Aug. 21
9th week: Aug. 22 - Aug. 28
10th week: Aug. 29 - Sept. 8

that the Mackinaw was most popular in the 2nd and 9th weeks; the Pere Marquette in the 6th, 8th and 10th weeks, though the Lake Superior captured the equally largest percentage of day visits during the 9th week because of its highest response rates and number of campgrounds surveyed among the four forests; the Au Sable was most popular in the 1st week (see Appendix B, Table B-1).

By Distance Traveled to Reach the Campground

It is obvious from the data presented in Table 25 that the first distance zone (1 - 25 miles) was the origin of the largest percentage of day use party visits to each of the four state forests. It is also interesting to note that day use parties who traveled more than 200 miles accounted for a significant percentage of party visits to the Lake Superior (24.3%) and Mackinaw (16.7%) state forest, second only to that generated in the 1st distance zone. Figure 5 further illustrates the distribution of party visits to individual state forests by distance traveled to reach the campground.

Compared with the other three state forests, the Pere Marquette state forest campgrounds were relatively more popular with parties who traveled less than 50 miles and those traveling between 151 to 200 miles. Parties traveling between 101 to 150 miles chose the Pere Marquette and Au Sable state forest campgrounds relatively more frequently. Between them the Lake Superior and Mackinaw captured about 90% of all parties traveling more than 200 miles (see Table 26).

Table 25.-- Distribution of Party Visits to Individual State Forests by Distance Travelled to Reach the Campground.

Distance Traveled (Miles)	State Forest			
	Lake Superior N=37	Mackinaw N=54	Pere Marquette N=57	Au Sable N=33
	Percent			
1 - 25	48.6	55.6	64.9	45.5
25 - 50	25.0	11.1	12.3	6.1
51 -100	8.1	7.4	0.0	21.2
101 -150	0.0	3.7	7.0	12.1
151 -200	11.8	5.6	14.0	12.1
200 -More	24.3	16.7	1.8	3.0
Total	99.9*	100.1*	100.0	100.0

* This does not add to 100 percent due to rounding.

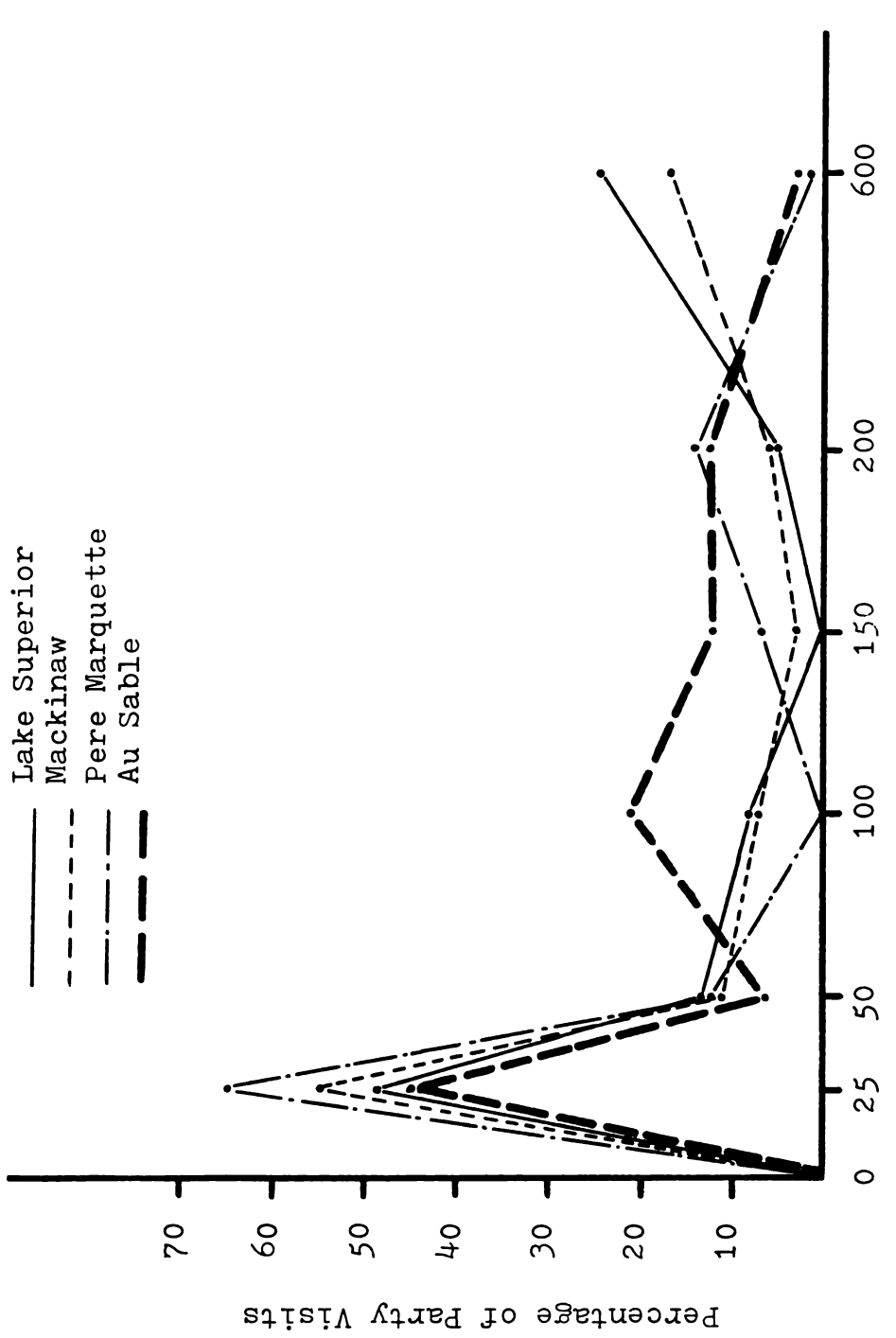


Figure 5.-- Comparison of Party Visits to Individual State Forests by Distance Traveled to Reach the Campground.

Table 26.-- How total Party Visits From Individual Distance Traveled Groups Are Distributed across the Four State Forests.

State Forest	Distance Zone (Miles) 1 to 25 N=100	26 to 50 N=20	51 to 100 N=14	101 to 150 N=10	151 to 200 N=17	201 to More N=20
	Percent					
Lake Superior	18.0	25.0	21.4	0.0	11.8	45.0
Mackinaw	30.0	30.0	28.6	20.0	17.6	45.0
Pere Marquette	37.0	35.0	0.0	40.0	47.1	5.0
Au Sable	15.0	10.0	50.0	40.0	23.5	5.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Participation Characteristics of Individual Activities

It is essential to examine the number of recreation opportunities for individual activities available in individual state forests and to compare these data to what users reported they did while visiting these campgrounds. Obviously what is or is not available will influence what activities visitors can and do participate in. Unfortunately, little of this information is currently available. Canoeing, boating and swimming opportunities are the only activities listed in the Michigan State Forests Campground Directory, Michigan DNR. These data are summarized in Table 27.

Table 27.-- Number of Campgrounds Offering Canoeing, Swimming and Boating Opportunity by Individual State Forests.

Recreation Activity	State Forest				
	Lake Superior N=20	Pere Marquette N=12	Mackinaw N=14	Au Sable N=11	Total N=57
Canoeing	3	6	1	9	19
Swimming	16	5	4	2	27
Boating	15	6	7	3	31
Total	34	17	12	14	77

. References from Michigan State Forest Campground Directory.

It should be noted that swimming is available in all 57 campgrounds but in 30 (52.6%) out of 57 campgrounds is not recommended by the Forest Management Division, Michigan DNR because of inadequate facilities or potentially unsafe conditions.

The most popular activities during the summer season of 1982 as previously noted, fishing and swimming, are water-oriented which is not surprising given that all 57 campgrounds are located on water bodies. Table 28 shows the percentage of day use parties involved in individual recreation activities while their cars were parked at a state forest campground. When the participation rates and the number of opportunities available are compared, some possible explanation for the differences in participation rates

Table 28.-- Percentage of Day Use Parties Participating in Individual Activities While Visiting an Individual State Forest.

