KELLOGG FOREST VISITORS:

A DESCRIPTIVE STUDY

By

Patricia Newmyer

A THESIS

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

MASTER OF SCIENCE

Department of Parks and Recreation Resources

1984

ABSTRACT

KELLOGG FOREST VISITORS:
A DESCRIPTIVE STUDY

By

Patricia Newmyer

The goal of this study was to describe visitors to the Kellogg Experimental Forest in Augusta, Michigan. The objectives were to outline use patterns; to develop a typology of visitors including group characteristics, respondent characteristics, and motives linked with characteristics of the Forest by activity group; to collect visitor data on issues of concern to Forest management; and to compare some results with a similar study (Kielbaso, 1967). The methods employed included: traffic counts, systematic observation, and 267 personal interviews.

Major findings follow. An estimated 95,939 people visited between August, 1983 and July 1984. This is an increase of approximately 250% over the 1967 attendance. The visitors described were a devoted group. Primarily, they were highly educated white, repeat visitors living within 15 miles of the Forest. Visitors in all activity categories stated similar motives and chose similar characteristics of the Forest as important. Visitors voiced satisfaction with the site and facilities. Implications for management are included.

ACKNOWLEDGEMENTS

There are many people who have earned my gratitude for their assistance in the production of this thesis. My thanks go to Joe Fridgen and Cass Book, two members of my committee, for their time and helpful suggestions. Maureen McDonough, my advisor and Chair of the committee, also offered her time and suggestions as well as criticisms and moral support through this experience. My appreciation also goes to the Michigan State University Department of Forestry and the Kellogg Biological Station for funding this study.

Tom Stadt, the final member of my committee and Resident Forester at the Kellogg Forest, was especially helpful as were the members of the Forest crew - Dave England, Don Alkema, and Steve Noble. Through my many trips to the Forest, Tom and Mary Stadt and the Forest crew offered their hospitality, humor, and enthusiasm for this project. Working at the Forest has been one of the best integrations of work and recreation I have experienced.

Another source of encouragement and suggestions during this project and my entire program has been my friends and colleagues in the Parks and Recreation Resource Department. Their numerous consultations, stimulating discussions and jokes have made my stay at Michigan State University fun.

Just when I thought this thesis would never get typed in time, Laurie Kimble, confidently assured me it would. Laurie's commitment and dedication were an inspiration in meeting the deadline.

Finally, a special note of appreciation goes to two of my favorite people. Thanks, Ellen and Mark, for putting up with yet another weirdness.

T.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Recreation, especially outdoor recreation, is an integral element in our society. A 1977 nationwide survey of households and visitors to federal recreation areas reported that 59% of all Americans rate outdoor recreation as very important in comparison with other interests (Heritage Conservation and Recreation Service, 1979). This survey also reported an increase in the frequency of participation in outdoor recreation.

The importance placed on outdoor recreation has translated into a growing demand for outdoor recreation opportunities in the United States. One concern today is the availability of outdoor recreation sites close to population centers. Our population has shifted from rural to urban areas. Since the 1960's an emphasis on providing recreation opportunities in close proximity to the urban population centers has been a recognized need. Currently, the majority of sites are removed from the cities.

When the demand exceeds the supply, visitor pressure is exerted on the available recreation sites. "Intermediate" type forests (Clawson and Knetsch, 1966) those within easy driving distance of population centers that are mainly undeveloped or moderately developed, serve a vital need in meeting outdoor recreation demand. Since they are closer to population centers, they are visited with a greater frequency than the more distant resource-based recreation areas.

The Kellogg Experimental Forest is located within 15 miles of the cities of Battle Creek and Kalamazoo, Michigan. As an intermediate type forest, it serves to meet the demand for outdoor recreation close to home.

The problem at the Kellogg Forest is the increase in recreation use at a primarily research oriented site. Some use studies have been done in the past. However, the management need is to assess current visitors, and to use visitor data as a basis for recreation management decisions. Also important is the development of a monitoring system to evaluate use changes over time.

PROBLEM JUSTIFICATION

Recreation is a complex human phenomenon influenced by a variety of factors. The challenge to resource managers is to provide recreation services that meet the needs and desires of the visitors, and to adapt these services to change. The first step in planning management strategies to meet visitor needs is knowing the visitor. Information on who the visitors are, where they come from, what they seek from their recreation experience, their interests, and their recreation behavior is the foundation for decision making. Sometimes managers also desire information evaluating specific recreation services.

Socio-demographic variables are a standard method for describing the visitor. Information on visitors' age, sex, race, education, income, occupation, and place of residence are explanatory variables for recreation behavior. They describe individual characteristics of the people who participate in specific activities (Burch, 1969; ORRC, 1962; Owens, 1970). Other descriptive variables address what visitors do. These variables include how often visitors participate and in which activities. Data on characteristics of the visiting group are also an important concern reflecting recreation's social aspect and the satisfactions derived from group interaction (Cheek, Field and Burdge, 1976).

These factors are some ways to assess the visitor. However, there are also other variables that affect recreation behavior and participation. Understanding the

reasons people participate-their motives-is another important aspect of defining the visitor. This view assumes that people participate as the means to a particular end. Another theory outlined by Sessoms (1984) defines recreation activities as a pleasurable end in themselves.

An additional aspect, especially pertinent to managers, is matching visitor desires with the types of settings best able to meet those desires. Thus, the optimal benefits are provided to the visitor along with the optimal compatible utilization of the resource base. This dual optimalization is seen as the goal of management (Lucas and Stankey, 1974).

Visitor motives have long been touted as playing a pivotal role in explaining recreation behavior. These motivations may be: curiosity, to develop a skill, exploration, socialization, to learn to relax, to enjoy solitude, to cope with adverse conditions at home, in the community or at work, a form of self expression, competition, exercise; or a combination of these reasons.

Understanding motives is seen as an aid to resource managers in recreation planning, too. By recognizing different motives for engaging in activities, managers can develop strategies and opportunities to meet those motives. (Knopf, Driver, Bassett, 1973). Visitor motives have also been suggested as a means to deal with a wide range of use problems including visitor conflicts (Gramann and Burdge, 1981) and vandalism (Clark, 1976).

There are a number of theoretical approaches for explaining recreation motives. The social organizational

model (Cheek and Burch, 1976) explains leisure in terms of its social, cultural, and environmental components and seeks to understand how people organize themselves for leisure. For some activities, Buchanan, Christensen, and Burdge (1981) found evidence that social groups do vary in their definitions of activities. They suggest exploring the possibility of a connection between the various definitions of an experience and social groups. This perspective further implies that recreation sites could be managed to optimize experiences by specific social groups (Burch, 1964).

A complex evaluation of motives examines variations in motives related to differing experience levels (Schreyer, 1982). The basic tenet is that more experienced individuals differ from novices in the extent of their information, skill level, and frame of reference for evaluating recreation experiences.

The social-psychological needs approach proposes linkages between various motives and preferred environmental features. It is a composite motivational model of human behavior; one that views recreation behavior as problem-solving (Driver and Brown, 1975). Problem solving does not have a negative connotation, but can imply a need for a more positive state. It relies on the person's goal directed nature and looks beyond the on-site activity in evaluating effectiveness. This behavioral approach is being used to classify, not activities, but recreation experiences. It advocates matching a person's desired outcomes with an experience. These desired outcomes vary across and within

activities. There are also relations between outcomes and preferred environmental factors (Driver and Brown, 1975; Stankey, 1977; Hendee, 1974).

This relationship between motives and environmental preferences is the basis of the recreation opportunity spectrum (Clark and Stankey, 1979). It is a system for recreation planning seen as being particularly useful to resource managers.

Increased demand for outdoor recreation has placed pressure on the available resource. Recently, planners and managers have modified strategies from attempting to provide more recreation opportunities to providing opportunities that meet specific needs. This approach is aimed at accommodating a diversity of recreation preferences.

The Recreation Opportunity Spectrum (ROS) defines three sets of opportunities: activity opportunities; setting opportunities; and experience opportunities. The opportunities are organized into six classes along a spectrum from primitive to urban. They are also defined according to the levels of physical, social and management characteristics (Brown, et al, 1979). The physical environment is seen as the prime determinate of the recreation experience. The goal of ROS is to match desired outcomes with preferred environmental features.

There have been a number of studies conducted on the linkages between activity, desired outcome, motive, and preferred environmental characteristics. A study of recreationists at Glenwood Springs Resource Area in Colorado

indicated different settings provided different experiences, and the preferences for those settings are influenced by the type of experience desired (Brown and Ross, 1982). This reinforces the experience setting link. However, the study was inconclusive in establishing the relationships between activities, outcomes, and settings. Additional studies have not been successful at defining the relationships (Allen, 1979). Manfredo and Anderson (1982) found managerial relevant differences between groups of Oregon trout anglers, but the preferences were diverse.

Recently, river users motives from different settings were compared. The study reported the possibility that intergroup motive differences are greater than the differences between river settings (Knopf, Peterson, Leatherberry, 1983). The authors suggest that there are a limited number of general motives. It also casts doubts on the importance of the physical environment in recreation site selection.

These research findings point out the descrepancies of the various motive perspectives. Components of the motive debate include: Are motives linked to activities?; How do people choose sites?; Are the visitors seeking a specific outcome from their visit or are visitors more generalists in what they seek? A convenient site was available at the Kellogg Forest to investigate the relationships of motives and environmental characteristics. One goal of this study was to investigate the two variables as an aid to management.

The results of this study will describe visitor motives and physical characteristics of the Kellogg Forest. An understanding of the visitor motives could help to explain the phenomenon of recreation in urban forests.

As an emphasis on providing outdoor recreation opportunities in close proximity to population centers is a recognized need, the motives and preferred characteristics sought by visitors could be used in planning similar urban recreation opportunities.

More specifically, the managers at Kellogg Experimental Forest could benefit from the information about visitors. The provision of services and facilities would be facilitated by an understanding of visitor desires. The data from the study could be used: to define planning alternatives by matching motives and preferences with environmental constraints; in planning cost efficient facilities; and in visitor management. The visitor would be the ultimate beneficiary by having their needs met.

The results of this study will also be compared to a similar study done in 1968 (Kielbaso) to assess visitor trends at Kellogg Experimental Forest.

The specific study objectives follow.

1. To describe visitors to the Kellogg Forest by:

   a. describing use patterns,

   b. developing a typology of the visitors including demographic information and characteristics of the recreation activities pursued,

   c. defining visitor substitutes for the Kellogg Forest (alternative sites participants would visit if not the Kellogg Forest),

   d. obtaining access information from visitors including distance traveled and determination if the Forest was the sole destination of the visitor's trip,

   e. discovering visitors perceptions of who administers the Forest and the type of research conducted, and

   f. obtaining Forest visitors rating of the site and facilities.

2. To investigate, motive, activity, and environment linkages.

   a. Explore the relationship between motives and activities.

      H_0: There are no significant differences in motives for participation among activity categories.

      H_1: There are significant differences in motives for participation among activity categories.

   b. Study the relationship between activities and visitor choice of characteristics of the Forest.

      H_0: There are no significant differences in Forest characteristics selected by visitors in the various activity categories.

      H_1: There are significant differences in Forest characteristics selected by visitors in various activity categories.

CHAPTER II

METHODS

STUDY AREA

The site of this study was the W. K. Kellogg Experimental Forest which is operated on a multiple use objective by the Michigan State University Department of Forestry.

The Forest is located two miles north of Augusta in Ross Township, Kalamazoo County, Michigan. It is about half way between the cities of Battle Creek and Kalamazoo; the distance from either city is approximately 15 miles. (Figure 1).

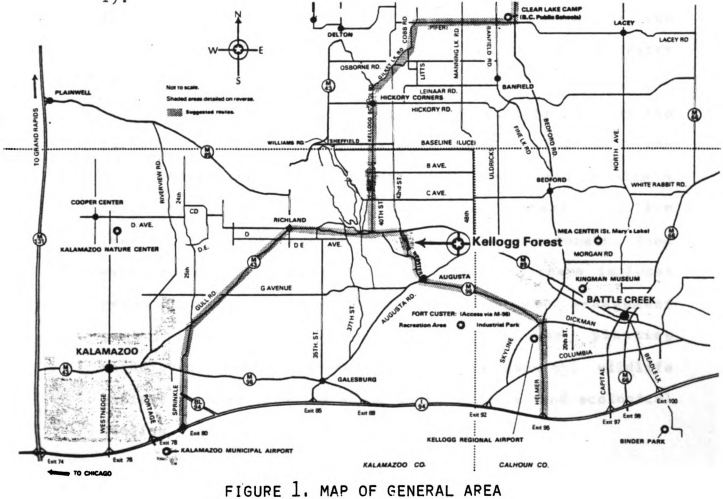


FIGURE 1. MAP OF GENERAL AREA

The rolling hills of the Forest are a reminder of the glacier that descended from the Artic over Michigan. There is a diversity of habitat types from marshy lowland to upland dry sands. The initial tract of land was donated by W. K. Kellogg, the breakfast cereal magnate of Battle Creek, in 1932 to serve as a model for reforestation and conservation practices. During the 1920's, 90% of the 602 acres that comprise the Forest was planted agricultural crops. The farming methods employed, however, were destructive, leading W.K. Kellogg to donate the abandoned, eroded farms.

Since the original donation, the Forest has undergone an evolution of natural and planted vegetation types. A large number of tree species have been planted in the intervening 52 years as a result of the on-going forestry research.

Today, forestry research is the primary function of the forest. The emphasis in research began in 1947 with the acknowledged need to do statistically sound studies with a diversity of tree and shrub species. Many long-term research projects have been conducted at the Forest. Some examples of the types of research conducted there include: genetic studies, demonstration of Forest management techniques. silvicultural studies, tree planting techniques, herbicide studies, stream research, wildlife habitat studies, hunting and fishing studies, and ecological studies.

The Forest is also the site for a variety of educational activities. Seminars and workshops are sponsored through the Forest in conjunction with the Michigan State University Cooperative Extension Service. Recent seminars have included topics such as Forest Management for Small Landowners, Sawmill Clinics, and Twilight Forestry Tours. Classes from Michigan State University, Purdue, Western Michigan University, Central Michigan, and the University of Michigan use the Kellogg Forest as a living laboratory. The Forest is also visited annually by school classes and a variety of organized groups.

Recreation is another of the uses of the Forest and is the emphasis of this study. The Forest was first opened to use by recreationists in 1940 with the implementation of a multiple use plan.

Access first was provided through a gravel road around the east side of the Forest and into the picnic area. In 1982 other improvements were made at the Forest through a Kellogg Foundation grant. The grant money financed the paving of the entrance road, the construction of a new office shop, and classroom with public restrooms, and the fencing of the boundaries.

The 602 acre Forest is divided by 42nd Street into west and east sections. Most of the recreation at the Forest is concentrated on the approximately 307 acres on the east side.

The Forest is open and staffed every day of the year from dawn to dusk and accommodates a variety of recreation activities. Activities include: driving, picnicking, hiking, leaf collecting, exercising, horseback riding, hunting, fishing, cross-country skiing, snowmobiling, photography, reading, foraging, etc.

There is also a diversity in the uses by organized groups at the Forest: local schools use the Forest for track and cross country team practice and meets; Girl Scouts and Boy Scouts visit for outings and cook-outs as do church and school groups; a road rally has used the Forest as part of its event; and couples are married at the Forest. School classes utilize the Forest quite extensively especially in the Spring.

Figure 2 shows the roads and trails available for use by visitors. The dotted lines mark trails used in the day-to-day management of the Kellogg Forest. These trails are accessible to visitors by foot. Vehicular use is limited to the Forest road and picnic area road indicated by the heavy dark lines. The Forest road is open to motorists during all but the snowy winter months. Then, it is closed due to hazardous conditions. Foot propelled visitors also choose to travel the road and can do so in all seasons.

W. K. KELLOGG FOREST

AUGUSTA, MICHIGAN

KALAMAZOO COUNTY

ROSS TWP. – T1S R9W

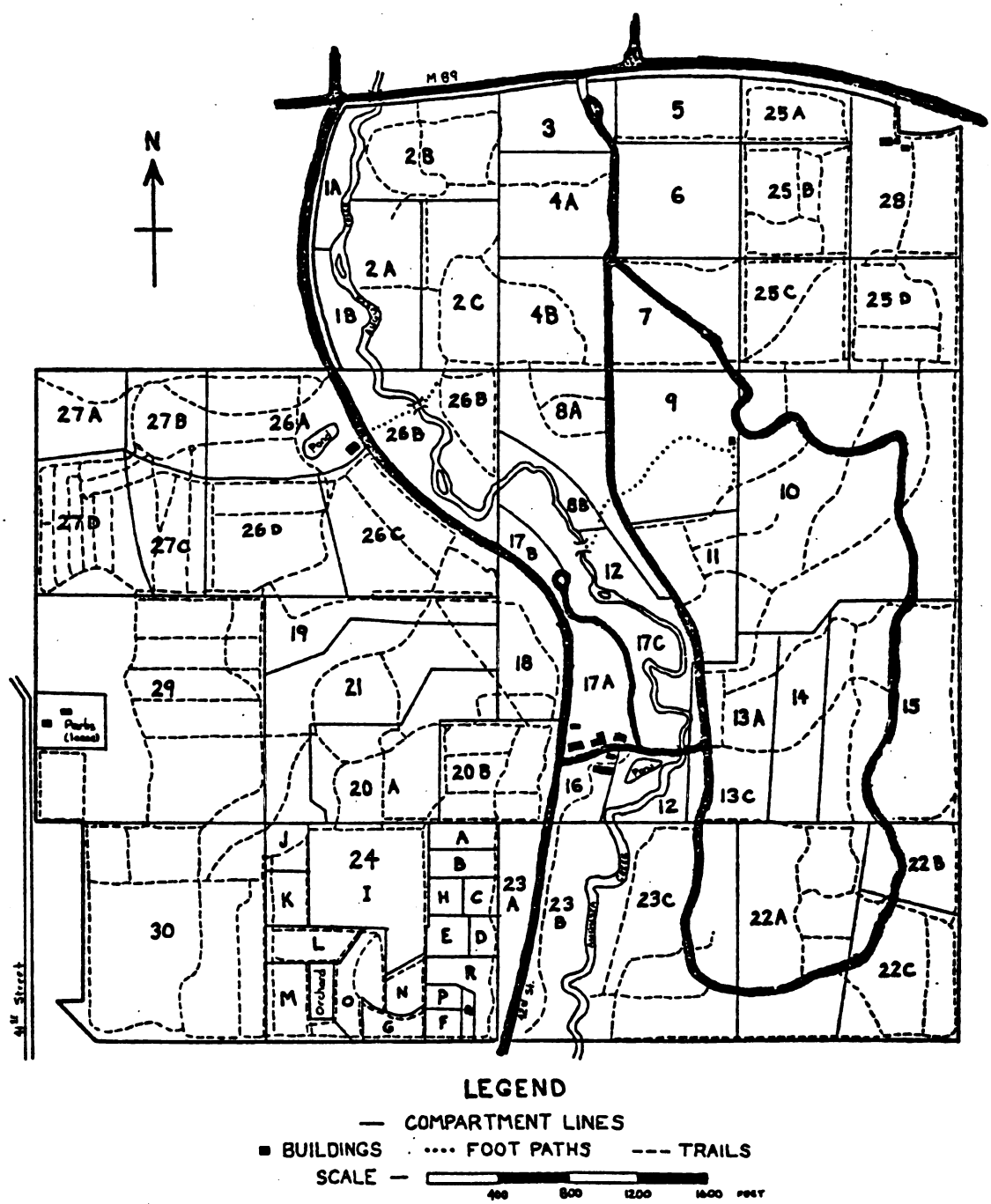


FIGURE 2. TRAIL MAP

The 2.5 mile road is an unpaved one-way, one-lane circuit of the east side of the Forest. Signs are spaced along the road to explain the research being conducted in the Forest compartments and are also used to label many species of trees. A scenic point of interest along the road is McCrary Lookout. Many visitors stop at the shelter to enjoy the view of the surrounding hills.