Recreation Activity	State Forest				
	Lake Superior	Mackinaw	Pere Marquette	AuSable	Total
Fishing	60.0	41.4	54.1	55.6	51.8
Swimming*	25.0	56.9	49.2	61.1	48.7
Nature Observation*	62.5	39.7	32.8	25.0	39.5
Picnicking	20.0	37.9	27.9	38.9	31.3
Just Look	47.5	25.9	31.1	22.2	31.3
Boating	22.5	34.5	36.1	25.0	30.8
Camping	30.0	24.1	23.0	22.2	24.6
Photography	37.5	24.1	19.7	13.9	13.6
Canoeing	25.0	8.6	23.0	16.7	17.9
Hiking	22.5	19.0	11.5	13.9	16.4
Picking	22.5	13.8	8.2	8.3	12.8
Visit Camper	7.5	15.5	6.6	5.6	9.2
Rockhunt*	25.0	5.2	3.3	2.8	8.6
ORVuse	2.5	3.4	0.0	2.8	2.1
Other	10.0	8.6	14.8	0.0	9.2

* For this activity, differences between the four state forests are statistically significant at the 95% confidence level (Swimming: $X^2 = 12.77782$, D.F.=3, P = .0051; Nature Observation: $X^2 = 13.17415$, D.F.= 3, P = .0043; Rock Hounding: $X^2 = 19.06167$, D.F.=3, P = .0003).

in certain activities among the four state forests come into focus.

For example, only 25 percent of day use parties participated in swimming while visiting the Lake Superior state forest campgrounds. This is surprising given that swimming is listed as being available at 16 (80%) out of 20 campgrounds surveyed in the Lake Superior, which is more than for the other three forests combined. This result might be explained by the fact that the temperature of swimming water is relatively lower than that in Northern Lower Peninsula and the use of non-designated swimming areas in the other three forests. This suggestion, if true, illustrates the complexity of completely relating observed use to facilities available, in particular it demonstrates the need for a more complete inventory of campgrounds to determine recreation opportunities available to include a description of the quality of what is offered.

Another example is that only 8.6 percent of day use parties were involved in canoeing while visiting the Mackinaw state forest campgrounds probably because only 1 (7.1%) out of 14 campgrounds surveyed in the Mackinaw offers canoeing opportunities. This result is a clear example of the relationship between opportunities available and participation level.

Table 29 shows the percentage of participations in individual recreation activities by individual state forest.

Table 29.-- How Total Participations Occurring in the Individual Forests are Distributed among Recreation Activities.

Recreation Activity	State Forest			
	Lake Superior P=168	Mackinaw P=208	Pere Marquette P=209	Au Sable P=113
Fishing	14.3	11.5	15.8	17.7
Boating	5.3	9.6	10.5	7.9
Swimming	5.9	15.9	14.3	19.5
Canoeing	5.9	2.4	6.7	5.3
Camping	7.1	6.7	6.7	7.1
Just Look	11.3	7.2	9.1	7.1
Picking	5.3	3.8	2.4	2.6
Visit Camper	1.8	4.3	1.9	1.7
Hiking	5.3	5.3	3.4	4.4
Photography	8.9	6.7	5.7	4.4
Nature Observation	14.9	11.0	9.6	7.9
Picnicking	4.8	10.6	8.1	12.4
Rockhunt	5.9	1.4	0.9	1.0
ORVuse	0.6	0.9	0.4	1.0
Other	2.7	2.7	4.5	0.0
Total	100.0	100.0	100.0	100.0

* P indicates the number of participations in individual recreation activities occurring in individual state forest.

The nature observation activity accounted for the largest percentage of total participations in the Lake Superior state forest (14.9%) followed by fishing (14.3%) and just looking (11.3%). The three most popular recreation activities are swimming, fishing and boating in the Mackinaw; fishing, swimming and boating in the Pere Marquette; swimming, fishing and picnicking in the Au Sable.

It is also useful to review the relative popularity of individual activities across the four forests. Table 28 is organized to permit such comparisons. Compared with those in other three state forests, day use parties prefered to participate in fishing, nature observation, just looking, camping, photography, canoeing, hiking, picking, rock hounding and "other" activities in the Lake Superior; visiting campers and ORV use in the Mackinaw; boating in the Pere Marquette; swimming and picnicking in the Au Sable.

The differences noted in activities participation levels across the four forests are only significant at the 95% confidence level for the following activities: swimming, nature observation and rock hounding. Possible explanations for the different levels of participations in swimming and rock hounding may be the presence of warmer water in the Lower Peninsula and agates along the Lake Superior shoreline. The difference in nature observation may be related to perceptions that the U.P. has more "nature" to observe (Nelson, 1982).

Also, compared with the other three state forests, the

Lake Superior captured the largest percentage of participations in the following four activities: picking, photography, nature observation and rock hounding, the Mackinaw captured the largest percentage of participations in the following five activities: swimming, visiting campers, hiking, picnicking and ORV use, the Pere Marquette captured the largest percentage of participations in the following three activities: fishing, boating and canoeing (see Table 30).

Yet another way of viewing participation data across activities and across individual forests is presented in Table 31. In Table 31, total participations are distributed among the 15 individual activities and by the forest where the participation occurred. For example, the fishing activity in the Pere Marquette accounted for the largest percentage of total participations (4.7%) followed by swimming in the Mackinaw (4.6%) and by swimming in the Pere Marquette (4.4%).

Tests of Hypotheses

Null Hypothesis 6-A: There is no significant difference in distance traveled to participate in day use activities among the four state forests.

Decision: Fail to Reject.

Those day use parties who visited the Lake Superior state forest campgrounds traveled 118.9 miles on average; those visiting the Mackinaw traveled 74.6 miles; those visiting the Pere Marquette traveled 51.6 miles; and those

Table 30.-- How Total Participations in Individual Activities is Distributed across Four State Forests.

Recreation Activity	State Forest: Lake Superior	Mackinaw	Marquette	Au Sable	Total %	N
Fishing	23.7	23.7	32.7	19.9	100.0	101
Boating	15.0	33.3	36.7	15.0	100.0	60
Swimming	10.5	34.7	31.6	23.2	100.0	96
Canoeing	28.6	14.3	40.0	17.1	100.0	35
Camping	25.0	29.2	29.2	16.6	100.0	49
Just Look	31.1	24.6	31.1	13.2	100.0	61
Picking	36.0	32.0	20.0	12.0	100.0	24
Visit Camper	16.7	50.0	22.2	11.1	100.0	17
Hiking	28.1	34.4	21.9	15.6	100.0	32
Photography	32.6	30.4	26.1	10.9	100.0	46
Nature Observation	32.4	29.9	26.0	17.7	100.0	77
Picnicking	13.1	36.0	27.9	23.0	100.0	61
Rockhunt	62.5	18.7	12.5	6.3	100.0	16
ORVuse	20.0	40.0	20.0	20.0	100.0	5
Other	22.2	27.8	50.0	0.0	100.0	18

Table 31.-- Distribution of Total Participations across Individual Activities and State Forests.

Recreation Activity	State Forest				
	Superior	Mackinaw	Marquette	Au Sable	Total
Fishing	3.5	3.5	4.7	2.9	14.5
Boating	1.3	2.9	3.1	1.3	8.6
Swimming	1.5	4.6	4.4	3.2	13.7
Canoeing	1.5	0.7	2.0	0.8	4.9
Camping	1.7	2.0	2.0	1.1	6.8
Just Look	2.7	2.1	2.7	1.1	8.6
Picking	1.3	1.2	0.7	0.4	3.6
Visit Camper	0.4	1.4	0.6	0.3	2.7
Hiking	1.3	1.7	1.0	0.7	4.7
Photography	2.1	2.0	1.7	0.7	6.5
Nature Observation	3.6	3.3	2.9	1.3	11.1
Picnicking	1.1	3.1	2.4	2.0	8.6
Rockhunt	1.7	0.4	0.2	0.1	2.4
ORVuse	0.2	0.2	0.1	0.1	0.6
Other	0.9	0.8	0.8	0.0	2.5
Total	24.8	29.9	29.2	16.0	99.9*

* This does not add to 100 percent due to rounding.

visiting the Au Sable traveled 75.3 miles. The results of the analysis of variance test presented in Table 32 indicates these differences are not statistically significant at the 95% level of confidence. Therefore, the null hypothesis was not rejected, thus resulting in a decision that there was insufficient evidence for concluding that the day use parties visiting state forests as a group differed with respect to the distance traveled.

Null Hypothesis 6-B: There is no significant difference in distance traveled to participate in day use activities between individual paired state forests.

Decision: Reject only for the paired comparison of the Lake Superior and Pere Marquette.