Another area where recreationists congregate is the picnic area. It is the only area of the Forest specifically set aside for recreation. The picnic area is located on the west side of Augusta Creek in Compartments 17C and B. A few sites are spaced separately along the creek, but the majority of the 24 tables are in the vicinity of the cul-de-sac. Grills, garbage cans, and pit toilets comprise the facilities available for visitor use. A foot bridge, located in the area, enables visitors to cross the creek.

Management for Recreation

The Kellogg Forest is not an intensively managed recreation area, rather, it is similar to other natural and undeveloped sites with a low level of management. Natural is a deceptive term when applied to the Forest. In fact, the Forest is managed intensively for forestry research. All the compartments have been planted as part of some research project with the exception of a few control plots. However, due to the nature of the research projects and their long term aspects, the research management may not be apparent to the casual visitor.

Management specifically for recreation currently consists of maintenance of the picnic area, restrooms, roads and some trails, and staffing the Forest during weekends and holidays. Since 1941, when hunting was first permitted at the Forest, hunters have been required to sign in and out. Until recently anglers were also required to register as part of the management procedure.

A number of information and interpretive services are provided. Forest maps, a brochure, and a self-guiding trail pamphlet are hand-out materials available outside the Forest office to augment visitor experience. Group tours are available upon request.

Previous Studies

There have been two previous studies of recreation at the Kellogg Forest. The first was a summary of recreational use written by Lemmien and Geis (Lemmien and Geis, 1955). This article related attendance figures, the distance visitors travelled, and cost of providing recreation at the Forest. Forest visitors were divided into four categories: hunters, fisherman, picnickers, and visitors.

An in-depth study of recreation was done by James Kielbaso in 1967. (Kielbaso, 1968). Kielbaso described user groups, attendance patterns, satisfactions sought from recreation, and user attitudes. An attempt was made to replicate some aspect of the 1967 study.

STUDY DESIGN

This study of recreational uses of the Kellogg Forest is cross sectional in design. The data were collected from August, 1983 until May, 1984. A year was determined as the appropriate length of time to record the cyclic changes in recreation participation and to include all the types of activities at the Forest.

USE ESTIMATION

A variety of methods were employed to describe recreation use at the Forest and to meet study objectives. One fundamental way to describe usage is by measuring the number of visitors. Amount of visitation is the traditional way to measure effectiveness of recreational services, can be used in future planning, and is the basis for other types of analysis. In addition to measuring volume of use, total use figures can be collapsed into categories that describe the percentage of visitors participating in different activity types. These figures provide a gross picture of recreation at the Forest. The use figures can also be compared with previous estimations of use to describe changes that have occurred over time in the recreational use at the Forest.

Different methods were used to estimate attendance according to the resources available and limitations dictated by the season of the year. During the summer and fall seasons of 1983, traffic counts were taken by meters. Both the Michigan Department of Transportation and the

Kalamazoo County Road Commission placed counters at the Forest for one week periods in each season to count the number of cars entering the Forest. During the Spring season, the use of a traffic counter on a continual basis became available. The counter was used through the Spring and Summer of 1984. Therefore, the use of a traffic counter for the Spring and Summer seasons are the most reliable.

Since traffic counters are not an accurate and reliable measure of use in the Winter season, a vehicle count observation schedule was set up to record the number of vehicles present at the Forest. Patrols were made of the parking area and the number of vehicles recorded to develop an estimation of use. Both the traffic meter and observation methods for estimating use are described below.

Traffic Meter

The traffic meter method to estimate use assumes that visitors enter by vehicle at a fixed point. This method seems suited to the Forest where most of the visitation occurs on the east side of 42nd Street property and visitors drive to reach the Forest. However, there are certain portions of some user groups that were not counted. They are visitors who may not enter by vehicle or who use the west side of the Forest property. This group includes some joggers, horseback riders, snowmobilers, and anglers. To include some estimation of this uncounted use, hand counts were made of cars parked along the road during peak use periods such as beginning of fishing season and peak winter weekends.

Records were kept during the use estimation sampling periods of the number of employee trips over the counter. This number was subtracted from the total count to yield the number of visitor vehicles entering and exiting the Forest. The double count was divided by two to arrive at the final count of visitor vehicles.

In order to calibrate the traffic counters, a census survey was done during random weekly periods in each season. Exiting cars were stopped and the number of people per car recorded. Visitors were also asked the length of their stay at the Forest and the activities in which they had participated.

The average number of people per car is the "load factor" The load factor is used with the total number of visitor vehicles entering the Forest to estimate total number of people visiting the Forest. Load factors can also be used in determining other usage figures.

Observation Methods

Vehicle counts were taken during the Winter season to estimate use. Patrols were made of the parking area, and the number of vehicles recorded, to develop an estimation of use from January 28 through March 26. For data representativeness, the Winter sampling was stratified into three four-hour time periods. The counts were scheduled evenly through the sampling to overcome factors such as weather. A total of 12 counts were made during weekends; 8 counts were made on weekdays.

The estimate of vehicles is a ratio of (McCurdy, 1968):

$$\frac{\text{Number of Counts}}{\text{Number of Vehicles}} = \frac{\text{Number of Days in Estimation Period}}{\text{X (Total Vehicle Estimation, Uncorrected)}}$$

This estimation is not corrected to account for the difference between the length of sampling time periods and the length of visitor's stay. To correct the total estimation the following formula is used:

$$\text{Corrected Estimate} = \text{Uncorrected Estimate X } \frac{\text{10 Hour Day}}{\text{Assumed Average Length of Stay}}$$

The average length of stay was determined from Winter calibrations. Corrected estimates from weekends and weekdays were added to determine the total use.

Yearly Attendance

Yearly attendance was estimated by combining three different methods. Each of the methods divides months into weekdays and weekend days to compute the total attendance for the month. The number of vehicles during the weekdays or weekend days is then multiplied by the appropriate load factor to determine the number of visitors.

September and October, 1984, estimates were computed using the Michigan Department of Transportation counts taken from September 1, to September 7. Since the counts measured both entering and exiting vehicles, the total was divided by two. Then, employee round trips were subtracted from the count. From those counts, the average number of vehicles

per weekday was multiplied by the number of weekdays in each month to calculate the total number of vehicles visiting on weekdays. Finally, the total number of vehicles was multiplied by the Fall weekday load factor to calculate the total number of visitors in the month.

The same procedure was used in obtaining weekend estimates. Labor Day fell into the September 1-7 count and was included as a weekend day. November estimates used averages from the Kalamazoo County Road Commission counts taken from August 12-18: (March, 1984 estimates use Kalamazoo County counts taken during March 28 to April 4.) Winter estimates employed the observation counts outlined earlier.

The attendance for April through July 1984 were calculated from the stationary counter at the Forest during the entire period. That procedure was also outline earlier.

SYSTEMATIC OBSERVATION

Systematic observation was employed primarily in the Summer to collect data on picnicking behavior. During specified time periods, information was recorded on the number of people in the picnicking group, the age distribution represented, group type, location of the group in the picnic area and types of activities picnickers were engaged in. Contact was made with some groups to record their comments of the picnic area and the Forest in an informal setting.

Data on the use of the picnic area were collected to discover how and which facilities in the area were used. The form for recording the observation data is in Appendix E.

PERSONAL INTERVIEWS

Use estimations and systematic obeservation, however, are only a gross way to describe recreation and do not reveal many of the characteristics of the users. To collect more detailed information on visitors, personal interviews were conducted. Personal interviews were conducted with visitors as they left the Forest with the exception of hunters (noted below). The survey took an average 10-15 minutes to complete. Sometimes, with more talkative visitors, the surveys took longer. There was little difficulty in getting people to stop for the survey. During the entire year there were only five refusals.

Beginning in August of 1983 and ending in May, 1984, 267 interviews were conducted at the Kellogg Forest. The first three questions regarding number of people per group, group composition, and age distribution pertained to the entire visiting group. Subsequent questions were directed only at one respondent per group. For some of the questions, many respondents chose to discuss their reply with others in the group.

Study Sampling

The elements in the systematic random sampling plan were: season of the year; day of week; and time of the day.

Over the course of the year each of the elements were slightly modified. The predominate activities change as the season does. The forest conforms to the number of daylight hours in a season; this effects the number of sampling periods available. For example, during Summer the two hour sampling periods started at 8:00 a.m. and ended at the Forest's approximate closing time of 8:00 p.m. In the Winter, closing time was at approximately 6:00 p.m.

Another change in visitation patterns that effected the sampling in any particular season was day of week. Weekday visitation drops when school opens in the Fall for example. The sampling proportions for weekend and weekday times were based on Kielbaso's 1967 data. The sampling days were spaced throughout each season.

Visitors sixteen years of age and older were the respondents in the survey. The sixteen year old age group is included to assess the recreation desires of young adult visitors. Since visitors usually drive to the Forest, sixteen, the age when a driver's license may be obtained, was determined as the appropriate age. A deliberate attempt was made to interview equal numbers of male and female group members.

During the sampling periods, an attempt was made to stop each car exiting. However, it was not possible to interview every car. Cars often exited in spurts, so, some groups were missed while an interview was in progress.

There were certain problems with activity sampling size in the fall and winter seasons. Hunters are required to register, so, as the season neared its end it became evident that there was an insufficient representation of hunters in the sample. Therefore, it was decided to conduct telephone interviews of that group. A systematic sampling scheme choosing every tenth name was used with the hunter registration sheets as the sampling frame. Duplicate registrations were omitted. Three attempts were made to reach each possible respondent (11-27 starting date). If three attempts failed, the next name on the list was chosen. Four interviews were conducted by phone.

The weather had a major influence on winter sampling. December to mid-January were ideal for winter activities, but conditions deteriorated for the remainder of the season. Twenty skiers were interviewed, but only two snowmobilers were interviewed.

Although snowmobiling is permitted on the east side of the Forest on the road, few snowmobilers use the east side where the interviews were conducted. Cross-country skiers predominate on the Forest's east side; one reason for the few snowmobiles may be the presence of skiers. Also, snowmobilers are allowed anywhere on the west side, whereas, they are restricted to the road on the east side. Another reason for the small number of snowmobilers interviewed is that they don't use the parking lot as an entry point. They

often enter and exit through an adjoining property using the forest property as a part of their excursion. Snowmobilers are also difficult to stop for an interview.

Instrument Development

One aspect of this study was to compare the responses with the 1967 study. Therefore, it was determined that similar questions, providing similar response categories would be used. Group size and type categories, frequency and length of participation, and access information remained constant. Demographic information also remained the same with the exception of household income queries. From the previous study and current recreation research, it was determined that income data would not provide any added explanation of recreation at the forest Another important consideration in excluding income was the sensitive nature of the question to many visitors.

A number of revisions were indicated however, both as a result of the 1967 study and due to changes in society occurring in the 17 intervening years since data was collected.

In order to access visitor trends, the activity categories were the same as in Kielbaso's 1967 study. The categories are: motoring; picnicking; fishing; hunting; (deer and small game); and miscellaneous. Skiing and snowmobiling were included as additional categories during the Winter season. As the study progressed, it became apparent that an exercise category was important and was added.

Satisfaction response categories were expanded. Additional questions were written to meet the study objectives. One of them was a question concerning environmental attributes. It was divided into six categories that outline the range of Forest attributes. Within each of the categories there was a variety of responses. The categories indicate the importance to the visitors of location, free access, Forest environment, educational opportunities, and site facilities.

A new series of questions were also formulated to collect data on specific management concerns. The concerns were: the effectiveness of informational and interpretive services; visitor's rating of the facilities; sources of information about the Kellogg Forest; visitor's perception of the purpose and management of the Forest; use patterns of areas within the Forest; and sites visitor's perceived as similar to the Forest (substitutes).

Each respondent was asked all questions pertaining to use patterns, demographics, access, substitutes, and general management concerns. Questions evaluating specific facilities, or informational or interpretive services, were chosen according to the activity type in which the visitor had participated. For example, picnickers rated the picnic site and facilities while trail users rated the trails, maps, or pamphlets they had used. Since visitors often participate in multiple activities, some users responded to more than one set of specific questions.

Pre-Test

The pre-test of the survey questionnaire was conducted on August 7, 1983 at the Kellogg Forest. Thirty-eight individuals were interviewed. Respondents were interviewed in the picnic area, and upon exiting to complete as many interviews as possible. The pre-test confirmed some of the revisions already made in the satisfaction and attribute categories. It also indicated other categories to be included in those two questions. However, since the pre-test was not conducted in the other three seasons and because of its limited trial, it was not extensive enough to delimit all the categories for the two questions. Therefore, additional categories were added as indicated.

Coding and Processing of Surveys

Early in the study it was decided to capitalize on the advantages of using a microcomputer to manage the data. One of the advantages is that current and future data will be easily accessible to personnel at the Forest through the IBM microcomputer there.

A program to enter the survey data using the Condor Database Management System was written by the consulting services of the Michigan State University Computer Center. The data from the questionnaire were entered directly into the IBM microcomputer from the questionnaire form, thereby, eliminating extra coding. Preliminary analysis of the data was also done using Condor.

For more detailed analysis, the data files from the micro-computer were loaded into the Michigan State University Cyber where the Statistical Package for the Social Sciences (SPSS) was used.

Analysis

The major data transformation that were done was the assigning of visitors to one activity category. Many visitors participate in multiple activities at the Forest. For analysis by activity type, users were assigned to categories on the basis of their predominate activity, thus, creating discrete user groups. The amount of time visitors spent in each activity was the determining factor in the assignment of categories.

A number of different statistical tests were performed on the data. Frequencies on each of the questions were used to check for errors in data entry and to obtain a description of respondents. The initial frequencies were conducted on all the data. Subsequent frequencies were run on various subgroups of respondents--first time visitors, repeat visitors, organized groups, and seven activity categories. Selected frequencies were also done by season.

Nominal level data from the surveys was analyzed using the Chi-Square test. Chi-Squares were also used to compare 1984 data with Kielbaso's 1967 study and with 1980 U. S. census data from Calhoun and Kalamazoo Counties.

Chi-Square is a non-parametric test that compares two distributions to determine if they are statistically different. It implies a relationship, but not the direction

or strenth of the relationship. The test evaluates the difference between expected and observed frequencies in various categories. Chi-Squares of the 1984 data uses a theoretical distribution to compute the expected frequencies.

In comparison with 1967 and census data, the expected frequencies from either 1967 or census results are compared with the observed frequencies from 1984 data to test their statistical significance. Corrections were made to account for the differences in sample size. These Chi-Square computations were done by hand.

Cramer's V is included as a measure of strength of the Chi-Square relationship since Chi-Square is influenced by sample size. The range of values for this statistic is from 0, indicating independence, to 1, indicating complete dependence.

For some analysis, Lambda was used as a measure of association. It is a test used on nominal level variables and was employed when the conditions for a Chi-Square test were not met. Asymmetric Lambda is a statistic that measures the percentage of improvement in predicting the dependent variable when the value of the independent variable is known. Predictions without error can be made when Lambda equals 1.0. For example, an assymmetric Lambda of .298 indicates a 29.8% improvement in predicting the dependent variable (Nie, Hull, Jenkins, Steinbrenner, Bent, 1975).

Another statistical test, performed on ratio level variables was the student's T-test for independent samples. This test compares two sample means for significant differences. It was used to evaluate differences between activity categories.

Responses to the satisfaction question were marked by the order in which the responses were made. Up to three responses to the question were recorded. Each response was weighted by the order it was mentioned, with the first response receiving the most weight.

The values for each of the satifactions mentioned were added and then divided by the total number of responses to construct an index. The index value is also a percentage.

LIMITATIONS

The major deficiency of the use estimation results from the lack of reliable traffic counters from September to March. At the start of the survey year the problem was one of locating a traffic counter. After a counter was located, the problem became one of the counter's reliability. During the Spring season the use of a reliable traffic counters on a continual basis became available. Therefore, the use figures for the Spring and Summer months of 1984 are the most accurate of the seasons.

Fall months usage was calculated using the Michigan Department of Transportation and Kalamazoo County Road Commission's traffic counts. The figures represent averages and may not be indicative of the cyclic pattern of recreation participation.

The Winter use figure is also an incomplete estimation of attendance. Weather is a major factor influencing Winter recreation participation. The primary consideration is a sufficient snow cover to permit Winter sports. The observation counts taken to estimate Winter attendance started in mid-January of 1984. It was in mid-January that the snow melted. The remainder of the season had insufficient snowfall to permit Winter sports.

However, December and early January were ideal for Winter sports. Casual observation during this time indicates that the Winter use figure is an underestimation. This underestimation is probably especially true of cross-country skiing at the Forest. Skiing appears to have become a large segment of the recreation population at the Forest and the dominate one in Winter when the snow cover permits.

Another limitation of this study is the small size of some samples. For example, only eight visitors used the self-guiding trail pamphlets. This sample is very small for generalizable results.

A number of visitors participate in multiple activities while at the Forest. For analysis by activity types, activity in which they had spent the most time. This arbitrary assignment to an activity on the basis of time may not reflect the character of the visitors recreation experience.

A final limitation of this study is the Summer period. Interviews were not conducted in June and July during the

sampling year. Users during these two months may be different than those who visit in the other months of the year.

CHAPTER III

RESULTS AND DISCUSSION

The goal of this study was to construct a clearer picture of the recreationists who visit the Kellogg Forest. This chapter is divided into five sections to describe the visitors. First, attendance figures from use estimation outline the amount and pattern of usage. A description of seasons follows to give an overview of recreation at the Forest.

The third section presents a typology of visitors including: characteristics of the visiting group, a detailed accounting of individual responses to survey questions and motives related to preferred characteristics of the Forest. The typology section is further divided into subheadings summarizing the reponses of all visitors and by the seven activity categories.

In the next section management concerns are addressed. Comparison of the 1984 data with the results of J. J. Kielbasso's study in 1967 are in the final section of this chapter.

ATTENDENCE PATTERNS

The yearly attendance figure from August, 1984 until July, 1984 was estimated at 95,939 visitors. The figure was estimated using a variety of methods described in the previous chapter. The load factors derived from seasonal calibration were mutliplied by the vehicle count to estimate

attendance (Table 2). Table 1 gives a breakdown of attendance by season.

Table 1. Seasonal Attendance (August, 1983-July, 1984)

	All Visitors Excluding Organized Groups		Visitors in Organized Groups	
	Monthly Total	Seasonal Total	Monthly Total	Seasonal Total
September	5,561.3		133.0	
October	6,242.9	15,980.6	195.0	441.0
November	4,176.4		113.0	
December	Observation		10.0	
January	Estimate for	5,743.0	0.0	10.0
February	Entire Season		0.0	
March	13,460.1		100.0	
April	14,451.9	50,505.1	272.0	2,558.0
May	22,593.1		2,186.0	
June	6,035.1		404.0	
July	6,299.5	19,427.5	229.0	1,274.0
August	7,092.9		641.0	
Total Visitors		91,656.2		4,283.0
Summed Totals		95,939.2		

Hunters by Attendance Patterns

Exact attendance figures are available participants in one activity category. Figure 1 charts the attendance patterns for small game and rifle hunters from 1959 to 1984. Generally, the figures indicate a decline in the number of visits by hunters from a peak in the 1960-61 season. There

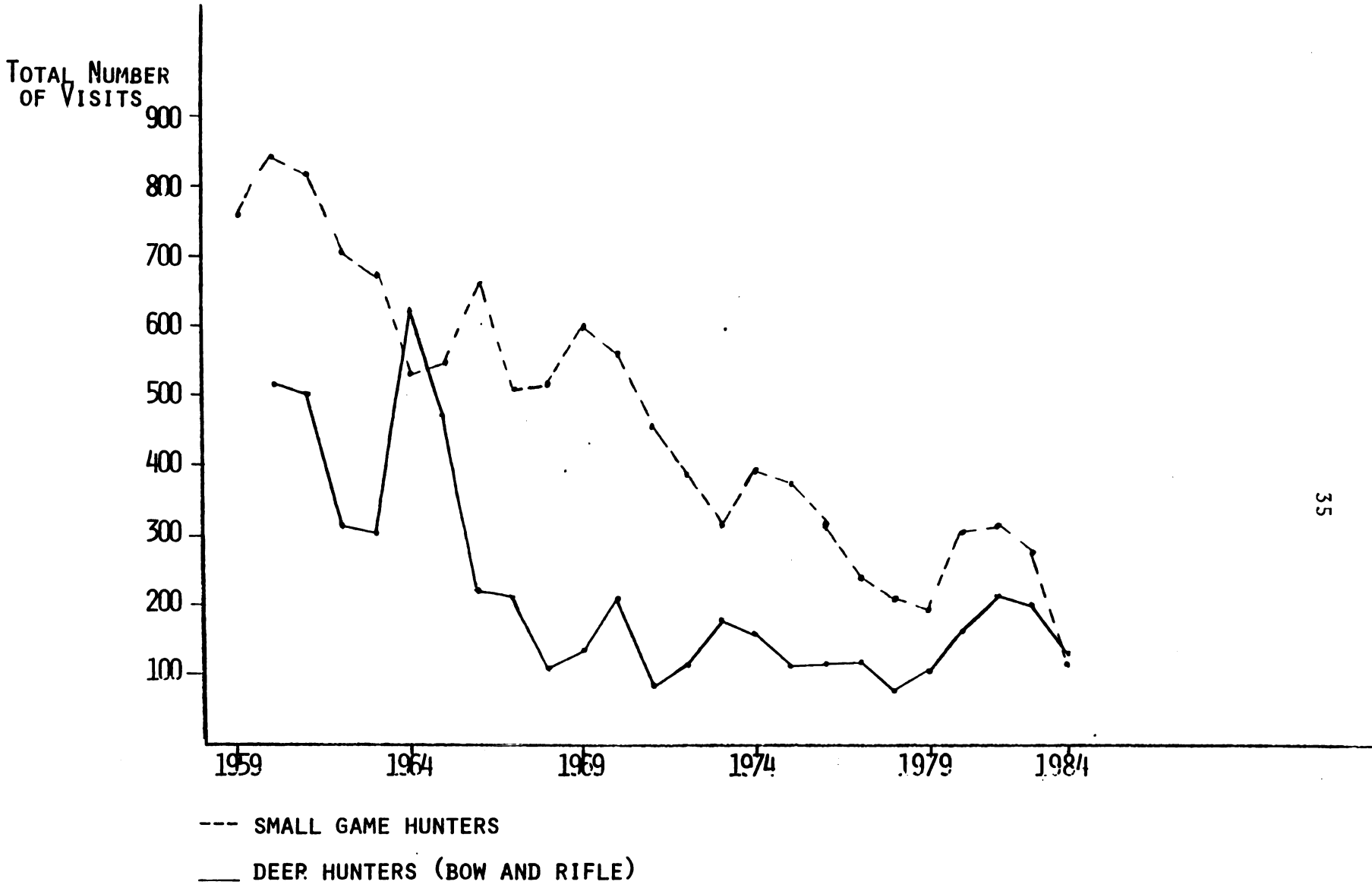


FIGURE 3. TOTAL HUNTING VISITS

are a number of factors that influence hunting. One factor is the weather, including snow cover, during the hunting season. Another factor is the types of habitats at the Forest. Habitat modifications occur as the result of management manipulations for forestry research and effect the type and number of game animals. A further influence on the number of hunter visits is the number of hunters actually participating in the sport, and the amount of free time and money they have to devote to hunting. Finally, the number of hunter visits may be influenced by the number of other visitors hunters encounter. Casual observation suggests that hunters may perceive the Forest as too crowded.

Table 2. Seasonal Load Factors

	Summer	Fall	Winter	Spring
Weekdays	2.90	1.74	1.33	10.84
Weekends	3.30	2.63	2.18	3.03

The most obvious interpretation of the attendance data is that Spring was the busiest season at the Forest. Over half of all the use occurs then (55.3%). The month that contributes the most visitors to the total was May. It accounts for 25.8% of all the attendance for the year.

A major factor influencing the large estimated number of visitors in Spring was the number of organized groups that visit. The load factor for spring weekdays was much higher than in any other season reflecting the high visitation by organized groups. Once again, May was the most popular month. It accounted for 85.5% of organized group visits during the Spring. May also attracted over half (51%) of all organized group visits for the entire year.

The weekday load factor was responsible for the high estimation of use during the Spring. Six buses visited during the traffic counter calibration period. The high attendance during the Spring has also been consistently reported by the Forest staff.

Of the other seasons, Summer contributed 21.6% of all the use; Fall had 17.1% of all use; and Winter was last with 6% of the total use. However, a limitation of this study is the suspected underestimation of Winter recreationists, mainly skiers, at the Forest. Skiers appear to have become a large segment of the recreation population at the Forest and the dominate ones in Winter when the snow cover permits.

Weekly Use

Another piece of the pattern of use is the cycle of weekly visitation. A measure of this pattern was the percentage of vehicle traffic occurring during the weekdays (Monday through Friday) and on weekends (Saturday and Sunday) (Table 3). During the Fall, Winter, and Spring,

more than half of the visitation occureds on the two days of the weekend. Sunday was the busiest day in the Fall and Spring. No breakdown is available for weekend days during the Winter since the winter observation method does not lend itself to separate analysis of weekend days.

In the Summer, the traditional recreation time, the opposite was indicated. More than half the traffic was on the weekdays. Saturday, however, was the busiest day.

Table 3. Percent Vehicle Traffic on Weekdays and Weekends

	Summer (N=121)	Fall (N=131)	Winter (N=34)	Spring (N=65)
Percent Total on Weekdays	52.7%	48.4%	31.2%	47.3%
Percent Total on Saturday	22.6%	23.6%	---	20.2%
Percent Total on Sunday	20.2%	28.0%	---	32.5%
Percent Total on Weekends	42.8%	51.6%	68.9%	52.7%

DESCRIPTION OF RECREATION ACTIVITIES

Many visitors to the Kellogg Forest participate in multiple activities during their stay. During the year a little over a quarter (25.8%) of all visitors did more than one activity. Most commonly, visitors hike and drive, or picnic and hike. Table 4 shows the five most common clusters of activities. There were twenty different combinations of activities.

Table 4. Five Most Frequent Multiple Activity Clusters

Activities	Percent of all Multiple Activities
1. Drive, Hike	34.8%
2. Picnic, Hike	20.3%
3. Leaf Collect, Drive	8.7%
4. Picnic, Drive, Hike	7.2%
5. Picnic, Drive	5.8%
Total	76.8%

As would be expected, certain activities occur in all four seasons while a few are season specific. Leaf collecting, snowmobiling and skiing are associated with specific seasons. Deer hunting, small game hunting, and fishing are controlled by a legal season with deer season being the shortest of the three.

Other activities such as hiking, picnicking, driving and exercising cross over seasonal boundaries. Hiking takes place in all four seasons even with snow on the ground. Picnicking does the same, but with fewer people participating. In the Winter, some skiers choose to picnic after they have finished skiing. Early Spring brings out the picnickers too. Even though the weather can be quite brisk, picnickers don't seem to be concerned. Perhaps it°s a reaction to Winter-time "cabin fever".

As a summary of the seasonal activities at the forest, below is the relative ranking of activities visitors reported as those they participated in during the previous twelve months.

Table 5. Top Five Ranked Activities by Season

Summer			Fall		
	Rank	% of Responses		Rank	% of Responses
1.	Hiking	34.3%	1.	Hiking	40.8%
2.	Driving	28.3%	2.	Driving	26.0%
3.	Picnicking	19.6%	3.	Picnicking	12.0%
4.	Exercising	7.8%	4.	Hunting	6.8%
5.	Photography	2.8%	5.	Exercising	6.4%
	Total	92.8%		Total	92.0%

Winter			Spring		
	Rank	% of Responses		Rank	% of Responses
1.	Hiking	32.4%	1.	Hiking	41.9%
2.	Skiing	32.4%	2.	Driving	26.0%
3.	Driving	12.9%	3.	Picnicking	9.9%
4.	Exercising	6.5%	4.	Fishing	8.9%
5.	Picnicking	4.3%	5.	Exercising	6.4%
	Total	88.5%		Total	93.7%

Winter

Visitors can drive through the Forest in Winter except when the road is closed due to hazardous conditions. The amount of time the road is closed depends on weather conditions.

Although exercisers at the forest are also effected by Winter weather and road conditions, there are some visitors who begin to run at the Forest as soon as the road is free of snow. In fact, a few devoted exercisers continue to run the Forest road even with snow on the ground.

Primarily, however, when there is sufficient snow on the ground, the Winter season belongs to the skiers. The parking spaces are filled and the road to the picnic area lined with vehicles during the weekends. During heavy use hours, these vehicles cause a congestion problem. The congestion problem doesn't appear to effect the visitors while they are skiing. They are dispersed by traveling the many trails on the eastern 305 acres of the Forest. Skiing participation has increased at the Forest as the sport gains popularity.

Spring

As the weather breaks, more hikers and drivers appear to experience the awakening of Spring. The opening of trout season attracts anglers to the Augusta Creek which flows through the Forest. Another ritual of a different sort, Spring field trips, brings a number of school and other organized groups to the Forest. Sometimes, these groups stop at the Forest for lunch on their way to or from the Kellogg Bird Sanctuary. Other groups request tours of the Forest or conduct their own programs while at the Forest. Fall visits by school and organized groups are much the same, although there appear to be more visits in the Spring (Table 1). Most of these visits consist of elementary grade students, but all grades through college are represented. College-age students from Michigan State University visit the Forest during all seasons of the year; but, the Spring is the most intensive period of visitation when third year forestry students spend a week using the Forest as an

outdoor classroom. It is the visits by school groups that are responsible for the peak attendance figure in the Spring.

Another Spring event that is indicative of another type of organized activity occurring throughout the year is an endurance race. The Battle Creek Hunt Club sponsors the ride each year. Horses and riders race over a 50-mile course, part of which is through the Forest. The Hunt Club also uses the Forest in the Fall during their hunts.

Summer

Summertime is the most concentrated time for picnickers. Groups vary in size from one to two people to large family reunions. For some picnickers, as with other visitors, the forest is part of tradition. An example is an extended family group of grandparents, parents, children and friends who visit the Forest each year on Labor Day for a breakfast picnic. These picnickers have been coming to the Forest each Labor Day for years and feel in a personal way that the Forest is "theirs". This sentiment of ownership was expressed by many visitors during the survey year.

Campers and staff from a nearby camp, Camp Timbertrails, visit the Forest four time each summer as part of their regular program. The entire camp of around 100 people spend the day cooking out, competing in a forest-wide scavenger hunt and playing games.

Hikers take to the woods during the Summer too, as do drivers, and exercisers. Some of the more wary hikers

expressed a tendency to avoid the Forest during the peak mosquito season. So, there tends to be a cyclic pattern to participation within the summer season.

Fall

As the summer nears its end, the forest becomes the training grounds for two local cross country teams. They usually run the road through the Forest twice, once in either direction. Approximately half of the Forest road is a hill. The hill has earned its own place in cross counry team minds. They refer to the short steep climb as "Agony Hill" and the long climb as "Eternity Hill".

During the Fall the Forest attracts vistors interested in witnessing the trees and shrubs changing color. One of the best views is from the McCrary Lookout which offers a panorama of the valley and surrounding hills. Another group attracted by the leaves are the leaf collectors. Numerous schools in the area require a leaf collection of their students. Teachers recommend the Forest as a collection site because of the variety of species present and the identifying labels at the Forest.

Some over zealous leaf collectors create problems at the Forest when they stop their cars in the middle of the road or at undesignated pulloffs in search of leaves. The personnel at the Forest have adopted a wildlife term to describe the area from the ground to the upper reaches of the trees utilized in leaf collecting. It is called the "browse line". Some groups are quite systematic and inventive in their quest for leaves. One group of high

school girls came equiped with hand pruners to aid their collecting. When they came to a tree that had leaves they wanted beyond their reach, they climbed on the hood of their car to reach the leaves.

TYPOLOGY OF VISITORS

Group Characteristics

The social aspect is an important dimension of recreation. Data was collected on group size, group type and the age composition of visitors to learn more about visiting groups.

GROUP SIZE

All Visitors

The most common group size during the year was two. Groups of two comprised 38.6% of all the visitors who were interviewed. The next most frequent group size were single visitors at 18.4%; 12.7% of all groups had three visitors; 12% were comprised of four people and those groups of five visitors made up 6.4% of all interviews. Percentages show an inverse relationship to group size. The groups of six people or less total 91% of all interviews. Only 4.1% of groups interviewed had ten or more people (Table 6).

Table 6. Percentages of Visitors by Group Size*

Activity	Group Size 1	2	3	4	5	6 or more	Mean	N
Picnic	0.0	23.8	4.8	33.3	4.8	33.3	8.3	21
Drive	7.4	39.7	22.1	14.7	4.4	11.1	3.9	68
Hike	11.1	43.3	10.0	12.2	11.1	12.2	5.0	90
Misc.	30.8	42.3	11.5	7.7	3.8	3.8	2.3	26
Exercise	66.7	22.2	0.0	0.0	0.0	11.1	2.2	18
Hunt/Fish	37.5	37.5	16.7	4.2	0.0	4.2	2.0	24
Ski	25.0	40.0	10.0	5.0	10.0	10.0	2.8	20
All Visitors	18.4	38.6	12.7	12.0	6.4	11.9	4.1	267

*May not equal 100% due to rounding.

By Activity Category

Driving, hiking, hunting/fishing, skiing, and miscellaneous activities also show groups of two people as the most common type of group. Picnicking and exercising divert from this trend. The most common size group of picnickers was a tie between four people per group and six or more people per group. Exercise was most commonly done alone. The group size of these two activities indicates something of the nature of the two activities. Picnicking is primarily a social activity, implying it is done with a number of people. There were no solitary picnickers. Exercise, although it can be done in a group, is more inclined to be done alone.

GROUP TYPE

All Visitors

The most common type of group interviewed were families with children under 18 years of age (25.1%). The next most common group were couples (23.2%). Friends and single visitors each comprised 18.7% of the groups interviewed. Organized groups including those affiliated with Michigan State University were 5.6% of all the interviews. Percentages of visitors by group type are listed in Table 7.

When the five family categories are combined, they indicated family groups are more than a third of all the visitors to the Forest (33.8%). The family category is actually larger since a portion of the couples were married.

By Activity Category

The frequencies for activity categories indicate that exercising and hunting/fishing were most apt to be solitary activities. Picnicking, hiking, and miscellaneous activities were most often engaged in by families with children under 18 years of age. Groups of friends comprise the largest percentage of driving and skiing activities.

AGE IN GROUPS

All Visitors

The age of visitors in the group was another variable used to describe recreationists (Table 8). Ages of visitors were divided into preschoolers (0-5 years), children (6-12 years), adolescents (13-17 years), adults (18-60 years) and seniors (60 plus years). Preschoolers were present in 12.4%

Table 7. Percentages of Visitors by Group Type

Activity	Group Type: Single Visitors	Families w/Children Under 18 Years	Families w/Children Over 18 Years	Family & Friends w/Children Under 18 Years	Family & Friends w/Children Over 18 Years	Family & Friends with no Children	Friends	Organized Groups including MSU Affiliated	Couples	N
Picnicking	0.0	28.6	4.8	9.5	4.8	14.3	4.3	14.3	19.0	21
Driving	7.4	26.5	2.9	5.9	0.0	1.5	27.9	5.8	22.1	68
Hiking	12.2	32.2	4.4	1.1	0.0	0.0	12.2	6.7	31.1	90
Miscellaneous	30.8	34.5	0.0	7.7	0.0	3.8	3.8	0.0	19.2	26
Exercising	66.7	0.0	0.0	0.0	0.0	0.0	11.1	11.1	11.1	18
Hunting/ Fishing	37.5	16.7	4.2	0.0	0.0	0.0	33.3	0.0	8.3	24
Skiing	25.0	5.0	0.0	0.0	0.0	0.0	40.0	0.0	30.0	20
All Visitors	18.7	25.1	3.0	3.4	0.4	1.9	18.7	5.6	23.2	267

of all the groups interviewed. Children comprised 21% of the visitor groups. Adolescents were present in 11.6% of the groups. As would be expected, adults were present in the overwhelming majority of groups at 93.6%. Seniors were in 12% of the groups. The number of preschoolers, children and adolescents are a reflection of the predominance of family groups at the Forest.

Table 8. Visitors by Age Group

Age	Percent Present In All Groups	Percent Present In All Groups
Preschoolers (0-5 years)	65	12.4%
Children (6-12 years)	305	21.0%
Adolescents (13-17 years)	74	11.6%
Adults (18-60 years)	589	93.6%
Seniors (60 plus years)	67	12.0%
Totals	1,100	149.6%

To facilitate comparisons between age groups in the population of the surrounding counties and the Kellogg Forest, a Chi-Square test of significance was done. A Chi-Square testing the distribution of age groups in Kalamazoo - Calhoun counties and Kellogg Forest visitors shows significance at the .001 level (Cramer's stat = .2849) indicating the differences in the population are not due to chance. (Table 9)

Those cells that contribute more than 5 to the Chi-Square are preschoolers, children, and seniors. This

indicates those three cells may be more likely to account for the descrepancies between Kalamazoo-Calhoun counties age distribution and that of the Kellogg Forest age distribution. There is no direction implied in the Chi-Square test.

Table 9. Number of Visitors by Age Group Observed and Expected (Census of Population, 1980, pp 443,445)

	Observed	Expected
Preschoolers (0-5)	65.00	92.79[a]
Children (6-12)	305.00	118.69[a]
Adolescents (13-17)	74.00	91.69
Adults (18-60)	589.00	643.83
Seniors (60+)	67.00	152.74[a]

Sample Size = 1,100

Chi-Square = 18.465, four degrees of freedom, significant at .001 level

[a]Contributes more than 5 to Chi-Square

By Activity Categories

An Analysis of Variance Test indicates a significant variation in the number of adolescents and Seniors in the seven activity categories (Tables 10 and 11).