Since the result showed in Null Hypothesis 6-A does not assure that there are no statistically significant differences in distance traveled between any two forests, the responses were compared using the t-test. The t-test is a statistic that can be used when comparing the difference between two sample means to determine if the difference is significantly large (the "paired comparison" technique). Results of this test of pairs of forests is presented in Table 33. The difference in distance traveled to visit the Lake Superior and the Pere Marquette is the only one of the six possible pairings which was found to be significant at the 95% level of confidence. Thus, considering the four forests together there are no significant difference in travel distances, however, visitors did on average travel further to the Lake

Table 32.-- Analysis of Variance Test for Distance Traveled to Visit Individual State Forests.

Distance Traveled (Miles)					
Group Means (Standard Deviations)					
Lake Superior		Mackinaw	Pere Marquette	Au Sable	
118.9 (165.2)		74.6 (94.5)	51.6 (80.5)	75.3 (73.5)	
Source	D.F.	Sum of Squares	Mean Squares	F-Ratio	F-Prob.
Between Groups	3	102027.0948	34009.0316	3.021	.311
Within Groups	177	1992363.5460	11256.2912		
Total	180	2094390.6409			

Table 33.-- Student's t Test for Distance Traveled to Visit Individual Paired State Forests.

Contrast	Mean Difference	Standard Error	T Value	D.F.	T-Prob.
Lake Superior VS. Mackinaw	44.2808	30.0552	1.4733	52.2	.147
Lake Superior* VS. Pere Marquette	67.2779	29.1840	2.3053	47.2	.026
Lake Superior VS. Au Sable	43.5283	30.0290	1.4995	50.9	.153
Mackinaw VS. Pere Marquette	22.9971	16.7076	1.3764	104.3	.172
Mackinaw VS. Au Sable	-.7525	18.1433	-.0415	80.0	.967
Pere Marquette VS. Au Sable	-23.7496	16.6603	-1.4255	72.0	.158

* For this contrast, there is significant difference in distance traveled between two state forests at the 95% confidence level.

Superior than to the Pere Marquette state forest.

Null Hypothesis 7-A: There is no significant difference in the number of different activities which day use parties participated in among the four state forests.

Decision: Fail to Reject.

It can be seen from Table 34 that day users participated on average in 3.32 to 4.33 different recreation activities. Analysis of variance indicates that this difference is not significant considering all four forests as a group at the 95% confidence level.

Null Hypothesis 7-B: There is no significant difference in the number of different activities which day use parties participated in between individual paired state forests.

Decision: Reject only for the paired comparison of the Lake Superior and Pere Marquette.

Paired comparison tests, which are presented in Table 35 suggest that the only statistically significant difference in the number of different activities pursued occurs between the Lake Superior and Pere Marquette state forests. Thus, while frequency of participations in individual activities does not vary significantly considering the four forests as a whole, visitors to the Lake Superior participated in more activities than those visiting the Pere Marquette.

Table 34.-- Analysis of Variance Test for Number of Different Activities Which Day Use Party Participate in by State Forest.

Number of Different Activities Participated					
Group Means (Standard Deviations)					
Lake Superior		Mackinaw		Pere Marquette	Au Sable
4.33 (2.4423)		3.54 (2.0360)		3.37 (2.1896)	3.32 (2.4950)
Source	D.F.	Sum of Squares	Mean Squares	F-Ratio	F-Prob.
Between Groups	3	27.2120	9.0707	1.776	.1531
Within Groups	191	975.3829	5.1067		
Total	194	1002.5949			

Table 35.-- Student's t Test for Number of Different Activities Which Day Use Party Participate in by Paired State Forests.

Contrast	Mean Difference	Standard Error	T Value	D.F.	T-Prob.
Lake Superior VS. Mackinaw	.7829	.4750	1.6619	71.7	.101
Lake Superior* VS. Pere Marquette	.9624	.4799	2.0055	74.3	.049
Lake Superior VS. Au Sable	1.0090	.5667	1.7804	73.6	.079
Mackinaw VS. Pere Marquette	.1729	.3874	.4463	117.0	.656
Mackinaw VS. Au Sable	.2195	.4909	.4472	65.9	.656
Pere Marquette VS. Au Sable	.0466	.4956	.0941	68.2	.925

* For this contrast, there is significant difference in number of different activities which day use party participate between two state forests at the 95% confidence level.

Three Types of Campgrounds

Characteristics of Day Use Parties

The Origin of Day Use Parties

Regionalization was employed to facilitate origin-destination analyses. The reader should refer to the general discussion of the regionalization of the SFC System day use parties and to Figure 1 in Chapter II.

The flows of day use parties to individual types of campgrounds are illustrated in Table 36. Southeastern Michigan (Region 9) generated the largest percentage of day use parties for the Lake campgrounds (18.9%) followed by Region 4 (17.4%). For the River campgrounds, the Pere Marquette state forest area (Region 4) generated the largest percentage of day use parties (29.1%) followed by Region 9 (16.2%). The Southeastern and East Central Michigan areas shared the lead position as providers of day use parties for the Lake/River campgrounds (16.7%) followed by Region 6 (13.9%).

Frequency of Party Visits to Individual Types of Campgrounds

Thirty-two campgrounds located on lakes, 19 campgrounds located on rivers, and 6 campgrounds located on both a lake and a river were surveyed in this study. Of the responses 126 respondents were from the Lake, 32 from the River and 37 from the Lake/River campgrounds.

Since a proportional sample technique was employed

Table 36.-- Distribution of Party Visits to Individual Types of Campgrounds by Region of Day Use Parties' Origins.

Region	Types of Campgrounds			
	Lake N=126	River N=32	Lake/River N=37	All Types Combined N= 195
	----------Percent----------			
1	0.9	3.2	0.0	1.0
2	2.7	2.6	5.6	2.7
3	11.2	6.4	5.6	8.8
4	17.4	29.1	5.6	16.7
5	10.3	6.4	11.2	9.6
6	12.1	0.0	13.9	10.8
7	6.9	12.9	16.7	9.7
8	10.4	12.9	16.7	11.9
9	18.9	16.2	11.2	16.7
10	9.3	12.9	13.5	12.1
Total	100.0	100.0	100.0	100.0

Note: Region 1: Western Upper Peninsula
Region 2: Lake Superior State Forest
Regiin 3: Mackinaw State Forest
Region 4: Pere Marquette State Forest
Region 5: Au Sable State Forest
Region 6: West Central Michigan
Region 7: East Central Michigan
Region 8: Southwestern Michigan
Region 9: Southeastern Michigan
Region 10: Out-of-State Regions

for selecting campgrounds of the three individual types, analyses from these data can be generalized to the statewide forest campground system. However, when these three types of campgrounds are compared to identify the relative differences in the nature of day use between them, the difference in the number of campgrounds of each type surveyed should be noted. Therefore, in the following analyses of results there are two major phases, one phase is the description of general findings from the data base and implications of these findings to the statewide forest campground system; the other phase is to identify any differences in the nature of day use which exist between the three types of campgrounds considering the difference in the number of campgrounds surveyed of each of the three types.

Thus, Table 36 also suggests that campgrounds located on lakes attract relatively more day use parties (N=126) than the other two types of campgrounds combined but this is at least partially due to differences in sampling rates between the three types. One way to adjust for this difference is to compare the number of responses returned on average from individual types of campgrounds. The campgrounds located on both a lake and a river were most popular (6.16 parties/campground)[1] followed by the Lake campgrounds (3.93 parties/camp-

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[1] Number in parentheses is derived from the equation:
$$\frac{\text{Number of responses in individual campground}}{\text{Number of campgrounds surveyed in that campground type}}$$

ground) and the River campgrounds (1.68 parties/campground).

By Day of the Week

Compared with the other two types of campgrounds using the expected and obtained share of party visits to individual types of campgrounds[1], the campgrounds located on both a lake and a river are most popular on Monday, Tuesday, Wednesday, Saturday and Sunday. On Thursday and Friday the Lake campgrounds are most popular to visit by day use parties (see Table 37).

By Week within the Season

Table 38 shows the differences in frequencies of party visits to individual types of campgrounds by week within the season. The largest percentage of party visits was generated during the 2nd week for the Lake campgrounds, during the 6th week for the River campgrounds and during the 2nd and 7th weeks for the Lake/River campgrounds equally.

Also, Lake campgrounds attract relatively more party visits than the other two types of campgrounds combined. However, compared with the other two campground types, the Lake/River campgrounds are most popular in the 1st, 5th, 7th,

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[1] The expected share of party visits to individual types of campgrounds are as followings: 56.1 percent for campgrounds located on lakes, 33.3 percent for campgrounds located on rivers, and 10.6 percent for campgrounds located on both a lake and a river, and is derived from the equation:

$$\frac{\text{Number of campgrounds surveyed in individual campground type}}{\text{Total number of campgrounds surveyed}}$$

Table 37. -- Distribution of Party Visits by Individual Day of the Week across Three Types of Campgrounds.

Day of the Week	Types of Campgrounds			Total	
	Lake	River	Lake/River	%	N
	----------Percent---------				
Expected Share of Party Visits	56.1	33.3	10.6	100.0	
Monday	61.5	15.4	23.1	100.0	13
Tuesday	64.3	14.3	21.4	100.0	28
Wednesday	59.1	9.1	31.8	100.0	22
Thursday	77.8	11.1	11.1	100.0	27
Friday	70.4	7.4	22.2	100.0	27
Saturday	59.6	23.4	17.0	100.0	47
Sunday	56.0	32.0	12.0	100.0	25

Table 38.-- Percentage Distribution of Party Visits to Individual Types of Campgrounds by Week within the Season.

Week within the Season	Types of Campgrounds		
	Lake N=121	River N=32	Lake/River N=36
	----------Percent----------		
June 23 - July 3	6.6	12.5	11.1
July 4 - July 10	17.4	15.6	16.7
July 11 - July 17	6.6	9.4	5.5
July 18 - July 24	15.7	0.0	11.1
July 25 - July 31	14.0	15.6	16.7
Aug. 1 - Aug. 7	13.3	21.9	5.6
Aug. 8 - Aug. 14	9.0	12.5	16.6
Aug. 15 - Aug. 21	9.1	3.1	8.4
Aug. 22 - Aug. 28	3.3	0.0	2.7
Aug. 29 - Sept. 8	5.0	9.4	5.6
Total	100.0	100.0	100.0

and 10th weeks, the Lake campgrounds are most popular in the 2nd, 3rd, 4th, 5th, 6th, 8th and 9th weeks (see Appendix B, Table B-2).

Distance Traveled to Reach the Campground

Compared with other distance travel zones, the first zone (1 - 25 miles) generates the largest percentage of party visits for all three types of campgrounds (Table 39). Over 60 percent of Lake type campground visits involved travel of 25 miles or less which is about 20 percent more than for the other two types of campgrounds. This indicates that the day use parties tended to visit state forest campgrounds relatively close to their residence or their temporary residence especially those located on lakes. To further illustrate this findings, Figure 6 shows the comparison of the differences in the percentage of party visits to individual types of campgrounds by distance traveled.

Compared with the other two types of campgrounds, the Lake campgrounds were most popular to those day use parties traveling 25 miles or less, or between 101 to 150 miles, or between 151 to 200 miles; the Lake/River campgrounds were most popular to those day use parties traveling between 26 to 50 miles, or between 51 to 100 miles, or between 201 and more miles (see Table 40).

Participation Characteristics of Individual Activities

To assess the differences in the popularity of individual

Table 39.-- Distribution of Party Visits to Individual Types of Campgrounds by Distance Traveled to Reach the Campground.

Distance Traveled (Miles)	Types of Campgrounds		
	Lake N=118	River N=28	Lake/River N=35
	----------Percent----------		
1 - 25	62.7	42.9	40.0
26 - 50	6.8	17.9	20.0
51 -100	5.9	10.7	11.4
101 -150	5.9	3.6	5.7
151 -200	9.3	10.7	8.6
201 -More	9.3	14.3	14.3
Total	99.9*	100.1*	100.0

*This does not add to 100 percent due to rounding.

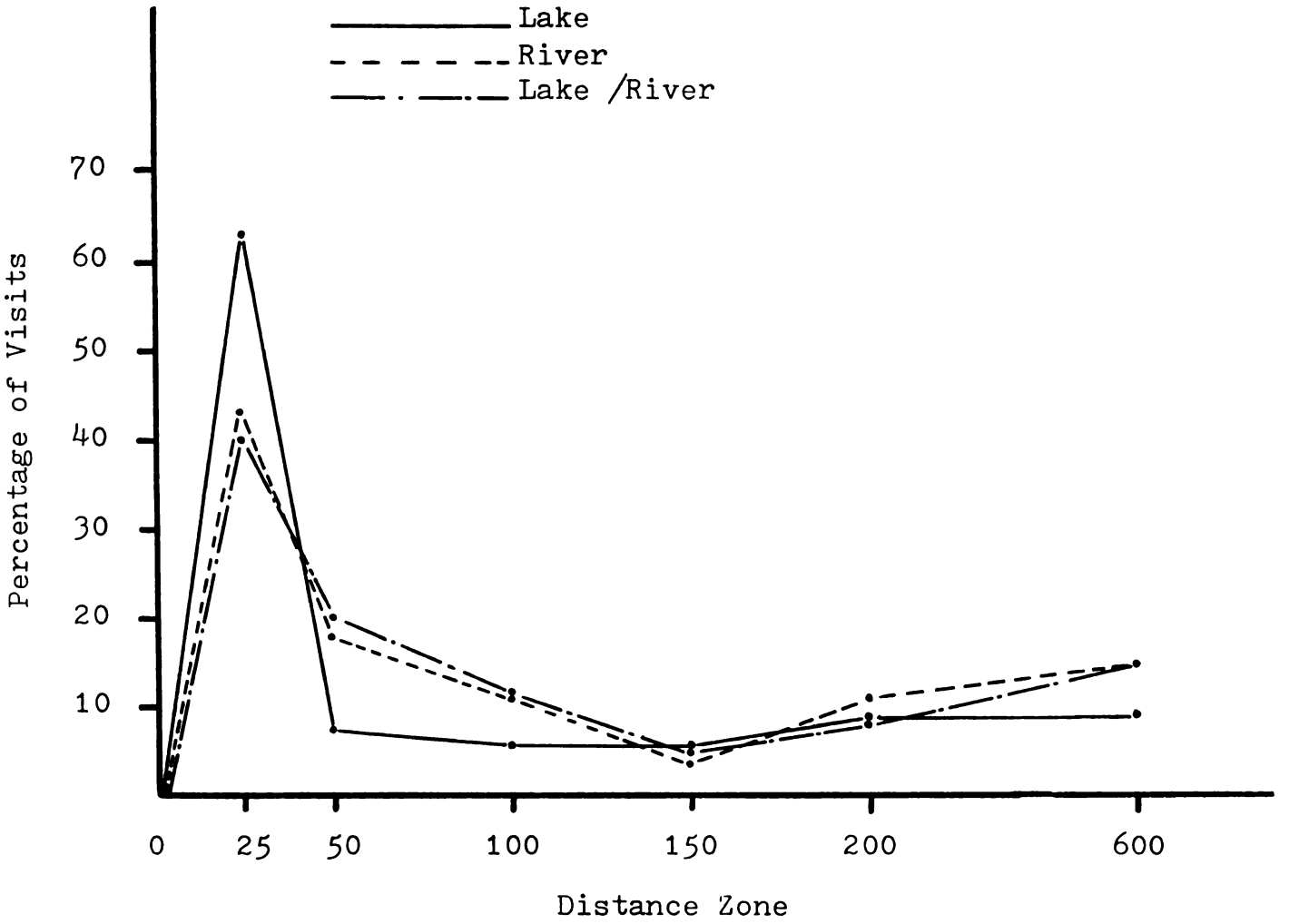

Figure 6. -- Comparison of Party Visits to Individual Types of Campgrounds by Distance Traveled to Reach the Campground.

Table 40.-- Distribution of Total Visits from Each Travel Distance Zone among the Three Campground Types.