Table 10. Analysis of Variance Test for Adolescents in Activty Categories

Activity	Group Means	Standard Deviation	N
Picnicking	.9048	1.670	21
Driving	.1471	.530	68
Hiking	.1556	.520	90
Misc	.2308	.514	26
Exercising	1.1110	3.230	18
Hunting-Fishing	.2083	.660	24
Skiing	0.0000	0.000	20

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	6	24.9780	4.1630	3.7003	.0015
Within Groups	260	292.5127	1.1250		
Total	266	317.4906			

Table 11. Analysis of Variance Test for Seniors in Activity Categories

Activity	Group Means	Standard Deviation	N
Picnicking	.6190	1.11	21
Driving	.5882	1.44	68
Hiking	.1110	.57	90
Misc	.0385	.20	26
Exercising	1.1110	.32	18
Hunting-Fishing	.0417	.20	24
Skiing	0.0000	000	20

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	6	16.1778	2.6963	3.5765	.002
Within Groups	260	196.0095	.7539		
Total	266	212.1873			

Respondent Characteristics

Information was collected during the survey year to discover more about the people who visit the Forest - who they are, where they come from, what they do during their visit, and their motives.

The preceding information on group characteristics was collected from the entire group visiting the Forest. The following data reflects the replies of one respondent per group.

GENDER

All Visitors

As was noted earlier, a conscious attempt was made to interview an equal number of female and male visitors. The result was that 40.4% of the respondents were female, while 59.6% were male. The primary reason the sexes are not more equal is women's underrepresentation in the hunting and fishing category (Table 12).

Table 12. Percentages of Visitors by Gender

	Gender		
Activity	Female	Male	N
Picnicking	47.6	52.4	21
Driving	36.8	63.2	68
Hiking	46.7	53.3	90
Misc.	53.8	46.2	26
Exercising	44.4	55.6	18
Hunting/Fishing	0.0	100.0	24
Skiing	45.0	55.0	20
All Visitors	40.4	59.6	267

By Activity Category

The only activity that shows a higher percentage of female participation than male is the miscellaneous category. However, due to the higher percentage of males interviewed, it is difficult to make comparisons.

AGE

All Visitors

The mean age of the respondents was 37.5 years. The median age was 34.4 with a range of 16 to 78 years (Table 13).

Table 13. Ages of Visitors

	Age				
Activity	Mean	Mode	Median	Range	N
Picnicking	42.8	51.0	41.0	18-69	21
Driving	41.6	32.0	36.5	19-78	68
Hiking	34.9	26.0	33.5	18-57	90
Misc.	33.7	18.0	32.0	17-75	26
Exercising	34.9	21.0	34.5	17-74	18
Hunting/ Fishing	38.6	34.0	34.5	16-67	24
Skiing	35.3	24.0	32.8	22-63	19
All Visitors	37.5	32.0	34.4	16-78	266

By Activity Categories

To discover if there was significant variation across the categories, a comparison was made of the mean ages of the seven activities. Table 14 shows that there is a significance at the .0173 level.

Table 14. Analysis of Variance Test for Ages of Seven Activity Categories

	AGES		
Activity	Group Means	Standard Deviation	N
Picnicking	42.8	16.8	21
Driving	41.6	15.4	68
Hiking	34.9	11.5	90
Misc.	33.7	13.6	26
Exercising	34.9	14.5	18
Hunting/Fishing	38.6	14.6	24
Skiing	35.3	11.7	20

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	6	2963.2634	493.8772	2.625	.0173
Within Groups	259	48729.1013	188.1432		
Total	265	51692.3647			

Since the F-Probability indicates there is a statistical significance in the mean ages of the activities, T-tests were conducted on all combinations of the seven categories. T-tests compares two sample means to determine if there is a statistical significance between them. Those T-tests that showed significance are shown in Table 15.

The three pairs of means showing significance are: driving and hiking; driving and miscellaneous; and miscellaneous and picnicking. This indicates that there is a statistical difference of ages between each of the three pairs of activities.

Table 15. T-Test for Ages of Activity Categories

Activity Category	T Value	DF	T-Prob.
Driving vs. Hiking	3.03 (separate)	119.21	.003
Driving vs. Misc.	2.29 (pooled)	92.00	.024
Misc. vs. Picnicking	2.04 (pooled)	45.00	.048

RACE

All Visitors

The overwhelming majority of (97.8%) of Forest visitors were white. Blacks were 1.9% of those interviewed while Asians are represented in only one case (.47%). when the racial composition of Kalamazoo and Calhoun Counties is compared with that of the Forest, there is significant difference (.001; Cramer stat. = .1595) between the two (Table 16).

The cell contributing more than 5 to Chi-Square is the Black population. This indicates that fewer Blacks recreate at the Forest than would be expected from the racial composition of the 2 surrounding counties.

Table 16. Racial Comparison of Kalamzaoo and Calhoun Counties and Kellogg Forest Visitors

	Observed	Expected
White	261	243.01
Black	5	22.49[a]
Asians	1	1.50

Sample Size 267

Chi-Square = 15.1, 2 degrees of freedom, significant at .001

Cramer's V = .1595

[a]Contributes more than 5 to Chi-Square

By Activity Category

Because the number of Black and Asian visitors was so small, all the Chi-Square cells in the non-white category had expected frequencies less than 5. Therefore, it was not possible to use the Chi-Square test to compare activity categories by racial composition.

EDUCATION

All Visitors

Another variable used to describe visitors was their level of education. An outstanding feature of the data is that 40.5% of Forest visitors have graduated from college or have done post-graduate work (Table 17).

One possible explanation for the large percentage of visitors with high levels of education could be the Kellogg

Forest's affiliation with Michigan State University and the number of teachers who utilize the Forest. However when organized groups and Michigan State University groups are accounted for there are still 28.2% of the visitors who have graduated from college or done post-graduate work.

Table 17. Education Level of Visitors by Percentages

Highest Grade Completed	% of Visitors	% Excluding Organized Groups
8th Grade	.4	.4
9th-11th Grade	7.0	7.1
High School	29.6	30.6
1-3 Years College	22.5	23.8
College Graduate	18.4	17.9
Post Graduate	22.1	20.3

To further explore the education variable, a Chi-Square test was done. The following table (Table 18) compares the distribution of Kellogg Forest visitors twenty-five years or older with the combined distribution of residents twenty-five years or older in Kalamazoo and Calhoun Counties. The differences between the two distributions appear to be related to four cells. They are the cells indicating the following educational levels: 8th grade, 9-11 grades, college graduates, and post graduate education. It appears that the educational level of visitors is different than would be expected from the composition of the two surrounding counties.

Table 18. Number of Visitors by Education Level Observed and Expected

Grade Level	Observed	Expected
8th	1.0	26.6[a]
9-11th	12.0	34.3[a]
12th	59.0	81.6
13-15th	49.0	37.8
College Graduate	44.0	20.3[a]
17 years or more	56.0	20.3[a]

Sample Size = 222

Chi-Square = 139.26, five degrees of freedom, significant at .001

By Activity Category

A percentage breakdown of education levels by activity categories is given in Table 19. It shows that skiers attain the highest level of education with mean of 16.3 years of schooling. Although, hunters and anglers have the lowest mean, 13.1 years, the mean indicates that the "average" hunter and angler has completed one year of school after high school graduation.

To determine if there was a significant difference between the seven category means, an analysis of variance was conducted. Table 20 shows that there was a significance at the .0008 level. This indicates there was a difference between the mean education levels of the activites.

Table 19. Education Levels by Activity Categories

Activity	PERCENTAGES IN EDUCATIONAL LEVELS							
	8th Grade	9-11th Grade	Graduated High School	13-15th Grade	Graduated College	Post Graduate	Mean	N
Picnicking	0.0	0.0	38.1	19.0	19.0	23.8	14.6	21.0
Driving	1.5	11.8	33.8	25.0	8.8	19.1	13.7	68.0
Hiking	0.0	6.6	22.2	24.5	22.2	24.2	14.7	90.0
Miscellaneous	0.0	3.8	34.6	19.2	23.1	19.2	14.5	26.0
Exercise	0.0	5.6	33.3	27.8	11.1	22.3	14.6	18.0
Hunting/ Fishing	0.0	12.5	45.8	20.9	16.7	4.2	13.1	24.0
Skiing	0.0	0.0	10.0	10.0	35.0	45.0	16.3	20.0

Table 20. Analysis of Variance Test for Education Levels by Seven Activity Categories

EDUCATION LEVEL

Activity	Group Means	Standard Deviation
Picnicking	14.5714	2.6565
Driving	13.7059	2.8862
Hiking	14.7333	2.5864
Misc.	14.5000	2.3707
Exercising	14.5556	2.5718
Hunting/Fishing	13.0800	2.0624
Skiing	16.3000	2.0545

Source	D.F.	Sum of Squares	Mean Squares	Forest Ratio	Forest Prob.
Between Groups	6	157.8696	26.3116	3.9639	.0008
Within Groups	260	1725.8383	6.5378		
Total	266	1883.7079			

To ascertain which of the activities were responsible for the variation, a series of T-Tests were conducted. Table 21 lists those T-Tests that indicate significance. The skiing category appears as an unique population differing from all other categories; it shows the highest level of education. Hunting and fishing is also a distinct population differing from all categories except driving; it was the lowest level of education. The only other pair of categories to exhibit significance was the driving vs. hiking pair.

Table 21. T-Test for Education by Activity Category

Activity Category	T Value	DF	T-Prob.
Skiing vs. Picnicking	-2.32	39.00	.026
Skiing vs. Driving	-3.74	86.00	.000
Skiing vs. Hiking	-2.53	108.00	.013
Skiing vs. Misc.	2.70	44.00	.010
Skiing vs. Exercising	2.32	36.00	.026
Skiing vs. Hunting/ Fishing	5.16	42.00	.000
Hunting/Fishing vs. Picnicking	2.11	43.00	.040
Hunting/Fishing vs. Hiking	2.89	112.00	.005
Hunting/Fishing vs. Misc.	2.26	47.84	.028
Hunting/Fishing vs. Exercising	2.06	40.00	.046
Driving vs. Hiking	-2.35	156.00	.020

DISTANCE

All Visitors

That the Kellogg Forest qualifies as an intermediate type recreation area is indicated by the distance traveled by visitors. 78.7% of all visitors live within 15 miles of the Forest. Table 22 shows the distances traveled by all visitors.

Table 22. Distances Traveled by All Visitors

Distance Traveled	Percent of Visitors
Within 15 Miles	78.7%
15-30 Miles	9.4%
Southern Lower Michigan	6.4%
Northern Lower Michigan	1.1%
Upper Peninsula	.4%
Out-of-State Visitors	4.1%

Of the 78.7% within 15 miles, 55% live in either Kalamazoo (15%) or Battle Creek (40%). Kalamazoo and Battle Creek are the largest urban areas in the vicinity of the Forest. The discrepancy in visitor participation between Kalamazoo and Battle Creek is not easily explained.

Both cities are are approximately the same distance from the Forest. Battle Creek has a population of 77,789. Kalamazoo's population is 154,990; almost two times the population of Battle Creek. Kielbaso (1968) noted the same discrepancy in visitor participation between Kalamazoo and Battle Creek.

One explanation for the discrepancy may be the recreation opportunities available in the area around each city. One of the subsequent questions in the survey asked visitors to name places similar to the Kellogg Forest. This question was meant to identify substitutes for the Forest. After eliminating the responses that could be applicable to either Kalamazoo or Battle Creek visitors (the Kellogg Bird Sanctuary, Fort Custer, Other and None), the next most

frequent responses are sites closer to Kalamazoo. Those sites are: Yankee Springs, Allegan Forest, and the Kalamazoo Nature Center. The residents of Kalamazoo may have a wider choice of recreation opportunities that are similar to the Forest than the residents of Battle Creek.

Other source areas to the Kellogg Forest with percentages of visitors over 1% from highest to lowest: Augusta (9%); Richland (7.1%); Galesburg (1.1%); Cersco (1.5%); Climax (1.5%); Hickory Corners (1.5%); Allegan (1.1%); Marshall (1.1%); and Plainwell (1.1%). Of the places listed above only Allegan and Marshall are more than 15 miles from the Kellogg Forest.

By Activity Category

Table 23 lists distances traveled by visitors in each activity category. The exercising category shows a concentration of users who travel 50 or fewer miles to visit. Hunting/fishing shows the second highest percentage of visitors who traveled 15 miles to the Forest. There were no hunters or anglers who came from northern lower Michigan, the Upper Peninsula, or out of state.

Picnicking and skiing have the highest percentage of visitors who travel 15 miles or more and travel from southern lower Michigan. They have the fewest in the 15 miles or less range. So, generally, the exercisers, hunters/anglers travel the least distance; while picnickers and skiers travel further to the Forest.

Table 23. Distance Traveled by Activity Categories

Activity	DISTANCE TRAVELED						
	Within 15 Miles	15-30 Miles	Southern Lower MI	Northern Lower MI	Upper Peninsula	Out of State	N
Picnicking	57.1	19.1	14.3	0.0	0.0	9.5	21.0
Driving	79.4	5.0	7.4	1.5	0.0	5.9	68.0
Hiking	80.0	8.9	4.4	2.2	1.1	3.3	90.0
Miscellaneous	84.5	3.8	7.7	0.0	0.0	3.8	26.0
Exercise	88.9	11.1	0.0	0.0	0.0	0.0	18.0
Hunting/ Fishing	87.5	4.2	8.3	0.0	0.0	0.0	24.0
Skiing	65.0	25.0	5.0	0.0	0.0	5.0	20.0

NUMBER OF VISITS

All Visitors

Another way to describe recreation is by visitation patterns: number of visits by season and annually, length of visits, and type of activity. The "average" respondent visited 12.9 times in the last twelve months. Users divide their visits evenly throughout the season although there was a slight tendancy to visit more often in the Fall as shown in Table 24.

Repeat Visitors

It has been anticipated that most of the visitors to the Forest would be repeat visitors. This is indicated by the number of repeat visitors interviewed. Repeat visitors comprised 89.14% of the interviews.

The tendency to visit more often in the Fall seems to contradict the previous indication that Spring is the season of highest visitation. One explanation of the discrepancy might be the predominance of organized groups in the Spring. Although, there are fewer organized groups than other visitors, organized groups have more people per group accounting for the high Spring attendance.

Table 24. Number of Visits by Season

NUMBER OF VISITS (N = 267)				
Season	Mean	Mode	Median	Range
Summer	5.3	1	2.2	1-84
Fall	6.3	1	2.5	1-84
Winter	5.5	1	2.1	1-50
Spring	5.7	1	2.2	1-84
All Seasons	12.9	1	3.8	1-280

By Activity Category

Of the seven categories, exercisers had the highest mean number of visits (56.1). The next highest mean was 13.6 in the miscellaneous category. Hikers had the lowest mean number of visits.

However, these means should be interpreted with caution. Visitors often participate in different activities on the other occasions they visit. For example, a visitor classified as a picnicker from the interview may hike or drive on subsequent visits to the Forest. No analysis of seasonal visitation by activity category was done for this reason. Refer to Table 5 for the five top ranked activities by season.

Table 25. Number of Visits by Activity Categories

	NUMBER OF VISITS				
Activity	Mean	Mode	Median	Range	N
Picnicking	10.6	1	1.5	1-144	21
Driving	10.8	1	2.5	1-200	68
Hiking	8.1	1	3.8	1-100	40
Misc.	13.6	1	.8	1-100	26
Exercising	56.1	3	25.5	1-280	18
Hunting/ Fishing	8.8	1	5.2	1- 27	24
Skiing	9.2	1	2.5	1- 62	20

TIME

All Visitors

The average amount of time visitors spend at the Forest is approximately an hour and one half. Visitors spent anywhere from 5 minutes for a quick trip through the picnic area in Winter to 7 hours in a hunting excursion during their visit. Table 26 indicates length of visit by all visitors and activity categories.

Table 26. Length of Visit by All Visitors and Activity Categories (Minutes)

Activity	Mean	Mode	Median	Range	N
Picnicking	89.8	120	93.30	15-180	21
Driving	28.5	30	27.70	5- 60	68
Hiking	97.2	90	89.50	10-360	90
Misc.	91.7	90	8.95	15-240	26
Exercising	61.1	90	52.50	20-120	18
Hunting/ Fishing	217.1	120	200.00	60-420	24
Skiing	114.3	120	116.40	50-190	20
All Visitors	88.2	120	62.40	5-420	267

By Activity Category

When means are ranked from shortest to longest length of stay, their order is as follows: Driving, exercising, picnicking, misc., hiking, skiing, and hunting/angling. When comparing the shortest to longest length of stay, hunter/anglers stay 7.6 times longer than drivers. The picnicking, miscellaneous and hiking categories (the middle ranks) have means indicating visitors in these categories stay a similar amount of time. The three means are within seven minutes of each other (approximately).

When an analysis of variance is conducted on the length of visit variable, it shows a significance at the .000 level (Table 27).

Table 27. Analysis of Variance Test for Length of Visit by Activity Category.

TOTAL TIME

Activity	Group Means	Standard Deviation
Picnicking	89.7619	41.9963
Driving	28.4559	14.4361
Hiking	97.2222	55.6984
Misc.	91.7308	61.4808
Exercising	61.1111	27.2545
Hunting/Fishing	217.0833	107.9746
Skiing	114.2500	40.5318

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Prob.
Between Groups	6	.6759E +06	.1126E +06	40.194	.000
Within Groups	260	.7318E +06	2814.7181		
Total	266	.1408E +07			

T-tests (Table 28) indicate a considerable difference between pairs of activities on length of visit. Three activities - driving, exercising and hunting/fishing differ from all other activities. These activities represent the two shortest length of stays (driving and exercising) and the longest length of stay (hunting/fishing).

Table 28. T-Test for Length of Visit by Activity Category

Activity Category	T Value	DF	T-Prob.
Driving vs. Picnicking	6.57	21.48	.000
Driving vs. Hiking	-11.22	104.43	.000
Driving vs. Misc.	- 5.19	26.06	.000
Driving vs. Exercising	- 4.90	19.59	.000
Driving vs. Hunting/ Fishing	- 8.53	23.29	.000
Driving vs. Skiing	- 9.29	20.44	.000
Exercising vs. Picnicking	2.48	37.00	.018
Exercising vs. Hiking	4.15	50.53	.000
Exercising vs. Misc.	- 2.24	36.84	.031
Exercising vs. Hunting/ Fishing	- 6.79	26.81	.000
Exercising vs. Skiing	4.69	36.00	.000
Hunting/Fishing vs. Picnicking	- 5.33	30.59	.000
Hunting/Fishing vs. Hiking	- 5.26	26.35	.000
Hunting/Fishing vs. Misc.	- 4.99	35.87	.000
Hunting/Fishing vs. Skiing	- 4.32	30.38	.000

OTHER ACTIVITIES

All Visitors

When asked whether they had done activities other than they had expected, most visitors responded that they had not (90.5%). This may have to do with familiarity with the Forest. But, 72.4% of first time visitors who would not be expected to have familiarity with the Forest also participated in the activities they had planned. It may be that first time visitors adapt to the conditions they find or visitors may have only a general "plan" for their recreation activities.