Campground Type	Distance Zone (Miles) 1 to 25 N=100	26 to 50 N=20	51 to 100 N=10	101 to 150 N=10	151 to 200 N=17	201 to More N=20	All Types Combined N=177
	Percent						
Lake	74.0	40.0	50.0	70.0	64.7	55.5	65.2
River	12.0	25.0	21.4	10.0	17.6	20.0	15.5
Lake/River	14.0	35.0	28.6	20.0	17.6	25.0	19.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Note: The expected shares of party visits to individual types of campgrounds are as followings: 56.1 percent for the campgrounds located on lakes, 33.3 percent for the campgrounds located on rivers, 10.6 percent for the campgrounds located on both a lake and a river.

activities between and among the three types of campgrounds, it is first necessary to consider the relative availability of such opportunities. The State Forest Campground Directory currently only provides such information for boating, canoeing and swimming, and relative availability of these activi ties is listed in Table 41. If one were to ignore quality differences, most of the remaining activities examined (see Table 42) are available in all 57 campgrounds. Rock hounding is a clear exception and quality picking and ORV use opportunities are limited to only a few campgrounds in the sample. Finally, as noted earlier some participation in, for example, swimming does occur in campgrounds which are not listed as offering swimming opportunities.

Table 42 shows the percentage of day use parties involved in individual recreation activities while visiting day use areas of state forest campgrounds. When the participation rate and the relative number of opportunities for participating in individual recreation activities are compared, some possible explanations for participation rate differences in certain activities can be derived.

For example, only 6.7 percent of day use parties participated in boating activity while visiting the River campgrounds, which is the lowest participation rate for boating activity between the three types of campgrounds. This low participation rate in boating is probably explained by the fact that there are no boating services provided in any of

Table 41.-- Number of Sampled Campgrounds by Type Liated in the State Forest Campground Directory as Offering Canoeing, Boating and Swimming Opportunities.

Recreation Activity	Types of Campgrounds			
	Lake N=32	River N=19	Lake/River N=6	Total N=57
Canoeing	1	15	3	19
Swimming	22	0	5	27
Boating	25	0	6	31
Total	48	15	14	77

. References from Michigan State Forest Campground Directory.

N: The number of campgrounds of individual types of campgrounds included in the sample.

the River campgrounds surveyed. The size of and currents in these rivers generally are not conducive to boating but are ideal for canoeing.

While the above example clearly illustrates the relationship between opportunities available and participation rates, a focus on swimming provides an example of an exception to this general pattern. Swimming is among the four most popular activities in River campgrounds, but the data in Table 41 indicate that the River campgrounds do not offer swimming opportunities. While River campgrounds may not offer facilities judged to be suitable for swimming, many visitors apparantly are able to make do with what is there ——— water.

Table 42.-- Percentage of Day Use Parties Participating in Individual Activities by Types of Campgrounds.

Recreation Activity	Types of Campgrounds			
	Lake	River	Lake/River	Total
Fishing*	67.3	23.3	72.2	51.8
Swimming*	58.9	33.3	25.0	48.7
Nature Observation	35.7	50.0	44.4	39.5
Picnicking	35.7	23.3	22.2	31.3
Just Looking	29.5	33.3	36.1	31.3
Boating*	38.8	6.7	22.2	31.3
Camping	24.8	26.7	22.2	30.8
Photography	25.6	20.0	19.4	23.6
Canoeing*	9.3	50.0	22.2	17.9
Hiking	13.2	26.7	19.4	16.4
Picking	12.4	20.0	8.3	12.8
Visit Camper*	13.2	0.0	2.8	9.2
Rockhunt	7.8	3.3	13.9	8.6
ORV use	31.	0.0	0.0	2.1
Other	7.0	20.0	8.3	9.2

*For this activity, difference between the three types of campgrounds are statistically significant at the 95% confidence level. (Fishing: X^2= 15.79336, D.F.= 2, P= .0004; Boating: X^2= 13.28254, D.F.= 2, P = .0013; Swimming: X^2= 16.31663, D.F.=2, P = .0003; Canoeing: X^2= 27.92125, D.F.=2, P= .0000; Visiting camper: X^2= 7.23918, D.F.= 2, P = .0268)

Furthermore, Table 42 also suggests that there were significant differences, at the 95% confidence level, in the popularity of (activity participation levels in) fishing, swimming, boating, and canoeing when these three types of campgrounds were compared. Fishing was much more popular in impoundments and lakes than in rivers. Lakes were used more extensively for swimming. Boating was most common on lakes, while canoeing was most common on rivers. Levels of swimming, boating, and canoeing participation seem reasonable considering environmental factors such as sandy bottoms in lakes, ability to use power boats in lakes and the excitement of river canoeing. The lack of fishing participation on rivers, however, appears to be more complex. While runs of anadromous fish such as salmon and steelhead do not generally occur during the summer, resident fish such as brown trout are still available. Unlike the other activities , fishing may be more related to the ability of fishermen to capture fish, rather than simply having the resource available. Since sampling generally took place from 11:00 a.m. to 6:00 p.m. while stream fishing for trout is generally poor and other stream recreation activities, such as canoeing, are at their highest levels, total stream fishing activity may be under-represented (Nelson, 1983).

Table 43 shows the percentage distribution of participations among individual recreation activities for individual types of campgrounds. Compared with other recreation

Table 43.-- Percentage Distribution of Total Participations among Individual Activities by Types of Campgrounds.

Recreation Activity	Types of Campgrounds		
	Lake P=474	River P=102	Lake/River P=122
Fishing	14.3	6.9	21.3
Boating	10.5	1.9	6.5
Swimming	16.0	9.8	7.4
Canoeing	2.5	14.7	6.5
Camping	6.7	7.8	6.5
Just Looking	8.0	9.8	10.6
Picking	3.4	5.9	2.4
Visit Camper	3.6	0.0	5.8
Hiking	3.6	7.8	5.7
Photography	6.9	5.9	5.7
Nature Observation	9.7	14.7	13.1
Rockhunt	2.1	0.1	4.1
ORV use	0.8	0.1	0.0
Other	1.9	5.9	2.4
Total	100.0	100.0	100.0

*P: The number of total participations in individual activities occurring in individual types of campgrounds.

activities, swimming accounted for the largest percentage of total participations in Lake campgrounds (16.0%) followed by fishing (14.3%) and boating (10.5%). The three most popular activities at River campgrounds are canoeing, nature observation and swimming, fishing, nature observation and just looking are the most popular Lake/River campground related activities.

When the information in Table 42 and 44 are compared, it can be seen that although the Lake campgrounds captured the largest percentage of participations in all kinds of recreation activities occurring in state forest campgrounds, the Lake campgrounds were relatively more popular for only the following activities: swimming, picnicking, boating, photography and visiting campers after considering the sampling rates (see Table 44).

Other information supplementing the above findings are revealed from Table 45 which shows percentage distribution of total participations by type of campground and by individual activities. For example, the occurences of swimming activity in lakes accounted for about 11.3 percent of total participations followed by fishing (9.7%) and boating (7.2%) in the campgrounds located on lakes.

Tests of Hypotheses

Null Hypothesis 8-A: There is no significant difference in distance traveled to participate in day use activities

Table 44.-- Percentage of Participations in Individual Activities Across Three Types of Campgrounds.

Recreation Activity	Types of Campgrounds			Total	
	Lake	River	Lake/River	%	N
Fishing*	67.3	7.0	25.7	100.0	101
Boating*	83.3	3.3	13.4	100.0	60
Swimming*	80.0	10.5	9.5	100.0	96
Canoeing*	34.3	42.8	22.9	100.0	35
Camping	66.6	16.7	16.7	100.0	49
Just Looking*	62.3	16.4	21.3	100.0	61
Picking	64.0	24.0	12.0	100.0	24
Visit Camper*	94.4	0.0	5.6	100.0	17
Hiking	53.1	25.0	21.9	100.0	32
Photography	76.7	13.9	9.4	100.0	46
Nature Observation	59.7	19.5	20.8	100.0	77
Picnicking	75.4	11.5	13.1	100.0	61
Rockhunt	62.5	6.3	31.2	100.0	16
ORV use	80.0	20.0	0.0	100.0	5
Other	50.0	33.3	16.7	100.0	18

* For this activity, difference between the three types of campgrounds are statistically significant at the 95% confidence level.

Table 45.-- Percentage Distribution of Total Participations by Type of Campground and by Individual Activities.

Recreation Activity	Types of Campgrounds			
	Lake	River	Lake/River	Total
Fishing	9.7	1.0	3.8	14.5
Boating	7.2	0.3	1.1	8.6
Swimming	11.3	1.4	1.3	13.7
Canoeing	1.7	2.2	1.1	4.9
Camping	4.5	1.1	1.1	6.8
Just Looking	5.4	1.4	1.8	8.6
Picking	2.3	0.8	0.4	3.6
Visit Camper	2.4	0.0	0.1	3.6
Photography	4.7	0.8	1.0	6.5
Hiking	2.4	1.1	1.0	4.7
Nature Observation	6.6	2.2	2.3	11.1
Picnicking	6.6	1.0	1.1	8.6
Rockhunt	1.4	0.1	0.7	2.4
Other	0.5	0.1	0.0	0.6
Other	1.3	0.8	0.4	2.5
Total	68.0	14.3	17.2	99.9*

* This does not add to 100 percent due to rounding.

among the three types of campgrounds.

Decision: Fail to Reject.

Day use parties who visited Lake campgrounds traveled 65.1 miles on average; those visiting River campgrounds traveled 91.4 miles; and those visiting Lake/River campgrounds traveled 103.2 miles. Data presented in Table 46 suggests there is no statistically significant differences among these mean distances traveled when considering these three campground types as a group. Therefore, the null hypothesis was not rejected. Thus, there was insufficient evidence for concluding that the day use parties visiting different types of campgrounds differed with respect to the distance traveled to reach the campground.

Null Hypothesis 8-B: There is no significant difference in distance traveled to participate in day use activities between individual paired campground types.

Decision: Fail to Reject.

To determine the significance of the differences in distance traveled between pairs of campground types, the responses were compared using the t-test. The t-test is a statistic that can be used when comparing the difference between two sample means to determine if the difference is significantly large (the "paired comparison" technique"). However, no statistically significant differences were observed at the 95% confidence level for any of the three possible pairings as indicated in Table 47.

Table 46.-- Analysis of Variance Test for Distance Traveled to Visit Individual Types of Campgrounds.

Distance Traveled (Miles)					
Group Means (Standard Deviations)					
Lake		River		Lake/River	
65.1 (93.4)		91.4 (110.0)		103.2 (143.4)	
Source	D.F.	Sum of Squares	Mean Squares	F-Ratio	F-Prob.
Between Groups	2	46681.8612	23340.9306	2.029	.1345
Within Groups	178	2047708.7797	11503.9819		
Total	180	2094390.6409			

Table 47.-- Student's t Test for Distance Traveled to Visit Individual Paired Types of Campgrounds.

Contrast	Mean Difference	Standard Error	T Value	D.F.	T-Prob.
Lake VS. River	-26.3269	22.5115	-1.1695	36.8	.250
Lake VS. Lake/River	-38.1840	25.7219	-1.4845	42.9	.145
River VS. Lake/River	-11.8571	31.9445	- .3712	60.9	.712

Null Hypothesis 9-A: There is no significant difference in the number of different activities which day use parties participate in among the three types of campgrounds.

Decision: Fail to Reject.

From Table 48, it can be seen that day use paries participated in on average of about 3.6 different activities on a visit to a state forest campground. The variation is slight across the three campground types, and statistical analysis confirms that differences are insignificant for the group.

Null Hypothesis 9-B: There is no significant difference in the number of different activities which day use parties participate in between individual paired campground types.

Decision: Fail to Reject.

Paired comparison tests, which are presented in Table 49 suggest that there are no statistically significant differences present at the 95% confidence level for any of the three possible pairings of the three campground types. Thus, combining the information from the test of Null Hypothesis 9-A and 9-B, it is concluded that campground type has no influence on number of different activities a day use party participates in on a day use visit to a state forest campground.

Table 48.-- Analysis of Variance Test for Number of Different Activities Which Day Use Party Participate by Types of Campgrounds.

Number of Different Activities Participated					
Group Means (Standard Deviations)					
Lake		River		Lake/River	
3.68 (2.3380)		3.56 (2.4222)		3.58 (1.9344)	
Source	D.F.	Sum of Squares	Mean Squares	F-Ratio	F-Prob.
Between Groups	2	2.7156	1.3578	.261	.7708
Within Groups	192	999.8793	5.2077		
Total	194	1002.5949			

Table 49.-- Student's t Test for Number of Different Activities Which Day Use Party Participate by Individual Paired Types of Campgrounds.

Contrast	Mean Difference	Standard Error	T Value	D.F.	T-Prob.
Lake VS. River	.1200	.4762	.2521	46.8	.802
Lake VS. Lake/River	.3042	.3801	.8001	69.8	.426
River VS. Lake/River	.1841	.5334	.3452	59.1	.731

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

Due to the ever increasing number of people using the forest for leisure, the basic objective of this study was to investigate the nature of day use and characteristics of day users of the Michigan state forest campgrounds. An examination of these factors is periodically necessary in order to keep up with changes in day users and the way they use the forest.

Fifty-seven state forest campgrounds were selected as study sample areas. These 57 campgrounds were distributed among the four forests as follows: 20 from the Lake Superior, 14 from the Mackinaw, 12 from the Pere Marquette and 11 from the Au Sable. Of the 57 campgrounds, 32 are located on lakes, 19 on rivers and 6 on both a lake and a river. The relative mix of campgrounds by type of water body present in the sample is similar to that of the complete SFC System.

From June 26 to September 8 of 1982, 420 post-card questionnaires were administered to a sample of day users and 196 (46.9%) were returned in an usable condition by the cut-off date (September 15, 1982).

Information obtained included characteristics of day users and day users' recreation behavior in these 57 campgrounds. The information which was collected was analyzed

to provide a picture of day use and users across the SFC System, within each of the four forests and within each of the campground types.

Key results from these analyses are discussed below and summarized in Table 50.

State Forest Campground System

Most day use parties came from Michigan. Regionalization of users' origins indicated that day users were drawn from throughout the state and not only densely populated regions such as southeastern Michigan. Ohio generated the largest percentage of out-of-state day users to the Michigan state forest campgrounds. The day use party in 1982 consisted of 4.7 members on average and the median party size was 3.6 members.

It was found that day of the week or week within the season did not have a great influence on the number of party visits registered. The percentage of total party visits is distributed fairly evenly across the week except for the peak Saturday use and low Monday use; across weeks within the season except for the peak in the 2nd week and low in the 9th week use. However, distance traveled to reach the campground did have a great influence on the distribution of party visits with most of day use parties arriving from a distance of 1 - 50 miles. Also, it should be noted that

there were substantial proportion of day use parties willing to travel more than 150 miles to a SFC System campground for one-day recreation pursuit, and, interestingly, most of out-of-state day users traveled only 40 miles or less. The latter is probably explained by a portion of users traveling from a second home or other temporary lodging rather than traveling directly from their permanent residence.

Participation levels in individual recreation activities were examined and fishing was found to be the activity most often participated in, but swimming, nature observation, picnicking, just looking and boating were also quite popular. It was found that there was no statistically significant difference in the distribution of participations in individual recreation activities across the days of the week; except for the picking activity which peaked on Fridays, nor across weeks within the season. However, the participation levels in individual recreation activities were greatly influenced by the distance traveled, for example, 45.5 percent of day use parties who participated in picking activity traveled more than 150 miles on average.

It was found that the majority of day use parties participated in two or more recreation activities while visiting a state forest campground. Parties participating in one recreation activity tended to choose fishing, swimming or canoeing. In the two recreation activity packages, swimming with picnicking and fishing with boating were most popular.

Fishing-swimming-picnicking was the most popular three activity package.

Specific hypotheses were postulated and tested concerning day use of the SFC System. It was found that there is a statistically significant difference in the participation levels between individual recreation activities. No statistical significant difference was found between day of the week or between week within the season in terms of the number of different activities participated by day use parties. A negative relationship was found between the number of different activities which day use parties participated in and distance traveled for the closest and most distant travel distance zones. However, this relationship did not hold for the intermediate travel zones. This coupled with the relatively small sample available for analysis limits the degree of confidence one can place on the relationship between distance traveled and number of different activities day use parties pursue.

Four State Forests

The out-of-state origin (Region 10) generated the largest percentage of day use parties to the Lake Superior state forest campgrounds. Southeastern Michigan (Region 9) generated the largest percentage of day use parties for the Mackinaw state forest area. Both the Pere Marquette and

Au Sable state forests drew most heavily from within their boundaries for day use visitors. All four forests, however, drew significant number of visitors from many other regions of the state.

Compared with the other three state forests, the Pere Marquette's campgrounds were relatively more popular on Mondays, Tuesdays, Wednesdays, Thursdays and especially on Sundays. The Mackinaw state forest campgrounds were more popular than the other three's on Fridays and Saturdays. Compared with other weeks within the season, the 7th week accounted for the largest percentage of party visits to the Lake Superior, the 2nd and 4th weeks accounted for the largest percentage of party visits to the Mackinaw, the 5th week accounted for the largest percentage of party visits to the Pere Marquette state forest, and the Au Sable received the most party visits during the 2nd week of the season.