The responses by those who did participate in unplanned activies may shed some light on the question. Approximately 57.0% of the people did not expect to wade in the creek hike, or exercise. Another 9.5% of the responses were at the Forest by an unplanned stop (Table 29). The final category is serendipitous responses and indicate one of the problems of classifying the recreation experience. Approximately 33.3% of the responses were in this category (other). They include a pine cone fight, spotting trout, walking further than expected, hiking the back trails, looking at maple trees (Spring), and laying out on the bridge and contemplating.

Table 29. Participation in Unplanned Activities

Activities	% of Reponses
Other	33.3%
Wading	28.6%
Hiking	23.8%
Unplanned Stop	9.5%
Exercise	4.8%

EXCLUSIVENESS/SUBSTITUTES/RECOMMENDATIONS

All Visitors

Another way to typify the recreation experience is to rate the Forest attraction by the exclusiveness of visits, places visitors perceive as similar and by how often visitors recommend the Forest to others.

The Kellogg Forest was the sole destination of 69.4% of visitor trips. A quarter of the visitors had stopped or were planning to stop at some other recreation site. Approximately, 4.1% of the visitors were unsure if they would stop somewhere else. Most of the other sites where visitors planned to stop were located in the vicinity of the Forest. Half of the stops are a part of the Kellogg Biological Station (Table 30). Specific names of sites in the category are are listed in Appendix C.

Table 30. Other Planned Stops

Site	% of Responses
Other	39.2%
Fort Custer Recreation Area	26.5%
Gull Lake Station	14.9%
Gull lake Township Park	8.1%
Kellogg Farm	2.7%
Kellogg Company	1.9%
Yankee Springs	1.4%
Al Sabo	1.4%

SUBSTITUTES

All Visitors

To discover which recreation sites were substitutes for the Kellogg Forest, visitors were asked to name those places they thought were similar to the Forest. Approximately 35.9% acknowledged the uniqueness of the Forest by responding that there were no similar places. Responses indicate some visitors may have chosen sites they also

visit, not that those sites are necessarily similar to the Forest. Perhaps some respondents do not differentiate between levels of management. For example, the nearby Kellogg Bird Sanctuary is a site that is intensely managed for visitors. It has captive birds and mammals, hardened trails, a visitor center and charges an entrance fee.

The remainder of the responses indicate the Forest is in the same category as: Fort Custer, Yankee Springs, Allegan Forest, other state, county and metropolitan parks, national areas, and national forests and parks. These sites can be classified as natural, undeveloped areas.

Table 31. Similar Places to Kellogg Forest

Site	% of Responses	Site	% of Responses
None	35.9%	Binder Park	2.5%
Other	11.9%	MI State Parks	2.5%
Kellogg Bird Sanctuary	9.1%	Other Parks*	2.5%
Fort Custer	8.4%	Natural Areas	2.5%
Yankee Springs	6.9%	National Forests	2.2%
Allegan Forest	5.0%	Kimball Pines	1.9%
Kalamazoo Nature Center	3.8%	National Parks	1.9%
Al Sabo	3.1%		

RECOMMENDATIONS

All Visitors

Another indication of visitor rating of the Forest is their recommendation of it to others. Approximately 70% of the respondents had recommended the Forest during the

past 12 months. Some respondents (2.9%) could not remember if they had recommended the Forest. The number of visitors who had not suggested the Forest is 27.2%. This figure does not indicate that visitors were displeased with their recreation experience at the Forest as subsequent results show. There are alternative explainations such as having no opportunity to recommend the Forest.

MOTIVES

An important aspect of this study was to investigate vistior's motives for visiting the Forest, and the characteristics of the site that attracted the visitors.

The motive categories used were the same as those used by Kielbaso in 1967 with some additions. The question was a mutliple response one with up to three responses ranked by the order they were mentioned. Forest characteristics was another multiple response question and was divided into the following categories: location, fee, environmental attributes, educational aspects of the Forest, developed aspects of the site, and other.

All Visitors

The predominate reason visitors gave for visiting the Forest was the view. They enjoy the natural surrounding. It outrated the next highest ranked motive, exercise, by 22.7%. The third ranked motive - do something with children reflects the family orientation of the visitors (Table 32).

The diversity of motives people gave are an indication of the variety of appeal the Forest has for visitors. More than two thirds of the responses are in categories with 9.5% or less of all responses.

Seven of the response categories are actually activities and not motives. The seven categories are exercising, hunting/fishing, photography, leaf collecting, skiing and picnicking. The visitors who gave those responses were seeking a particular end - fish, leaves, photographs, etc.

Activity responses were most often the first reponses of visitors. When asked other responses for their visit, visitors usually replied with additional responses.

By Activity Category

When motives are examined by activity categories, view-enjoy the natural surroundings ranked first in four categories (picnicking, motorists, hikers, miscellaneous). The motive view-enjoy the natural surroundings ranks second in the skiing and exercising categories and third in hunting/fishing category. After the view-enjoy motive is eliminated, further examination of the ranking of motives shows some differences by activities (Table 33).

Picnickers cited getting way from crowds picnicking and spending time with their families as highest ranked motives. Showing family and friends the Forest and doing with something with their children were the second and third ranked motives of motorists. Hikers were interested in

doing something with their children and exercising. In the miscellaneous category second and third ranked motives were leaf collecting and photography.

Table 32. Motives for Visiting the Forest, All Visitors (N= 267)

Rank	Index Value (%)*	Motive (Satisfaction - Kielbaso)
1	32.2	View-enjoy natural surroundings
2	9.5	Exercise
3	7.1	Do something with children
4	5.7	Ski
5	5.4	Get away from crowds
6	4.7	Other
7	4.2	Hunt
8	4.1	Rest-relaxation
9	3.8	Show family/friends Forest
10	2.7	Fish
11	2.4	Photography
12	2.3	Learn about nature
13	2.1	Spend time with family
14	1.9	Socialize
15	1.7	Leaf collecting
16	1.5	Observe wildlife
17	1.2	Pass time
17	1.2	Picnic
18	.9	Enjoy creek/wade
19	.8	Forest as a classroom
19	.8	Lost
19	.8	Run Dogs
20	.4	Enjoy weather
21	.3	Cool off
22	.2	Teach family about nature
	99.8	

*Doesn't equal 100% due to rounding.

Skiers, exercisers and hunters/anglers all mentioned their activity as first ranked motives. Their second ranked motive was view-enjoy the natural surroundings. Their next ranked motives were: exercising by skiers; socializing by exercisers; and rest-relaxation by hunters/anglers.

Table 33. Motives for Visiting the Forest, Picncikers (N=21)

Rank	Index Value (%)	Motives
1	26.8	View-enjoy natural surroundings
2	11.6	Get away from crowds
2	11.6	Picnic
3	10.5	Spend time with family
4	9.3	Learn about nature
5	5.8	Rest-relaxation
5	5.8	Show family/friends Forest
6	3.5	Other
6	3.5	Socialize
6	3.5	Do something with children
7	2.3	Exercise
7	2.3	Observe Wildlife
	100.0	

Table 34. Motives for Visiting the Forest, Motorists (N=68)

Rank	Index Value (%)*	Motives
1	39.6	View-enjoy natural surroundings
2	9.2	Show family/friends Forest
3	8.0	Do something with children
4	7.6	Get away from crowds
5	7.2	Rest-relaxation
6	6.8	Other
7	4.0	Explore new area
8	3.6	Pass time
9	2.4	Socialize
9	2.4	Learn about nature
10	2.0	Spend time with family
11	1.2	Lost
11	1.2	Cool off
11	1.2	Use Forest as classroom
12	.8	Observe wildlife
12	.8	Exercise
	98.0	

*Doesn't equal 100% due to rounding

Table 35. Motives for Visiting the Forest, Hikers (N=90)

Rank	Index Value (%)*	Motives
1	44.4	View-enjoy natural surroundings
2	10.9	Do something with children
3	9.2	Exercise
4	7.3	Other
5	3.2	Use Forest as classroom
5	3.2	Get away from crowds
6	2.0	Show family/friends Forest
7	2.6	Learn about nature
7	2.6	Rest-relaxation
8	2.3	Run dogs
9	2.0	Explore new area
10	1.7	Observe wildlife
11	1.4	Spend time with family
11	1.4	Lost
12	1.2	Enjoy the weather
12	1.2	Photography
13	1.1	Socialize
14	.9	Enjoy creek
15	.6	Teach family nature
	100.1	

*Doesn't equal 100% due to rounding.

Table 36. Motives for Visiting the Forest, Skiers (N=20)

Rank	Index Value (%)*	Motives
1	79.2	Ski
2	11.1	View-enjoy natural surroundings
3	5.6	Exercise
4	2.8	Socialize
5	1.4	Observe wildlife
	100.1	

*Doesn't equal 100% due to rounding.

Table 37. Motives for Visiting the Forest, Exercisers (N=20)

Rank	Index Value (%)	Motives
1	81.8	Exercise
2	9.1	View-enjoy natural surroundings
3	6.1	Socialize
4	3.0	Get away from crowds
	100.0	

Table 38. Motives for Visiting the Forest, Hunters/Anglers (N=24)

Rank	Index Value (%)	Motives
1	49.4	Hunt
2	31.8	Fish
3	7.1	View-enjoy natural surroundings
4	4.7	Rest-relaxation
5	3.5	Observe wildlife
5	3.5	Other
	100.0	

Table 39. Motives for Visiting the Forest, Miscellaneous (N=26)

Rank	Index Value (%)*	Motives
1	23.5	View-enjoy natural surroundings
2	19.4	Leaf collecting
3	15.3	Photography
4	12.2	Get away from crowds
5	10.2	Do something with children
6	8.2	Other
7	6.1	Enjoy creek/wade
8	2.0	Spend time with family
8	2.0	Rest-relaxation
9	1.0	Observe wildlife
	99.9	

*Doesn't equal 100% due to rounding.

To explore the relationship between motives and activities an analysis of the motives for participation by activity categories was conducted. The hypothesis was tested using asymetrical Lambda. Lambda, rather than Chi-Square, was used as a measure of association since there were fewer than 5 cases in many cells of the motive by activity matrix and since the variables were nominal level.

Motive-Activity Link

Null Hypothesis: There is no significant difference in motives for participation across activity categories.

Alternative: There is a significant difference between different motives in various activity categories.

Decision: Fail to reject for all activity categories.

The results of the Lambda tests of motives by activity categories presented in Table 40 indicate that knowing the activity category does not aid significantly in the prediction of motives for participation. The first response to the motive question is a 29.8% improvement in prediction ability, while the second and third responses add 0 to the ability to predict activity.

It appears that the motives of visitors to the Kellogg Forest do not vary across the seven activity categories as would be expected from the social-psychological need fulfillment approach. Visitors in all activity categories show a tendency to report similar motives. Perhaps visitors to the Kellogg Forest are more "generalists" in their motives.

Table 40. Motives by Activity Category

First Response Asymmetric	= 0.29817
Second Response	= 0.00000
Third Response	= 0.00000

One explanation for this may be the Forest's intermediate and multiple use classification. The Forest can be visited often and provides the opportunity for various activities. It is not a one-time only site that visitors would invest extensive time, energy and money to visit and enjoy unique environmental features. There may be many substitutes for the Forest.

Another consideration in the interpretation of the findings is the possibility of bais as a result of the wording of the questions. Much has been written examining the effects of question wording (Schuman and Presser, 1981). It has been found that the manner in which questions are worded can have major influence on the results. An effort to eliminate wording bias was made during the pre-test of the survey instrument. However, question wording can not be ruled out as a source of bias.

FOREST CHARACTERISTICS

All Visitors

When asked their primary reason for choosing the Kellogg Forest, instead of somewhere else, visitors most often responded with an environmental response (43.4%). The aim of this questions was to discover which characteristics were important factors in the visitors' selection of the Forest (Table 41). The next most frequent reason 31.1% for choosing the Forest was the Forest's location. "Other" responses were cited by 16.1% of respondents. Developed characteristics of the site were mentioned by 9.7% of the visitors; followed by the educational aspects of the Forest with 7.1% of respondents mentioning it. Only 4.5% of the respondents cited the free access as a reason for visiting the Forest.

Table 41. Characteristics of Forest, All Visitors (N= 267)

Forest Characteristics		Count	% of Responses By Visitors
Location:	Close	54	20.2%
	On the way	29	10.9%
	Total responses	83	31.1%
Fee:	None required	12	4.5%
	Total responses	12	4.5%
Environment:	Cool	3	1.1%
	Quiet	26	9.7%
	Good place to...	23	8.6%
	Beautiful setting	33	12.4%
	Natural environment	12	4.5%
	Has creek	1	.4%
	Unique environment	5	1.9%
	Trout present	4	1.5%
	Other	9	3.4%
	Total responses	116	43.4%
Education:	Trees labeled	10	3.7%
	Demonstration forestry site	5	1.9%
	Other	4	1.5%
	Total responses	19	7.1%
Site:	Many and variety of trees	16	6.0%
	Maintained facilities	1	.4%
	Picnic area	2	.8%
	Other	7	2.6%
	Total responses	26	9.7%
Other:	New area	10	3.7%
	Few other people	8	3.0%
	Familiar with Forest	6	2.2%
	Other	19	7.1%
	Total responses	43	16.1%

By Activity Category

Environmental responses were ranked first in five of the seven categories (picnicking, hiking, exercising, hunting/fishing, and miscellaneous). The Forest location was ranked first by motorists, while skiers rated "other" first (Tables 42-48). Location was second ranked in three categories (hunting/fishing, picnicking, and miscellaneous). "Other" was also rated second be visitors in three activities (hunting/fishing, exercising and driving). The site, primarily the number and variety of trails, was ranked second by skiers.

Table 42. Characteristics of Forest, Picnickers (N=21)

Location	% of Responses by Visitors	Fee	% of Responses by Visitors	Environment	% of Responses by Visitors
Close	38.1%	None	4.8%	Quiet	28.6%
On the way	9.5%			Good place	9.5%
				Beautiful setting	4.8%
				Natural environment	9.5%
Total responses	47.6%		4.8%		52.4%

Education	% of Responses by Visitors	Site	% of Responses by Visitors	Other	% of Responses by Visitors
Trees labeled	4.8%	Picnic area	4.8%	None	0.0%
Other	4.8%				
Total responses	9.6%		4.8%		0.0%

Table 43. Characteristics of Forest, Motorists (N=68)

Location	% of Responses by Visitors	Fee	% of Responses by Visitors	Environment	% of Responses by Visitors
Close	13.2%	None	0.0%	Cool	1.5%
On the way	30.9%			Quiet	5.9%
				Good place	7.4%
				Beautiful setting	5.9%
				Natural environment	1.5%
Total responses	44.1%		0.0%		22.1%

Education	% of Responses by Visitors	Site	% of Responses by Visitors	Other	% of Responses by Visitors
Trees labeled	1.5%	Other	1.5%	Few other people	1.5%
Demonstration Forest site	3.0%			Explore new area	4.4%
				Other	17.6%
Total responses	4.5%		1.5%		23.6%

Table 44. Characteristics of Forest, Hikers (N=90)

Location	% of Responses by Visitors	Fee	% of Responses by Visitors	Environment	% of Responses by Visitors
Close	20.0%	None	3.3%	Cool	1.1%
On the way	3.3%			Quiet	8.9%
				Good place	5.6%
				Beautiful setting	16.7%
				Natural environment	5.6%
				Has creek	1.1%
				Uniqueness of Forest	4.4%
				Other	3.3%
Total responses	23.3%		3.3%		46.7%

Education	% of Responses by Visitors	Site	% of Responses by Visitors	Other	% of Responses by Visitors
Trees labeled	5.6%	Many trails	7.8%	Few other people	4.4%
Demonstration Forest site	3.3%	Picnic area	1.1%	Explore new area	5.6%
Other (educational)	3.3%	Other	4.4%	Other	18.9%
Total responses	12.2%		13.3%		28.9%

Table 45. Characteristics of Forest, Skiers (N=20)

Location	% of Responses by Visitors	Fee	% of Responses by Visitors	Environment	% of Responses by Visitors
Close	4.4%	None	30.0%	Beautiful	30.0%
Total responses	4.4%		30.0%		30.0%

Education	% of Responses by Visitors	Site	% of Responses by Visitors	Other	% of Responses by Visitors
None	0.0%	Many trails	30.0%	Few other people	5.0%
		Large area	5.0%	Explore new area	5.0%
				Other	35.0%
Total responses	0.0%		35.0%		45.0%

Table 46. Characteristics of Forest, Exercisers (N=18)

Location	% of Responses by Visitors	Fee	% of Responses by Visitors	Environment	% of Responses by Visitors
Close	16.7%	None	5.6%	Cool	5.6%
				Quiet	22.2%
				Good place	11.1%
				Beautiful setting	22.2%
				Natural environment	11.1%
				Other	11.1%
Total responses	16.7%		5.6%		83.5%

Education	% of Responses by Visitors	Site	% of Responses by Visitors	Other	% of Responses by Visitors
None	0.0%	Maintained	5.6%	Few other people	5.6%
		Other	11.1%	Other	11.1%
Total responses	0.0%		16.7%		16.7%

Table 47. Characteristics of Forest, Miscellaneous (N=26)

Location	% of Responses by Visitors	Fee	% of Responses by Visitors	Environment	% of Responses by Visitors
Close	11.5%	None	3.8%	Quiet	15.4%
On the way	11.5%			Good place	11.5%
				Beautiful setting	7.7%
				Natural environment	7.7%
				Other	3.8%
Total responses	23.0%		3.8%		46.1%

Education	% of Responses by Visitors	Site	% of Responses by Visitors	Other	% of Responses by Visitors
Trees labeled	11.5%	Many trails	3.8%	Few other people	3.8%
		Other	3.8%	Other	19.2%
Total responses	11.5%		7.6%		23.0%

Table 48. Characteristics of Forest, Hunters/Anglers (N=24)

Location	% of Responses by Visitors	Fee	% of Responses by Visitors	Environment	% of Responses by Visitors
Close	37.5%	None	0.0%	Good place	25.0%
				Beautiful setting	4.2%
				Trout present	16.6%
				Other	8.4%
Total responses	37.5%		0.0%		54.2%

Education	% of Responses by Visitors	Site	% of Responses by Visitors	Other	% of Responses by Visitors
None	0.0%	Other	0.0%	Explore new area	4.2%
				Other	16.7%
Total responses	0.0%		0.0%		20.9%

Activity-Characteristics Link

Another of the study objectivies was to investigate the relationship between activities and visitor's choice of characteristics of the Forest. The purpose was to discover if participants in the various activity categories deemed certain characteristics as more important than others in their selection of the Forest.

Null Hypothesis: There are no significant differences in the Forest characteristics selected by visitors in the various activity categories.

Alternative: There are significant differences in Forest characteristics selected by visitors in various activity categories.

Decision: Fail to reject for all activity categories.

An examination of characteristics by activity categories was conducted. The asymmetric Lambda value for each characteristic of the Forest by activity was 0. Thus, the choice of characteristics does not appear to be related to activity. Table 49 indicates that knowing activity categories does not significantly aid in predicting which characteristics of the Forest visitors rate as important.

The results of this test seem congruent with the results of the motive-activity linkage. Visitors in all activity categories have similar motives and choose similar characteristics of the Forest as being important. The data seems to support the view of visitors as generalists in both motivation and site selection.