Compared with other distance zones, the first distance zone (1 - 25 miles) was the origin of the largest percentage of day use parties to each of the four forests. Also, compared with the other three forests, the Pere Marquette was relatively more popular with parties who traveled less than 50 miles and those traveling between 151 to 200 miles. Parties traveling between 101 to 150 miles chose the Pere Marquette and Au Sable state forest campgrounds relatively more frequently. Between them the Lake Superior and Mackinaw forests captured about 90% of all parties traveling more

than 200 miles.

Statistical differences in levels of participation in individual activities across the four state forests were found at the 95% confidence level for the following activities: swimming, nature observation, just looking and rock hounding. In terms of the popularity of individual recreation activities across the four forests, fishing, nature observation, just looking, camping, photography, canoeing, hiking, rock hounding and "other" activities were most popular in the Lake Superior, visiting campers and ORV use were most popular in the Mackinaw, boating was most popular in the Pere Marquette, swimming and picnicking were most popular in the Au Sable. However, these differences in realtive popularity of individual recreation activities among the four forests does not necessarily translate into the forest where an activity is most popular capturing the greatest share of systemwide participations in this activity. Variations in questionnaires distributed and differences in response rates also bear on the relative percentage of systemwide participations an individual forest captures. For example, fishing was most popular in the Lake Superior forest, compared with that in other three forests, but the Mackinaw captured the largest percentage of fishing activity occurring in the SFC System.

Specific hypotheses were postulated and tested concerning the four forests to identify differences among them as a

group and between individual pairs of forests. It was found that there was no statistical difference in distance traveled to participate in day use activities among the four forests; however, visitors did on average travel further to the Lake Superior than to the Pere Marquette forest. No statistical difference was found among the four forests in terms of the number of different activities which day use parties participated in; however, visitors to the Lake Superior forest participated in more activities on average than those visiting the Pere Marquette.

Three Types of campgrounds

Southeastern Michigan (Region 9) generated the largest percentage of day use parties for the Lake campgrounds. For the campgrounds located on rivers, the Pere Marquette state forest region (Region 4) generated the largest percentage of day use parties. The southeastern and east central Michigan regions shared the lead position as providers of day use parties for the campgrounds located on both a lake and a river.

Since a proportional sampling technique was employed in the selection of campgrounds of the three types, there are significant differences in the number of campgrounds selected of each type (i.e. 32 campgrounds located on lakes, 19 on rivers and 6 on both a lake and a river). These sampling

rates need to be noted in reviewing some of the findings which follow.

It was found that campgrounds located on both a lake and a river were most popular. However, Lake campgrounds attracted relatively more day use parties than the other two types of campgrounds combined because of their dominance in the campground sample.

It was found that the Lake/River campgrounds were most popular on Mondays, Tuesdays, Wednesdays, Saturdays and Sundays. On Thursdays and Fridays the Lake campgrounds were most popular to visit by day use parties. The largest percentage of party visits was generated during the 2nd week for the Lake campgrounds, during the 6th week for the River campgrounds and visitation to the Lake/River campgrounds exhibited equal peaks during the 2nd and 7th weeks of the season. Compared with other distance travel zones, the first zone (1 - 25 miles) generated the largest percentage of party visits for all three types of campgrounds.

After adjusting for differences in sampling rates discussed above, it was found that the campgrounds located on both a lake and a river were most popular on Monday, Tuesday, Wednesday, Saturday and Sunday, and during the 1st, 5th, 7th and 10th weeks of the season, and to those day use parties traveling between 26 to 50 miles or between 51 to 100 miles or 201 miles or more. The Lake campgrounds were most popular on Thursday and Friday, and during the 2nd, 3rd, 4th,

5th, 6th, 8th and 9th weeks of the season, and to those day use parties traveling 25 miles or less or between 101 to 150 miles or between 151 to 200 miles. River campgrounds captured the least percentage of day visits by day of the week, by week within the season and by distance traveled.

In order to identify the popularity of individual recreation activities across the three types of campgrounds, the comparisons of percentage of day use parties participating in individual activities while visiting a campground type were calculated and compared. It was found that the swimming, picnicking, boating, photography and visiting campers activities were most popular in the Lake campgrounds, nature observation, canoeing, hiking, picking and "other" activities were most popular in the campgrounds located on rivers, fishing, just looking and rock hounding were most popular in the campgrounds located on both a lake and a river. However, the Lake campgrounds captured the largest percentage of participations in all kinds of recreation activities because of their dominance both in the sample and in the SFC System.

Compared with other recreation activities, swimming accounted for the largest percentage of total participations in Lake campgrounds, canoeing and nature observation shared the lead position in participations at River campgrounds, fishing was the most popular activity in the campgrounds located on both a lake and a river.

It was found that there were significant differences in activity participation levels among the three types of campgrounds at the 95% confidence level for the following activities: fishing, swimming, boating, canoeing and visiting campers.

Specific hypotheses were postulated and tested concerning the three campground types to identify differences among them as a group and between individual pairs of campground types. It was found that there was no statistical difference in distance traveled to participate in day use activities among the three types of campgrounds. Campground type had no influence on number of different activities a party participated in on a day use visit to a state forest campground.

From the results of analyses discussed above, some similar and different findings among these three kinds of groupings of state forest campgrounds, the SFC System, the four state forests and the three campground types, were observed. For example , the first distance zone (1 - 25 miles) was the origin of the largest percentage of day use parties to all these three kinds of groupings of campgrounds, on the other hand, most day use parties prefered to travel a rather short distance of 1 - 25 miles to visit and participate in recreation activities in a state forest campground, however, the most popular time (day of the week and week within the season) for day users to visit a state forest campground were quite different among and within individual three kinds of

groupings of campgrounds. Also, the participation levels in individual recreation activities in a state forest campground were quite different and greatly influenced by the geographical location and characteristics of that campground.

Table 50.-- Summary of Results for Key Variables.

Variable	SFC System	State Forests				Campground Types		
		Lake Superior	Mackinaw	Pere Marquette	Au Sable	Lake	River	Lake/ River
Origin								
Michigan	91.2%	82.1%	94.6%	90.0%	91.9%	90.7%	87.1%	86.5%
Out-of-State	9.8%	17.9%	5.4%	10.0%	8.1%	9.3%	12.9%	13.5%
Party Visits								
Day of the Week								
Monday	6.8%	8.3%	5.5%	6.5%	8.3%	6.6%	6.3%	8.3%
Tuesday	14.7%	16.7%	12.7%	16.1%	13.9%	14.9%	12.5%	16.7%
Wednesday	11.6%	22.2%	9.1%	9.7%	8.3%	10.7%	6.3%	19.4%
Thursday	14.2%	8.3%	14.5%	17.7%	13.9%	17.4%	9.4%	8.3%
Friday	14.2%	19.4%	14.5%	9.7%	16.7%	15.7%	6.3%	16.7%
Saturday	25.2%	16.7%	29.1%	22.6%	30.6%	23.1%	34.4%	22.2%
Sunday	13.1%	8.3%	14.5%	17.7%	8.3%	11.6%	25.0%	8.3%
Week within the Season								
June 26-July 3	8.4%	11.1%	7.3%	4.8%	13.9%	6.6%	12.5%	11.1%
July 4-10	16.9%	13.9%	18.2%	16.2%	19.4%	17.4%	15.6%	16.7%
July 11-17	6.8%	5.6%	5.4%	8.0%	8.4%	6.6%	9.4%	5.5%
July 18-24	12.1%	5.5%	18.2%	11.3%	11.1%	15.7%	0.0%	11.1%
July 25-31	14.7%	11.1%	12.7%	17.8%	16.6%	14.0%	15.6%	16.7%

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Table 50.-- Summary of Results for Key Variables (cont').

Variable	SFC System	State Forests				Campground Types		
		Lake Superior	Mackinaw	Pere Marquette	Au Sable	Lake	River	Lake/ River
Week within the Season (cont')								
Aug. 1-7	13.7%	8.4%	16.4%	11.3%	16.7%	13.3%	21.9%	5.6%
Aug. 8-14	11.5%	22.2%	9.1%	11.2%	2.8%	9.0%	12.5%	16.6%
Aug. 15-21	7.9%	13.9%	7.2%	6.5%	5.5%	9.1%	3.1%	8.4%
Aug. 22-28	2.6%	5.5%	1.9%	3.2%	0.0%	3.3%	0.0%	2.7%
Aug. 29-Sept. 8	5.8%	2.8%	3.6%	9.7%	5.6%	5.0%	9.4%	5.6%
Distance Traveled								
1- 25 miles	54.9%	48.6%	55.6%	64.9%	45.5%	62.7%	42.9%	40.0%
26- 50 miles	11.0%	25.0%	11.1%	12.3%	6.1%	6.8%	17.9%	20.0%
51-100 miles	7.7%	8.1%	7.4%	0.0%	21.2%	5.9%	10.7%	11.4%
101-150 miles	6.1%	0.0%	3.7%	7.0%	12.1%	5.9%	3.6%	5.7%
151-200 miles	9.3%	11.8%	5.6%	14.0%	12.1%	9.3%	10.7%	8.6%
201-more miles	11.0%	24.3%	16.7%	1.8%	3.0%	9.3%	14.3%	14.3%
Average (miles)	76.7	118.9	74.6	51.6	75.3	65.1	91.4	103.2
Number of Campgrounds Offering								
Canoeing	19	3	1	6	9	1	15	3
Swimming	27	16	4	5	2	22	0	5
Boating	31	15	7	6	3	25	0	6

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Table 50.-- Summary of Results for Key Variables (cont').

Variable	SFC System	State Forests				Campground Types		
		Lake Superior	Mackinaw	Pere Marquette	Au Sable	Lake	River	Lake/ River
Three Most Popular Activities in Individual Area (% of Participations)	Fishing (14.4%)	Natrobs* (14.9%)	Swimming (15.9%)	Fishing (15.8%)	Swimming (19.5%)	Swimming (16.0%)	Canoeing (14.7%)	Fishing (21.3%)
	Swimming (13.7%)	Fishing (14.3%)	Fishing (11.5%)	Swimming (14.3%)	Fishing (17.7%)	Fishing (14.3%)	Natrobs (14.7%)	Natrobs (13.1%)
	Natrobs (11.0%)	Justlook (11.3%)	Natrobs (11.0%)	Boating (10.5%)	Picnick (12.4%)	Boating (10.5%)	Swimming (9.8%)	Justlook (10.6%)
Number of Different Activities a Party Participated in on Average	3.58	4.33	3.54	3.37	3.32	3.68	3.56	3.37

* Natrobs indicates Nature Observations.

Recommendations

1. A replication of this study should be conducted with a larger sample size to facilitate more in-depth analyses, e.g. an analysis of the variations in the package of various recreation activities between the four state forests and/or the three types of campgrounds.
2. A modified schedule of sampling times should be developed in order to obtain information from those day use parties (e.g. fishermen) who visit a state forest campground either in the early morning or the late afternoon.
3. The Forest Management Division has no reliable estimate of total day use in the SFC System, in the four forests, or for individual campgrounds. This information void was a severe handicap in this study. For example, having it available would have permitted development of weighting schemes for adjusting for probable bias introduced in the sampling scheme which was employed in this study. Furthermore, FMD could use this information in many other ways to include simply better accounting for the services it is providing to the day user public.
4. Although a completely revised questionnaire will not be presented here, there are a number of items of information that should be included on future questionnaires. This new information would both greatly aid in the analyses employed herein and permit testing of other useful hypotheses as well.

These additional items are:

1) Campground name, which can be used to identify the distribution of day visits to individual campgrounds.
2) Party size, which can be used to estimate the total day day visitors such as in calibrating traffic counters.
3) The day user's name, address and telephone number, which can be used to reach the day users by telephone or by follow-up questionnaire.
4) Name of alternative campgrounds visited by users, which can be used to determine the number and location of possible competitive substitutes for a campground. If desired, this information can be used to predict the day-use visitation of a state forest campground.
5) Number of days this state forest campground was used in the preceding season and has been used in this season.
6) Time of entering and leaving this campground; number of hours spent in this campground, which can be used to determine the peaking of day use in campgrounds.
7) Activities participated by the day use party while there, which can be used to determine the levels of participation in individual recreation activities in a state forest campground.
8) Four activities which day use party spend the most time on, and number of hours spent doing each of them. Information contained in questions both 7 and 8 can be used to determine the relative popularity of individual

recreation activities in a campground.

9) Socio-economic data, such as age, income and education level, of the head of a day use party, which can be used to identify the effect of socio-economic characteristics of day users on their recreation behavior.

10) Travel characteristics, such as purpose of trip, day user's origin of residence, mileage traveled, and travel time. Crapo and Chubb (1969) explained the reason why the respondent should be asked for both "Mileage traveled" and "Travel time", that is "If the responses to one of these questions appears suspect, they can be checked against the responses to the other travel question and in this way some measure of their reliability established".

The information contained here could contribute to a better understanding of state forest campground day users' needs, desires, characteristics and recreation behavior for the purpose of developing a suitable and adequate operation and management policy to provide day users a more enjoyable experience while maintaining a quality forest environment.

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APPENDICES

APPENDIX A

SURVEY INSTRUMENT

APPENDIX A

SURVEY INSTRUMENT

MICHIGAN STATE FOREST CAMPGROUNDS DAY USE STUDY POST CARD

QUESTIONNAIRE

The DNR is interested in the amount and types of recreational activities that occur in relation to Michigan State Forest campgrounds. We would appreciate your help by telling us about your activities today.

1. How many people are in your party? _____people

2. What activities did your party participate in while your car was parked at _____ campground on _____?

   (Please check All the activities your party participated in)

____ Fishing	____ Swimming	____ Camping
____ Boating	____ Hiking	____ Picnicking
____ Just Looking	____ Canoeing	____ Rock Hounding
____ Pick berries, fruit, etc.	____ Photography	____ ORV use
____ Visiting campers	____ Nature observation	____ other (Please explain_____)

3. Where is your home? _____ County in _____ State or Province

4. How far did you travel to reach this campground today? _____ miles

5. Would you be willing to provide more information about your use of State Forest Campgrounds? ____ Yes ____ No (If no, you are done. Please follow the mailing instructions).
   If yes, please write your _____ Name
   _____ Address
   _____ City, State, Zip

Thank you for your help. Please mail this card. The postage is paid.

APPENDIX B

PERCENTAGE DISTRIBUTION OF PARTY VISITS IN INDIVIDUAL WEEKS WITHIN THE SEASON ACROSS THE FOUR STATE FORESTS AND ACROSS THE THREE TYPES OF CAMPGROUNDS

Table B-1.-- Percentage Distribution of Party Visits in Individual Week within the Season across the Four State Forests.

Week within the Season	State Forests: Lake Superior	Mackinaw	Pere Marquette	Au Sable	Total %	N
	----------Percent----------					
1st	25.0	25.0	18.8	31.2	100.0	16
2nd	15.6	31.2	31.2	22.2	100.0	32
3rd	15.4	23.1	38.5	23.1	100.1*	13
4th	8.7	43.5	30.4	17.4	100.0	23
5th	14.3	25.0	39.3	21.4	100.0	28
6th	11.5	34.6	26.9	23.1	100.1*	26
7th	38.1	23.8	33.3	4.8	100.0	21
8th	33.3	26.7	26.7	13.3	100.0	15
9th	40.0	20.0	40.0	0.0	100.0	5
10th	9.1	18.2	54.5	18.2	100.0	11

* This does not add to 100 percent due to rounding.

Table B-2.-- Distribution of Party Visits in Individual Week within the Season across the Three Types of Campgrounds.

Week within the Season	Types of Campgrounds: Lake	River	Lake/River	Total %	Total N
	----------Percent----------				
Expected Share of Party Visits	56.1	33.3	10.6	100.0	
1st	50.0	25.0	25.0	100.0	16
2nd	65.7	15.6	18.7	100.0	32
3rd	61.5	23.1	15.4	100.0	13
4th	82.6	0.0	17.4	100.0	23
5th	60.7	17.8	21.5	100.0	28
6th	64.0	28.0	8.0	100.0	25
7th	52.4	19.0	28.6	100.0	21
8th	73.3	6.7	20.0	100.0	15
9th	80.0	0.0	20.0	100.0	5
10th	54.6	18.2	18.2	100.0	11