A possible explanation is that the nature of the Forest site attracts generalists. It is an intermediate multiple use Forest. The site is conducive to a variety of activities. Visitors may participate in multiple activities during the same visit or visitors participate in different activites on different occassions.

Table 49. Forest Characteristics by Activity Categories

	Lambda
Location	0
Fee	0
Educational characteristics	0
Site characteristics	0
Environmental characteristics	0
Other	0

MANAGEMENT CONCERNS

Part of this study focuses on the interests of the manager of the Forest. Its purpose is to evaluate the effectiveness of recreation management and the visitors' perceptions of the administration of the Forest.

INFORMATION

A question of concern at the recreation areas is how visitors find out about the area's availability for recreation. Visitors' source of knowledge is interesting at the Forest since until recently the Forest has not been advertised as a recreation site. Within the past year the Forest was publicized as a cross-country skiing location and is mentioned as one of the excellent trout streams in Michigan. Neither of these advertisements were the result of management efforts. In the past, publicity concerning the Kellogg Forest was limited to its forestry emphasis.

The largest category of reponses for visitors'source of information was word of mouth (Table 50). Family and friends account for 47.9%; school - 9.7%. School responses may be attributed to field trips or teachers recommendations of the Forest as a leaf collecting site. At least some portion of the 16.1% of visitors who responded they knew about the Forest since they "lived here" could be assigned to the word of mouth category and their sources of information were certainly informal. These visitors could not be more specific about their source of knowledge. They

accepted knowing about the Forest as common knowlege. They, along with visitors who could not remember their source of knowlege, seem to be long-time visitors to the Forest. Some older visitors remembered when the Forest was first established, but could not remember how they found out about it. A few visitors "discovered" the Forest while driving by and noticing the entrance sign. Others learned about it through the Forest affiliation with Michigan State University or a recommendation by the Kellogg Biological Station. Approximately 1.1% of visitors attribute their source of knowledge to a newspaper article presumably related to forestry. The "other" response was a brochure at the Kellogg Cereal Company in Battle Creek.

Visitors source of knowledge about the Forest is related to the previous question on recommendation of the Forest to others in the past 12 months. The two compliment each other since recommendations are by word of mouth.

Table 50. Visitors Source of Knowledge

Source	% of Responses
Word of mouth	57.6%
-Family & friends	(47.9%)
-School	(9.7%)
Live here/Common knowledge	16.1%
Don't remember	10.1%
Entrance sign/Passing by	9.4%
Michigan State University	3.7%
Newspaper	1.1%
Kellogg Bird Sanctuary	1.1%
Other	.4%
Missing	.4%
	99.9%*

*Due to rounding. Sample Size = 267

The next aspects of information to be discussed are those concerning informational signage and materials. As visitors enter the Forest, there is a sign by the office for visitor information. Three types of materials are available to visitors -- a map; a brochure describing the various compartments within the Forest, and a self guiding trail pamphlet for use on the auto trail. Approximately 90% of visitors did not stop for information upon entering. Twelve percent of the 90% indicated they had stopped for information on previous occasions or visited often and had no need for information. When asked if they had noticed the sign for visitor information 46.8% of respondents said they had not. It appears that visitors do not stop for

information most commonly because they do not know information is available, or, because they are repeat visitors and feel they are familiar with the Forest.

To further explore the effectiveness of information services visitors in activities categories were querried about the Forest map and self-guiding trail pamphlet. Visitors using the road were a target population for the self-guiding pamphlet. Approximately 20% of road users knew that the pamphlet was available. Four percent of all road users used the pamphlet (Table 51). Thus, a small portion of drivers knew the pamphlet was available and only a few drivers actually used it.

Table 51. Drivers - Self-Guiding Trail Pamphlet

	Knew Pamphlet Was Available	Used Pamphlet
No	80.4%	96.0%
Yes	19.6%	4.0%

Sample Size = 101

The target population for the map and self-guiding trail pamphlet is trail users. Of all trail users, 12% used either the map or self-guiding pamphlet during their visit. Of the trail users who chose information, 81.3% of respondents used the trail map, 18.8% used the self-guiding trail pamphlet.

Table 52. Trail Users - Map and Self-Guiding Trail Pamphlet Used

Used Either Map or Pamphlet	% of Responses
No	88.0%
Yes	12.0%
Sample Size = 133	

Table 53. Trail Users - Which Material Used? (Map or Pamphlet)

Map	81.3%
Pamphlet	18.8%
Sample Size = 16	

When drivers and trail users are combined into one category to summarize use of information, only 8.5% of visitors utilized these materials. It appears this low proportion of use may be attributed to visitors being unaware of their availability. This is indicated by the 80.4% of drivers who did not know the self-guiding pamphlet was available. Informing visitors of the materials available may be one technique utilized in management of visitors to disperse use. A comment by one visitor echos this thought - "I didn't know you could drive, until I was half-way around. I like to walk anyway".

All of the eight visitors who used the self-guiding trail pamphlet were satisfied with it, but three visitors

offered suggestions for its improvement. The pamphlet follows marked posts around the Forest road. One visitor suggested increasing the size of the markers as he found some of them were easy to miss. Another visitor indicated that locating different species of trees on the pamphlet would improve the information provided. The final suggestion for improvement concerns the form of the pamphlets information and was made by an English teacher. He commented that the information could be made to read more easily. To improve the pamphlet's readability he suggests reducing the amount of information and reducing the number of clauses in the text.

Approximately, 64% of the trail users were satisfied with the map, but 58.3% thought the map could be improved. All the comments for improvement focused on locating landmarks on the map to orient the visitors. Suggestions include: locating the office on the map with a "you are there" device; numbering the trails in the Forest and corresponding trails on the map as reference points; one visitors suggested using the markers from the self-guiding pamphlet as reference points; and adding other prominent Forest landmarks to the map.

AREAS OF THE FOREST VISTED

The areas of the Forest visted were a multiple-response question. For determining which sections of the Forest were used most often, the Forest was divided into twelve geographic sections. There were also categories for

specific, seemingly often traveled trails. The following percentages are reported as the percent of cases, so, the totals exceed 100.

Hunters and Anglers

The areas most often used by hunters were the acreage west of 42nd Street, and Sections 5 and 2 of the Forest (Figure 3). Frequencies are shown in Table 54. These three areas contain the most attractive type of habitat for wildlife. The west side of the Forest has the additional advantage of attracting few other visitors. In fact, the only other visitor group that regularly utilizes the west side is snowmobilers.

Anglers chose most often to fish in the southern sections of the Augusta Creek. No one reported fishing the creek in Section 1.

All Other Trail Users (Excluding Hunters and Anglers)

The most frequently utilized areas by all other trail users were: the Forest road, Section 4 which includes the McCrary Lookout, and parts of the Forest road (Table 55).

The road seems to be a favored choice of visitors since it is an obvious route to follow. The Lookout is a defined scenic spot. It is a shelter with a view of the surrounding hills.

Section 7 was the next highest category of responses. Again, this may be a choice of visitors since it is the first obvious trail the visitors see. Most often visitors park their cars around the office and travel across the

W.K. KELLOGG FOREST

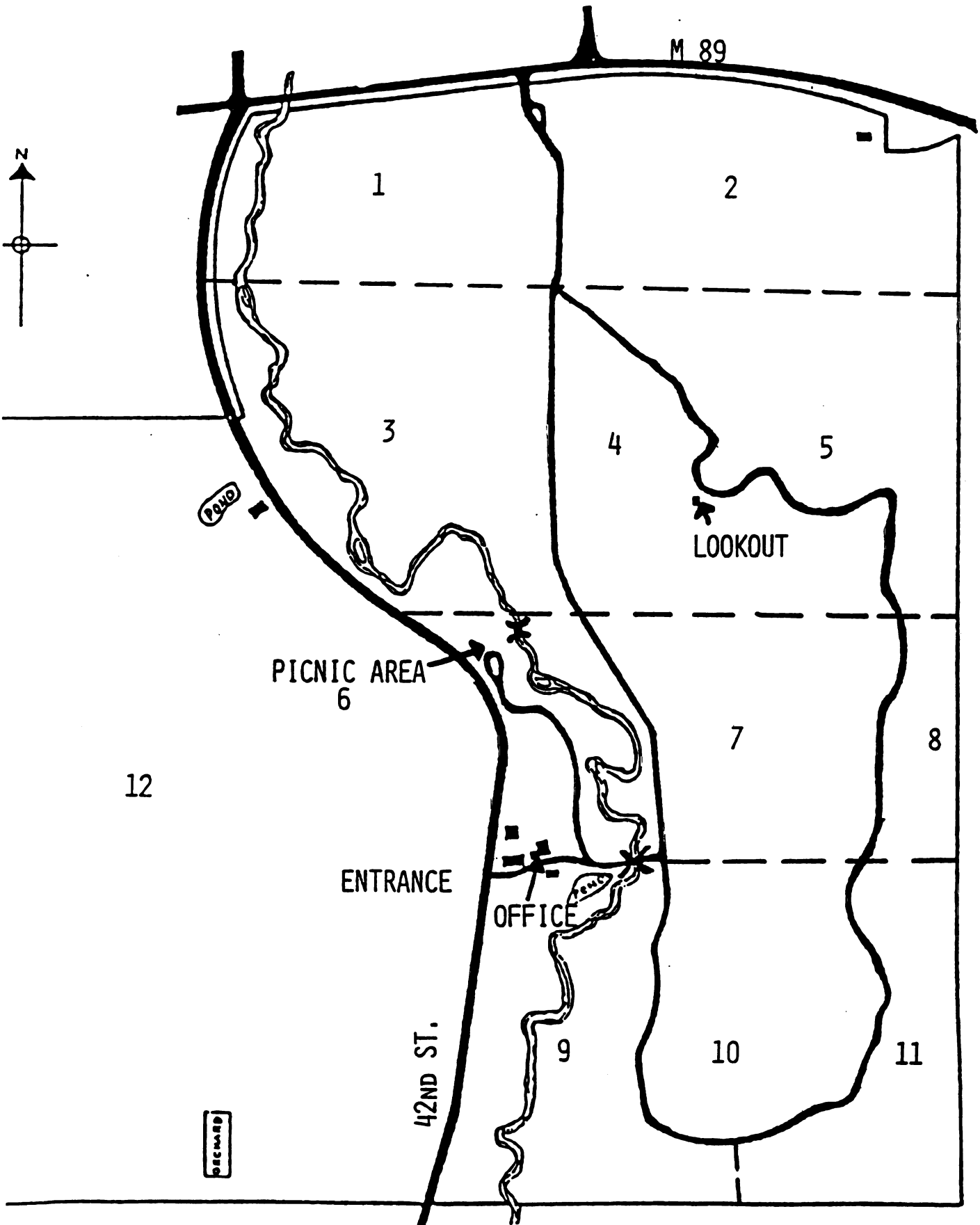


FIGURE 4. FOREST SECTIONS

Table 54. Areas of the Forest Visited, Hunters/Anglers

Area of Forest	Percent of Cases	
	Hunters (N=15)	Anglers (N=9)
North Area		
Section 1	0.0	
2	33.3	
3	6.7	33.3
4	13.3	
5	40.0	
Entire North Area (1-5)	6.7	
Total North Area	100.0	
South Area		
Section 6	0.0	66.7
7	20.0	
8	20.0	
9	0.0	66.7
10	6.7	
11	13.3	
Entire North Area (6-11)	6.7	
Total North Area	66.7	
West Side	53.3	
	220.0	116.7

Table 55. Areas of the Forest Visited, All Other Trail Users (Excluding Hunters/Anglers) (N=132)

Area	Percent of Cases
North Area	
Section 1	3.0%
2	8.3%
3	9.8%
4 (Lookout)	25.0%
5	17.4%
Entire North Area	5.3%
	68.8%
South Area	
Section 6	14.4%
7	20.5%
8	12.9%
9	6.8%
10	9.1%
11	6.1%
Entire South Area	7.6%
	77.2%
Road	37.9%
Part of Road	22.7%
Picnic Area at Lookout	12.9%
Other	9.9%
West Side	2.3%
	231.8%

OPINIONS OF THE SITE AND FACILITIES

The most obvious way to determine people's opinions is to ask them. Visitors were asked to rate their satisfaction with the facilities in the Forest. All respondents were asked their opinions on the general facilities of parking and entrance road conditions. Then visitors were asked about those facilities related to their activity, i.e.

creek by way of the entrance road. This leads them to Section 7 which has a number of trails intersecting the road.

It appears that many visitors utilize those areas that are obvious routes such as the road or the first opportunities they have of leaving the road. The previous section on useage of information lends support for this conclusion. The areas of the Forest visitors choose to travel may be an indication of the underutilization of informational materials including maps. One way to redistribute use in the Forest may be the use of information.

picnic area, road, and trail facilities. The data that follows is a summary from those visitors who used the facilities.

General

The parking and road conditions' responses overwhelmingly indicate visitors' approval of the recent improvements at the Forest. Approximately, 98.0% were satisfied with the parking conditions; approximately 99.0% of the respondents were satisfied with road conditions (Table 56).

These two questions prompted comments from one segment of visitors concerning future improvements. The theme of these comments was to discourage any future improvements. These visitors like the Forest the way it is. One typical comments was "there is less dust since the road was paved, but a fancier Forest brings out more people. I don't like improvement that bring out 'city folk'. The Forest is almost too good now."

However, one interesting occurance during the Winter was some confusion about parking. Some visitors did not realize there was additional parking to the east of the office. These comments were made during heavy use periods. During good skiing weekends, parking at the Forest can be a problem. The problem seemed to be compounded by inconspicuous signage. The signage confusion is another aspect of the information system problem.

Table 56. General Opinions

Parking

Opinion	% of Responses*
Unsatisfied	1.0%
Satisfied	97.5%
No Opinion	1.0%
Missing	1.0%
	100.5%

Sample Size = 201

Road Conditions

Opinion	% of Responses*
Unsatisfied	.4%
Satisfied	98.5%
No Opinion	.4%
Missing	.8%
	103.7%

Sample Size = 260

*Not equal to 100% due to rounding.

Table 57. Picnicking Opinions

Picnic Tables

Opinion	% of Responses*
Unsatisfied	26.9%
Satisfied	69.2%
No Opinion	3.8%
	100.9%

Sample Size = 33

Water Pumps

Opinion	% of Responses
Unsatisfied	0.0%
Satisfied	100.0%
	100.0%

Sample Size = 9

Pit Toilets

Opinion	% of Responses
Unsatisfied	25.0%
Satisfied	75.0%
	100.0%

Sample Size = 12

Grills/Firerings

Opinion	% of Responses
Unsatisfied	25.0%
Satisfied	75.0%
	100.0%

Sample Size = 12

Garbage

Opinion	% of Responses
Unsatisfied	0.0%
Satisfied	100.0%
	100.0%

Sample Size = 17

*Not equal to 100% due to rounding.

Picnic Facilities

The picnic area at the Forest consists of approximately eight groups of picnic tables with grills and fire rings along the Augusta Creek. Garbage cans, water pumps and pit toilets are available in the picnic area.

Approximately, 26.9% of picnickers were unsatisfied with the picnic tables and 25% of visitors were unsatisfied with both grills/firerings and pit toilets. Everyone was satisified with garbage facilities and water pumps. The dissatisfaction with the pit toilets may be due to the nature of the toilets, not their upkeep. One visitors comment on how well maintained they were..."It was the first outdoor toilet I've ever seen with toilet paper".

The amazing interpretation of this data is that more people were not dissatisfied with the picnicking facilities. Besides garbage removal and general clean up of the area, no maintenance had been done since the 1950's when the picnic area was first developed. (Replacement of picnic tables and other maintenance was begun after the survey period was completed). The picnic tables, firerings, and grills have deteriorated since then, but visitors seem to take the Forest as it is, although they were dissatisfied. The comments concerning the picnicking area were quite mild. "I like firerings, but they need some work." One fact to consider is that the percentages reported here are for users of the facilities only. It may be that visitors show their dissatisfactions with the picnic area by not using the facilities. They may also be unwilling to voice their

dissatisfaction to an interviewer that they perceive as representing the Forest. Visitors may not be concerned with the maintenance of the area.

Road

Visitors voiced their satisfaction (95.1%) with the Forest road by comments like: "the road isn't meant to be a super-highway; the road is narrow but challenging; I wouldn't want it any other way". There were 2.9% of visitors who were dissatisfied with the width of the road (Table 58). Their comments centered around widening the road as it descends by compartment 7. It is a steep hill. One visitor in the Fall remarked that "the road is narrow in places and it is hard to tell where it goes with the leaves down".

Again, visitors are satisfied with the pullovers around the Forest road (80.6%). Those visitors who were dissatisfied (8.3%) suggested that more pullovers were needed. These comments were made on high use days, mainly during the fall leaf collecting days. The leaf collectors sometimes disrupt the traffic flow in the road by stopping in the road.

One of the directional signs on the road drew a number of comments. The sign is located at the T intersection by Compartment 7 and contains a bi-directional arrow <-->. A right hand turn leads to cul-de-sac. Left is towards the exit. First-time visitors were confused about which way to go. This is another indication of the information system problem.

Table 58. Road Users Opinions

Width of the Road

Opinion	% of Responses
Unsatisfied	2.9%
Satisfied	95.1%
No Opinion	2.0%
	100.0%

Sample Size = 102

Pullovers

Opinion	% of Responses
Unsatisfied	8.3%
Satisfied	80.6%
No Opinion	11.1%
	100.0%

Sample Size = 72

Trails

Trail users (94.5%) were satisfied with the maintenance of the Forest trails, the directional signs (69%) and slope of the trails (77.4%) (Table 59). Generally, visitors comments indicated they were pleased with the trails. Skiers were a group who mentioned the variety, number, or quality of the trails quite often.

Table 59. Trail User Opinions

Maintenance of Trails

Opinion	% of Responses
Unsatisfied	.9%
Satisfied	94.5%
No Opinion	4.6%
	100.0%

Sample Size = 109

Directional Signs

Opinion	% of Responses
Unsatisfied	16.7%
Satisfied	69.0%
No Opinion	14.3%
	100.0%

Sample Size = 42

Slope of Trails

Opinion	% of Responses
Unsatisfied	22.6%
Satisfied	77.4%
	100.0%

Sample Size = 93

GENERAL COMMENTS

The previous questions illicted many spontaneous comments on the excellance of the maintenance and appearance of the Forest. Here is a sample of the comments: "I like the clean appearance of the Forest; keep up the good work; it's an excellent Forest and is kept up well; one reason I like it here is because it is well maintained; the bathroom

facilities are wonderful". There were many and enthusiastic comments on the new bathrooms. Other comments are summarized on Appendix A.

Another comment made by two of the women who visited the Forest alone indicates another aspect of the Forest. These women said they felt safe at the Forest alone. One commented: "I enjoy being in the woods without being hassled".

There were three categories of comments that indicated possible future conflicts. The 1st source of conflict is hunting. The hunting vs. non-hunting contraversy has raged in the United States in the past 15 years. Non-hunters may object on ethical principles to the killing of animals. They may object to being in the vicinity of armed hunters. Hunters dislike encountering many other users during their visit, since they detract from their experience and distrub game.

Another potential source of conflict is the snowmobilers vs the skiers. Skiers usually object to the noise made by snowmobilers and the disturbance of ski tracks by snowmobiles. Snowmobilers, on the other hand, voice dissatisfaction at being harassed by skiers.

The above two conflicts have become more noticeable in recent years and have no easy solution. The Forest managagement recognized the possibility of conflict and during the 1984 hunting season implemented an indirect

management strategy. Upon registration, hunters received a notice informing them of the other visitors at the Forest and cautioning them to be careful.

A direct management strategy used to deal with conflicts is excluding one user group. Exclusion can be implemented either in time or space. Sometimes, visitors exclude themselves voluntarily. For example, some hikers avoid the Forest during hunting season. They know there will be hunters present and choose not to visit. The snowmobilers policy is respresentative of spactial exclusion. They are permitted to use the entire west side of the Forest, and are only allowed on the road on the east side.

Currently at the Forest, the hunting vs. anti-hunting and skiing vs. snowmobiling conflicts are not prominent. However, there are signs of potential problems and strategies should be developed now to avoid conflicts.

Lastly, hikers object to the automobile traffic on the road. These comments were especially noticeable in the Spring time. A solution to this problem is the dispersal of hikers to another area of the Forest. As mentioned earlier, dispersal could be accomplished indirectly through a more effective information system that tells visitors what is available to them.

PERCEPTION OF FOREST ADMINISTRATION

A final management concern was whether visitors were aware of the primary purpose of the Forest and knew the

sponsoring agency. To determine visitors' perception, two "test" questions were included in the survey.

Approximately 64% of the visitors responded that Michigan State University administered the Forest. Approximately, 8.6% of respondents replied they did not know. The remaining responses were divided into the following categories: Kellogg; Department of Natural Resources; a University other than Michigan State University; and other responses (Table 60).

Table 60. Administering Agency.

Agency	% of Responses
Michigan State University	64.0%
Kellogg	12.0%
Don't know	8.6%
Department of Natural Resources	7.9%
Other University	4.5%
Other	1.9%
Missing	1.1%
	100.0%

Sample Size = 267

Visitors' perception of the Forest's primary purpose reflect the multiple uses of the site as much as the research emphasis. The category with the largest percentage of responses was Research (40.8%). An associated category, Forestry management, was the second largest group of responses (12.7%). Additional categories were: education, conservation, recreation, preservation and other responses. See Table 61. Primary Purposes of the Kellogg Forest.

Table 61. Primary Purposes of the Kellogg Forest

Category	% of Responses *
Research	40.8%
Forestry Management	12.7%
Education	10.9%
Conservation	8.6%
Recreation	8.6%
Others	6.0%
Don't Know	5.6%
Preservation	5.2%
Missing	1.5%
	99.9%

Sample Size = 267

*Not equal to 100% due to rounding.

The responses in the "other" category are noteworthy. All of them include some aspect of the Forest's purpose; some of the responses combine two of the categories. For a listing refer to Table 61. Responses like "show trees in a natural environment", "for people to look at trees", and "horticulture" may indicate that visitors have the right concept of the Forest's purpose, but were unable or

unfamiliar with the words to describe their ideas. If it is desired that visitors are to know the exact purpose of the Forest, they may have to be educated.

Table 62. Primary Purpose of Kellogg Forest - "Other" Responses.

Responses:
Reclaim the land
Show trees in a natural environment
For people to look at trees
Combination of recreation and wildlife sanctuary
Demonstration
Multiple use
Education and recreation
Research and education
Botanical management
Horticulture
Land management

COMPARISON WITH 1967 STUDY

Our society is a dynamic one that is continuously evolving. Recreation is a reflection of societal trends. The following is a comparison of some of the results of a 1967 study at the Kellogg Forest by J. J. Kielbaso and the 1984 results.

There are some differences between the two studies that demonstrate the emphasis of each study and the time in which they were conducted. For example, there were five activity categories represented in 1967 as compared with seven categories in 1984. The two new categories of activities are exercising and skiing. These two activities are currently in vogue. Exercise is one aspect of healthy lifestyle habits that are an emphasis in society. Cross-country skiing is one of the rapidly expanding recreation activities today.

Gender variables between the two studies are not comparable. In 1967, the head of the party, usually a male visitor, was interviewed. As previously noted, in 1984 there was a conscious attempt to interview equal numbers of both male and female visitors. Income, occupation, and marital status were not included in 1984. There were also more variables examined in 1984.

Attendance Patterns

There was a 38.6% increase in the number of visitors to the Kellogg Forest between 1967 and 1984. The number of estimated visitors in organized groups is slightly less in

1984 than 1967 (Table 62). However, the estimated number of visitors excluding organized groups has almost tripled since 1967.

Once factor to consider is that during 1967 there was no estimation of attendance from January to March since the Forest was closed in 1967 during those months.

Table 63. Attendance Comparisons 1967 and 1984.

	1967	1984
Visitors Excluding Organized Groups	32,024.0	91,656.2
Organized Groups	5,040.0	4,283.0
Total	37,064.0	95,939.2

As Table 64 shows, the major difference in the weekly attendance pattern between 1967 and 1984 is the amount of vehicle traffic that occurs on weekend days. In 1984, the percentages are more evenly distributed between Saturday and Sunday than in 1967. There is also an increase in use during the weekdays during the Summer and Fall. No use figures are available for Spring and Winter of 1967 for comparison in those seasons.

Table 64. Percent Vehicle Traffic on Weekdays and Weekends 1967 and 1984.

	Weekdays		Saturday		Sunday	
Period	1967	1984	1967	1984	1967	1984
Summer	44.0%	52.7%	16.0%	22.6%	40.0%	20.2%
Fall	29.0%	48.4%	23.0%	23.6%	47.0%	28.0%

PREDOMINATE ACTIVITIES

It appears a shift has occurred in the types of activities participated in by visitors since 1967. Then, the ranking frequency of activities was as follows: driving, picnicking, hiking, miscellaneous, hunting and fishing (Kielbaso, 1967). Hiking has taken over the first position in 1984 followed by driving and picnicking. One problem with further comparison of activities between the two years is that multiple activities were not reported in 1967. During 1984 25.8% of all visitors participated in multiple activities.

Another difference in 1984 that seems to reflect a changing emphasis in recreation trends is the importance of cross-country skiing and exercising at the Forest, and the decline of hunting and fishing.

GROUP CHARACTERISTICS

GROUP SIZE

There was a slight increase in the average size of a visiting group between 1967 and 1984. In 1984, the average size was 4.1; the average size in 1967 was 3.75. The primary

difference seems to be in the size of picnicking groups. Table 65 shows average group size for 1967-1984.

Table 65. Average Group Size of Activity Category, 1967 and 1984.

Activity	Average Group Size 1967	1984
Picnickers	5.43	8.30
Motorists	4.10	3.90
Hikers	4.50	5.00
Anglers	1.55	
Hunters (Deer)	1.42	2.00
Hunters (Small Game)	1.96	
Miscellaneous	3.87	2.30
All Visitors	3.75	4.10

RESPONDENT CHARACTERISTICS

AGE

The mean ages for all visitors are very similar for both years. In 1967, the mean age was 37.8; in 1984, 37.5 was the mean age. A difference occurs in the picnicking, driving, and angling and hunting categories during 1984. The ages in these four categories are somewhat older than in 1967 (Kielbaso, 1967). The miscellaneous category is 7.2 years younger in 1984 (Table 66).

Table 66. Ages of Visitors, 1967 vs. 1984

Activity	Mean Age 1967	N	Mean Age 1984	N
Picnickers	41.1	51	42.8	21
Drivers	41.1	58	41.6	68
Hikers	36.4	51	34.9	90
Anglers	36.8	20	37.9	9
Hunters	31.9	50	39.0	15
Misc.	40.9	15	33.7	26
All Visitors	37.8	245	37.5	267

RACE

The trend of Whites as the overwhelming majority of Forest visitors continues in 1984. 98.4% of Forest visitors were White in 1967, while 97.8% were White in 1984 (Kielbaso p. 89).

EDUCATION

In 1984 visitors to the Forest attained higher levels of education than in 1967. The major difference is that there are fewer visitors in the primary and secondary categories and more visitors in the junior college and post graduate categories (Table 67).

Table 67. Education Levels of Visitors by Percent, 1967 and 1984.

Education Level	1967	1984
Primary	17.0%	7.5%
Secondary	44.0%	34.1%
Junior College	11.0%	18.0%
College Graduate	19.0%	18.4%
Post Graduate	9.0%	22.1%
	100.0%	100.1%

DISTANCE

In 1984 the percentages of visitors traveling either 10 miles of less and eleven to twenty-five miles are almost reversed from 1967 (Table 68). Approximately, 62.2% of visitors came from within ten miles of the Forest in 1984, while only 21% came from within ten miles in 1967.

The cities of Battle Creek and Kalamazoo still contribute the highest percentage of visitors (55%) in 1984, but the percentage is much less than in 1967 (77%). The Forest still attracts a majority of visitors from within twenty-five miles, but there are fewer visitors from the two major urban centers in the area.

Table 68. Distance Traveled to Forest, 1967 vs. 1984.

Distance	1967	1984
10 miles of less	21.0%	62.2%
11-25 miles	69.0%	23.2%
Over 25 miles	10.0%	14.6%
	100.0%	100.0%
Battle Creek	51.0%	40.0%
Kalamazoo	26.0%	15.0%
	77.0%	55.0%

REPEAT VISITATION

There was an increase in the percentages of repeat visitors over time at the Forest. Approximately, 78%

(Kielbaso, p. 123) of all visitors interviewed in 1967 were repeat visitors; 89.1% of visitors were repeat visitors in 1984.

NUMBER OF VISITS PER YEAR

Table 69 indicates the visitation difference between the two years is in the one visit per year and ten plus categories. In 1984 there are more visits in those categories and fewer visits in the middle categories.

Table 69. Percent of Visits per Year, All Visitors 1967 vs. 1984

Number of Visits	1967 (N=245)	1984 (N-267)
1	17.0%	27.3%
2-3	29.0%	21.4%
4-5	20.0%	11.2%
6-10	21.0%	14.3%
10 Plus	13.0%	25.8%
	100.0%	100.0%

TIME

In 1984 visitors show a tendency to have shorter lengths of stay than visitors in 1967 (Table 70). One reason for this tendency may be the number of hunters and anglers surveyed in 1967. Hunters and anglers usually have longer lengths of stay than other activity categories (Table 26). In 1967, 28.6% of the sample was comprised of hunters and anglers and could be responsible for the longer length of stay.

Table 70. Percent of Visits in Time Periods, All Visitors 1967 vs. 1984

Length of Stay	1967	1984
1 hour	27.0%	50.2%
1.1 - 2.9 hrs.	49.0%	38.9%
2.9 - 4.9 hrs.	19.0%	7.9%
5 plus hrs.	5.0%	3.0%

EXCLUSIVENESS OF VISITS

The percentage of visitors who visited the Forest as part of another trip and those who exclusively visited the Forest are fairly similar between the two years. A difference is the percent of visitors who were undecided or missing in 1984.

Table 71. Visits Part of a Trip or Forest Sole Destination, 1967 vs. 1984

	1967	1984
Part of Trip	34.0%	25.0%
Sole Destination	66.0%	69.4%
Undecided	----	4.1%
Missing	____	1.5%
	100.0%	100.0%

VISITORS SOURCE OF KNOWLEDGE

Table 72 indicates that in 1984 fewer visitors found out about the Forest through family and friends and by driving by the Forest. However, the percentage still indicates word of mouth was the primary way visitors found out about the Forest.

More people stated they knew about the Forest through living in the area, or they could not remember how they first found out about the Forest.

Table 72. Visitor Source of Knowledge, 1967 vs. 1984.

Source	1967 (N= 267)	1984
Word of Mouth	68.0%	57.6%
Family and Friends	62.0%	47.9%
School	6.0%	9.7%
MSU	-----	3.7%
Newspaper	-----	1.1%
Kellogg Bird Sanctuary		1.1%
Live Here/Common Knowledge	10.0%	16.1%
Entrance Sign/Passing By	15.0%	9.4%
Other	7.0%	.4%
Don't Remember	-----	10.1%
Missing	-----	.4%
	100.0%	99.9%

MOTIVES

All Visitors

Index values and ranks for visitor motives show some differences over time. The number one ranked motive, view observe natural surroundings, remained the same in 1984 (Table 32) and 1967. Table 73 below shows 1967 results (Kielbaso, 1967). The 1967 second ranked, "Relax", dropped to the eighth ranked motive in 1984. The number three motive in 1984, "Do something with children", is very similar to the third ranked 1967 motive, "Give children a chance to play in the woods". The changing times are shown by the 1984 second ranked motive, "Exercise".

The major difference is the second ranked motive. The second ranked motive, "Relax", in 1967 dropped to eighth ranked in 1984. Relax was replaced in 1984 by "exercise". The importance of exercise is a indication of lifestyle trends in the 1980's.

Table 73. Satisfaction Rankings by Index Values, All Users, 1967.

Rank	Index Value	Satisfactions
1	29.6	Observe woodland scenery
2	16.7	Relax
3	8.3	Give children a chance to play in woods
4	7.6	Observe wildlife
5	7.3	Get away from crowds
6	6.1	Spend more time with family
7	6.0	Study nature
8	5.6	Find change of scene
9	5.0	Get together with friends or relatives
10	3.0	Commune with nature
11	2.8	Other
12	2.0	Cool off - get away from heat of home

CHAPTER IV

SUMMARY AND RECOMMENDATIONS

SUMMARY

The goal of this study was to describe visitors to the Kellogg Experimental Forest. The objectives were: to outline use patterns; to develop a typology of visitors including group characteristics, respondent characteristics, and motives linked with characteristics of the Forest by activity group; to collect visitor data about issues concerning Forest management; and to compare some results with a similar study conducted in 1967 (Kielbaso).

The study site was the W.K. Kellogg Experimental Forest in Augusta, Michigan. The Forest is operated on a multiple use objective by the Michigan State University Department of Forestry. Research is the primary function of the Kellogg Forest; Recreation is another of the uses and was the emphasis of this study.

A number of methods were employed to meet the study's objectives. Traffic counts were conducted to estimate attendance. Systematic observation was done to document visitor behavior in the picnic area. To collect more detailed information than either of the two previous methods provide for, personal interviews were conducted. Two hundred and sixty-seven interviews were administered to visitors between August, 1983 and May, 1984.

For some analysis respondents were divided into seven activity categories on the basis of their predominate

activity. The seven activities were: picnicking, driving, hiking, skiing, exercising, hunting/fishing and miscellaneous. The major results are described below.

ATTENDANCE PATTERNS

An estimated 95,939 people visited the Kellogg Forest between August, 1983 and July, 1984. This is an increase in attendance of approximately two and one half times since 1967.

Spring was the season of heaviest use in 1984 with more than 50% of the total use occurring then. The heavy Spring time use is influenced by the number of organized groups visiting. Cross-country skiing has become the dominate Winter use when Winter weather permits, a noticeable difference from the 1967 study. A limitation of this study is the suspected underestimation of Winter recreationists, mainly skiers, at the Forest.

The two most common activities in all four seasons were hiking and driving. During the Winter time when there is sufficient snow, skiing is tied with hiking as the most frequent activity.

During the Fall, Winter, and Spring more than half of all the vehicle traffic occurs on the weekend. Sunday is the busiest day in the Fall and Spring. No breakdown is available for Winter weekend days. In Summer, the traditional recreation time, the opposite is indicated. More than half the traffic occurs on the five weekdays; Saturday is the busiest Summer day.

The weekly pattern of attendance in 1984 seems to have changed since 1967. Then, Sunday had three times the vehicle traffic as on Saturday. In 1984, the amount of weekend traffic is more evenly divided between the two weekend days. There is also an increase in the weekday usage in 1984.

GROUP CHARACTERISTICS

The most common group size were groups of two people. There were two activity categories that diverted from the trend. Picnicking groups most often had four or six people per group. Exercising was commonly a solitary activity.

Group types were usually families with children under 18 years of age (25.1%). The next most frequent type of group was couples (23.2%). Family groups comprised 33.8% of all visiting groups. Organized groups comprised 5.6% of all the interviews conducted over the year.

RESPONDENT CHARACTERISTICS

The mean age of visitors to the Forest was 37.5 years. This was very similar to the mean age in 1967 (37.8). There were three pairs of activity categories that showed a significant difference between their mean ages. The three pairs of activities are: driving and hiking, driving and miscellaneous, and miscellaneous and picnicking categories. Picnicking (42.8) and driving (41.6) had the oldest means while the miscellaneous category had the youngest at 33.7.

Approximately 40.0% of the respondents were female and 59.6% were male. There was a deliberate attempt to interview equal members of male and female visitors.

Only 2.4% of Forest visitors interviewed were not White. A similar percentage of non-White visitors (1.6%) was reported in 1967. A Chi-Square test comparing the racial composition of Forest visitors with the racial composition of the Kalamazoo and Calhoun counties indicates that Blacks make up less of the Forest population than would be expected from the composition of the two surrounding counties.

An outstanding feature of the data was the high levels of education attained by visitors at the Forest. Approximately, 41% of the visitors interviewed had completed at least 16 years of formal education. There was a statistical difference between the level of education of the Forest visitors and the level of education in the two surrounding counties. The skiing category had the highest level of education of the seven activities and was significantly different than all other categories in the level of education. The hunters/ anglers category exhibited the lowest level of education and was significantly different from five of the six other activities.

Most visitors (78.7%) travel 15 miles or less to visit the Forest. The exercising and hunting/fishing categories showed the largest percent of visitors traveling 15 miles. Visitors live primarily in the urban areas of Kalamazoo or Battle Creek. However, the percent of visitors from those two cities is 22% less than in 1967.

The visitors to the Forest tend to be a devoted group. Nearly 70% of the respondents had recommended the Forest to someone else in the past twelve months; 89.1% respondents were repeat visitors. On the average, people divide their visits evenly throughout the year. They visit 12.9 times each year and stay about an hour and twenty minutes. This is shorter length of stay than in 1967. However, the 1967 sample included more hunters and anglers who tend to have the longest lengths of stay.

Drivers and exercisers stay the shortest length of time. Hunters and anglers stay the longest time. T-tests show a significant difference in length of stay between driving, exercising, hunting, and all other activity categories. The Forest was the sole destination of 69.4% of all visitor trips.

To discover which recreation sites were substitutes for the Forest, visitors were asked to name those places they thought were similar to the Forest. The largest category, containing over one third of all responses, indicates that the Forest is unique and visitors could not think of any similar places.

An investigation of motives and preferred Forest characteristics related to activities indicate Forest visitors are generalists. Visitors in all activity categories had similar motives and chose similar characteristics of the Forest as important in their site selection.

It appears that motives and site characteristics do not vary across the seven categories as would be expected from

the social/psychological need fulfillment approach. The results seem to support the view that visitors display a limited number of general motives and questions the importance of the physical environment in recreation site selection (Knopf, Peterson, and Leatherberry, 1983).

MANAGEMENT CONCERNS

The primary way visitors found out about the Forest was by word of mouth. Word of mouth was also indicated as the visitors' source of knowledge in 1967. Over a quarter of all respondents either could not remember how they found out about the Forest, or considered the information common knowledge. This may be indicative of the many long time visitors to the Forest.

Visitors were overwhelming satisfied with the Forest site and facilities. There were also many spontaneous comments on the excellence of the maintenance and the appearance of the Forest. Most visitors were aware that Michigan State University administers the Forest. Finally, visitors perception of the Forest's primary purpose reflects the multiple uses of the site.

There seemed to be a number of problems related to the information signage system. Most visitors do not stop for information upon entering the Forest. Many visitors are unaware of the informational materials such as trail maps and the self-guiding trail pamphlets that are available. The areas of the Forest trail users choose to travel may be an indication of the under utilization of Forest information

materials. There was a tendency of visitors to travel obvious routes such as the road. Two directional signs were also confusing to visitors.

General comments indicate the possibility of future conflicting uses at the Forest. Hikers objected to the vehicle traffic they encountered while traveling the Forest road. An effective information system could disperse visitor use in the Forest. It would also serve to solve the previously mentioned information signage problems.

Other sources of possible user conflicts at the Forest include skiing vs. snowmobiling and hunting vs non-hunting. Conflicts currently do not exist, so developing strategies now could manage for conflicting uses before they become a problem.

IMPLICATIONS AND RECOMMENDATIONS

The results of this study indicate visitor management has become an important concern at the Kellogg Forest. Attendance has exhibited an increase in the past years and will most likely continue to do so. More people will learn about the Forest through word of mouth, Forest sponsored seminars and workshops, and the Forest's cooperation with the Kellogg Biological Station. Currently, there are no conflicts among the various visitor groups and the research emphasis of the Forest. However, increase use may exert additional pressures.

To provide a direction, and, to avoid conflict and controversy, recreation management goals and objectives should be formulated. These goals should consider how recreation

fits into the overall goals for management at the Forest, visitor preferences, and the Forest resource. Specific objectives are needed to define the recreation "product" that is desired. Then, management strategies can be designed, implemented and evaluated.

Developing management strategies is of particular importance in the area of conflicting uses. Conflicts currently do not exist, but the signs of future problems are present in three user groups. They are: hunting vs. non-hunting; snowmobiling vs. skiing; and driving vs. hikers. Developing strategies now could manage for conflicting uses before they become a problem.

One of the results of this study that directly effects visitor management concerns information useage at the Forest. It appears that most visitors were unaware of the information materials available. These materials were designed to enhance visits by orienting visitors to the Forest and educating them about forestry. Modifications of the delivery system appear in order to let visitors know what is available.

The first step is getting information to the visitor. Most visitors do not notice the sign indicating where information is to be found. Another directional sign indicating the parking area was also inconspicuous to visitors. A third directional sign on the road was confusing. These signs need modifications in order to be effective.

Getting information to repeat visitors may be a challenge. Repeat visitors who perceive themselves as

familiar with the Forest may not seek information as readily as less experienced visitors. However, since the visitors to the Forest represent an educated group, they may readily utilize information once they know it is available.

Additionally, information services could serve as a method to disperse visitor use and manage for the hiking-driving conflict. Visitors would be made aware of the recreation potentials at the Forest. Alternative trails to the road could be presented to the visitor. Careful planning would avoid ecologically or research sensitive areas. Some modifications of the informational materials were also suggested to improve their effectiveness.

A continuous system for evaluation of Forest recreation is another important element in the provision of recreation services. Evaluation provides feedback for adjustments and improvement in management strategies, measures effectiveness, and charts changes over time. Often evaluation is ignored even though it is an integral component of visitor management.

Visitor attendance is often used as a baseline measure for monitoring recreation. A reliable traffic counter, specifically one imbedded in the road, would provide an accurate measurement of vehicle traffic at the Forest. One of the advantages of such a traffic counter is that it needs minimal maintenance and estimates attendance in all seasons. An estimation of Winter attendance was one limitation of this

study and should be calculated. Gauging Winter attendance is especially important since it is a source of increasing recreation use and a source of potential conflict.

However, attendance is only a gross measure of recreation. A plan for monitoring Forest recreation would include some of the variables examined in this study. For example, visitor use patterns and socio-demographic information are recreation indicators. Evaluating visitors could be accomplished using an abbreviated form of the survey instrument.

Visitor data could be collected at the same time the traffic counter is calibrated. It is recommended that traffic counters be calibrated in one week periods during each of the four seasons (U.S. Army Corps of Engineers, 1982). This sampling plan would monitor the variety of recreation uses at the Forest. Ideally, basic visitor data should be collected and evaluated each year with more extensive studies conducted at longer time intervals. The Forest's microcomputer could be utilized to record and analyze visitor data.

One of the implications of this study is that the Forest attracts fewer Blacks than other racial minorities that are represented in the general population surrounding the Forest. One reason for this may be that there are fewer minorities from the surrounding county that participate in outdoor recreation. Nationally, non-Whites have a lower rate of participation than Whites. However, there is an

increasing percentage of non-Whites beginning to participate in outdoor recreation activities (Heritage and Conservation Service, 1979).

Another reason for the discrepancy in participation rates by racial minorities may be that minorities are unaware of the availability of the Forest as a recreation site. Current visitors' primary source of knowledge was word of mouth. It is likely that minorities are not getting the word. One way to increase minority awareness is to target an information campaign directed at minorities.

One final consideration in recreation management is the "segment" of the recreation population the Forest serves. Currently, visitors are loyal active users who are generalists. They enjoy the natural environment of the Forest. Provision of recreation services for this type of visitor is compatible with the overall management goals of the Forest. Therefore, care should be taken not to displace this visitor segment through future development. Visitor displacement will be of special concern as the Kellogg Biological Station, and by extension the Forest, attracts more visitors. The new clientele will most likely have different recreation needs and desires than current Forest visitors. Management strategies based on defined recreation goals are one way to avoid displacement.

In summary, recreation has become a dominate use at the Kellogg Forest. This study describes current users to gain a better understanding of the visitor's desires,

characteristics and recreational behavior. The study has implications in recreation management and indicates future planning direction.

REFERENCES

REFERENCES

Allen,D. 1979. Wilderness User Preferences for Psychological Outcomes and Setting Attributes. Doctoral Dissertation. Colorado State University. Fort Collins.

Brown,P.J., B.L. Driver, D.H. Bruns, and C. McConnel. 1979." The Outdoor Recreation Opportunity Spectrum in Wildland Recreation Planning: Development and Application".In Proc. Speciality Conf., First Annual National Conference on Recreation Planning and Development. Vol. II. Am. Soc. Civil Engineers. New York. pp 527-538.

Brown,P.J., D. Ross. 1982. "Using Desired Recreation Experiences to Predict Setting Preferences." Ag. Experiment Stat. Minneapolis: University of Minnesota Misc. Publ. 18-1982. pp. 105-110.

Buchanan, T., J.E. Christensen, R. Burdge. 1981. "Social Groups and the Meanings of Outdoor Recreation Activities"Journal of Leisure Research:Third Quarter. pp. 254-266.

Burch, W.R. 1964. "Two Concepts for Guiding Recreation Management Decisions." Journal of Forestry 62(October):707-712.

Burch,W.R. 1969. "The Social Circles of Leisure: Competing Explainations." Journal of Leisure Research 1:125-147.

Cheek,N.H., W.R. Burch. 1976. The Social Organization of Leisure in Human Society. New York: Harper and Row.

Cheek,N.H., D.A. Field, R.J. Burdge. 1976. Leisure and Recreation Places.Ann Arbor,MI: Ann Arbor Science Publishers.

Clark,R.N. 1976 "Control of Vandalism in Recreation Areas- Fact, Fiction, or Folklore." In Vandalism and Outdoor Recreation. S.S. Alfana and A.W. Magill,ed. Berkley,CA: Pac. Southwest For. and Range Exp. Stat., USDA Forest Service Gen. Tech. Rep. PSW-17, pp.62-72.

Clark, R.N.,G.H. Stankey. 1979. "The Recreation Opportunity Spectrum: A Framework for Planning,Management, and Research." USDA For. Service Gen.Tech. Report, PNW-98.

Clawson,M., J.L. Knetsch. 1966. Economics of Outdoor Recreation. Baltimore: The Johns Hopkins Press.

Driver,B.L., P.J. Brown. 1975. "A Social-Psychological Definition of Recreation Demand with Implications for Recreation Resource Planning."Appendix A. Assessing Demand for Outdoor Recreation Washington: National Academy of Sciences, pp. 63-88.

Gramann, J.H., R.J. Burdge. 1981."The Effects of Recreation Goals and Conflict Perception: The Case of Water Skiers and Fishermen." Journal of Leisure Research. 13(1):15-17.

Hendee,J.C. 1974. "A Multiple Satisfaction Approach to Game Management." Wildlife Society Bulletin 2:3:104-113.

Heritage Conservation and Recreation Service. 1979. Third Nationwide Outdoor Recreation Plan.(Appendix I) Washinton:US Government Printing Office.

Kielbaso,J.J. 1968. "Use and Users of the Kellogg Forest:an Urban Oriented Area". Doctorial thesis. E. Lansing: Michigan State University.

Knopf,R.C., G.L. Peterson, E.C. Leatherberry. 1983."Motives for Recreation River Floating: Relative Consistency Across Settings. Leisure Science 5:3 pp. 231-255.

Knopf,R.C., B.L. Driver, J.R. Bassett. 1973. "Motivations for Fishing." presented at 38th N. Am. Wildlife and Natural Resources Conference.Washington,D.C.

Lemein, W.A.,A.D. Geis. 1957. "Recreation Use of the Kellogg Forest" E. Lansing Mi:Michigan State University.Quarterly Bulletin of Michigan Ag. Stat. 39:4:pp. 701-706.

Lucas,G.L., G.H. Stankey.1974."Social Carrying Capacity for Backcountry Recreation." In Outdoor Recreation Research: Applying the Results.USDA Forest Srv. Gen. Tech. report NC-9. N. Central For. Exer. Stat., St. Paul. pp.14-23.

Manfredo,M., D.H. Anderson. 1982. "Recreation Preferences of Oregon Trout Fishermen." Ag. Exper. Stat. Minneapolis: University iof Minnesota Misc. Publ. 18-1982. pp. 64-68.

McCurdy, D.R. 1968 "A System for Measuring Public Use on the National Wildlife Refuges." Branch of Public Use, Division of Wildlife, Bureau of Sport Fisheries and Wildlife. Washinton, D.C.

Nie,N.H.,C.H. Hull, J.G. Jenkins,K. Steinbrenner,D.H. Brent. 1975. Statistical Packakage for the Social Sciences.New York: McGraw Hill, Inc.

Outdoor Recreation Review Commission. 1962. National Recreation Survey.Report 9.Washington:US Government Printing Office.

Owens,G.P.1970."Outdoor Recreation: Participation, Characteristics of Users, Distance Travelled, and expenditures." Ohio Ag. Res. Bull. 1033.

Schreyer.R. 1982. "Experience Levels Affects Expectations for Recreation Participation" In Forest and River Recreation: Research Update. Minneapolis:Misc. Publ. 18-1982.

Schuman, H., S. Presser. 1981.Question and Answers in Attitude Surveys.New York: Academic Press.

Sessoms.H.D. 1984. Leisure Services. Englewood Cliffs,N.J.: Prentice Hall,Inc.

Stankey,G.H. 1977. "Some Concepts for Outdoor Recreation Planning." In Outdoor Recreation: Advances in Application of Economics. USDA Forest Service Gen. Tech. Rep. WO-2. Washington,D.C.

US Army Corps of Engineers. 1982."Recreation Use Estimation." Waterways Experiment Stat. Vicksburg, Miss.

US Dept. of Commerce. 1980. Census of the Population(Part 24,MI, Pc 80-1-B-24) Washington: US Government Printing Office.

APPENDICES

APPENDIX A

APPENDIX A

COMMENTS

- Seeing the couple necking on the picnic table was rejuvenating.
- The Forest is a place to get away from town.
- I come to visit every year and spend a lot of time walking the trails here. It is one of the two places I enjoy most.
- The Forest is a nice place to visit. We like it here.
- I like to visit here in the fall especially when the mosquitoes aren't as bad.
- It's a romantic place.
- This is the biggest and nicest forest preserve within 50 miles.
- I wish there were more animals in the Forest. I would like to drive through the Forest with the "Tales of the Vienna Woods" playing. It's convenient not having to get out of your car when you get older.
- We love to take pictures here and have many of the Forest, especially the creek and from the lookout.
- I like the view from the lookout...There have been a lot of changes since I was here last (20 years). The thinning in the Forest is appreciated.
- The new building is a good addition. Need a drinking fountain at the lookout.
- Do like the clean appearance.

- The Forest is conveniently located.
- It's perfect. I love it here and consider it mine.
- Directional signs are helpful for 1st time visitors, but make it less adventuresome for repeat visitors. Don't fix up the Forest anymore.
- I prefer here to other places to ski. Road is difficult to ski. Groom trails.
- Like the interpretive signs and maintained trails.
- Like the improved trails.
- Good fishing here.
- We need more places like this close to home.

Information

- We didn't know you could drive on the road until we had walked 1/2 way around it. But we prefer to walk anyway.

Parking

- Didn't know there were more parking spaces around the side.
- I didn't understand where to park. Confusing sign at the cul-de-sac.
- Didn't realize there was more parking.
- Got here early so parking was no problem.
- Not good parking. Can't drive through.
- Do you think more people would walk if they knew the distance around the road? Would like to have wildflowers identified if you have the time.

- Confusing sign leading to the cul-de-sac. Which way is out.
- Much improved parking.

Education

- The Forest is more interesting than a park. You can learn something here.
- We like it here where the trees are labeled.
- The Forest is a combined botanical garden and wilderness area, so it's unique - recreational and educational.
- Best place to get a variety of trees.
- Like the trees labeled. Identify more shrubs.
- Would appreciate more thorough labeling of the trees, especially where to find specific species in the Forest.
- There are many opportunities for kids - education, relaxation, exercise, etc.

Conflicts

- I love to run here except I don't like the hunters here in the Fall. It seems unsafe to me to mix people and guns.
- The snowmobilers behave well by staying on the road, but I would prefer to have no snowmobilers or hunters.
- Don't like the snowmobilers during cross-country skiing. They are obnoxious.
- Good hunting early in the season. Too many people when there's snow on the ground. Chased the dogs too much today.
- Get rid of the snowmobiles.

- Too many snowmobilers on this side.
- Get rid of the cars on the road.
- Cut down on road traffic.
- Too many cars.

Terrain

- The hills and the course here is a challenging one for a runner.
- This is the best place for me to come to exercise. I can run and enjoy the scenery with no traffic on the roads. it's close too.

Roads

- Don't pave the roads! It would change the character of the experience.
- The road could be wider. The road is much improved, landscaping too. The sign at the bottom of the hill is confusing.
- I'm sorry to see the road paved. I liked it better before. The Forest is getting to commercialized.
- On the main road need a sign to show which way to exit.
- There is less dust since the road was paved, but a fancier Forest brings out more people. I don't like improvements that bring out city folk. The Forest is almost too good now.
- The attraction of the road is driving slowly and enjoying it.
- The road is narrow, but challenging. Wouldn't want it any other way.

- The road isn't meant to be a super-highway. Mark arrows on the map.
- The road is narrow in places. It's hard to tell where the road went with the leaves down.
- Need more pullovers for group tours.
- The road needs to be a little wider down the hill (compartment 7).
- The road should be wider around the curves. The road seemed narrower this year.
- Picnic area road needs graded.
- Need a few more pullovers for stopping around the road.

People - Less Crowded

- We come to the Forest because there are fewer people and it is not as commercialized as other areas.
- I like it because not many people know about it and there are fewer people here.
- One of the beautiful things about this Forest is that there are not many people.
- We like it here because there are few people. Hope it stays that way; don't advertise. If a 1,000 other people started coming here, we would stop coming.
- It's an excellent Forest. I hope it doesn't get too popular. It seems that people don't abuse it. Kept up well.
- Don't broadcast the Forest.
- Don't let everyone in. Don't publicize it.

- People space themselves out in the Forest so its really not very crowded.
- Surprised there aren't more people. Need a place to get away from cars.
- Need a place to get away from the cars.
- I enjoy the woods anytime - quiet or noisy.
- Don't like vehicles on the road. Restrict traffic during heavy use periods, or close it altogether except at certain times for handicappers, etc.
- Don't like cars on the road. One is too many.
- Like to see more people.

Bathrooms

- One reason I like it here is the area is well maintained and the bathrooms facilities are wonderful.
- Loved the restrooms. They are clean.
- Like the bathrooms.
- The toilets are very well kept up for an outdoor facility. I went in to them just to look. It was the first outdoor toilet I've ever seen.
- Liked the warm, clean bathrooms.
- Like the bathrooms.
- Restrooms are nice.
- New bathrooms are nice.
- Bathrooms are nicer, kept up well.
- Like the new restrooms.

Safety

- I feel comfortable coming here alone because I feel safe here.
- One of the things I appreciate about the Forest is feeling safe here. I enjoy being in the woods without being hassled.

Special Interests/Suggestions/Comments

- One of the beautiful things about the Forest is that there are not many people. If you wanted to attract horseback riders there are a few things that would be helpful: a place to water them; a bar for tethering them; a wider spot to turn trailers around, especially if there were more than one; a bulletin board to tell riders where they could and could not ride; maybe, this area could include a picnic spot for riders.
- Picnic tables are deteriorated and old.
- The trail to the lookout is eroded.
- The leaf collectors are disruptive. They stop in the middle of the road when they could pull over.
- Paint the tables. Pit toilets eech! Like the fire rings, but they need repair.
- Frozen horse tracks make it difficult to walk.
- Don't like the hunting here.
- The fire rings need work.

- Try marking the trails according to difficulty and length of time it takes to ski them.
- The trails shouldn't be hardened.
- I would like wells around the trails.

APPENDIX B

TRAFFIC COUNT

1. METER READING AT START_____
2. METER READING AT END OF HOUR_____ _____

3. DATE:___ ___/___ ___/___ ___ 4. DAY: (1)S (2)M (3)T (4)W (5)TH (6)F (7)SAT

5. *TIME:*_____IN HOURLY PERIODS (Example 1-2PM)
START A NEW SHEET FOR EACH HOUR YOU STOP CARS.
6. WEATHER:_____ TEMPERATURE:___ ___ ___

****

NUMBER OF PEOPLE/ CAR	ACTIVITIES	LENGHT OF STAY IN MINUTES
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		

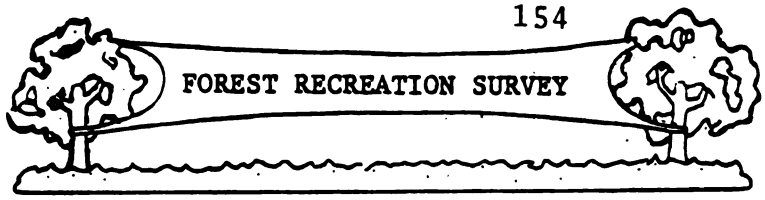
APPENDIX C

APPENDIX C

Table A1. Others: Places Similar to the Kellogg Forest

Other = 19.4% - 7.5 = 11.9% or 61 responses		
Camps	4	1.30%
Nature Centers (other than Kalamazoo WC)	3	.94%
Hidden Lakes Gardens	4	1.30%
Friend/Relatives/Own Property	4	1.30%
"Up North"	3	.94%
University of Michigan Ann Arbor	2	.63%
Greevers Woods	2	.63%
Saginaw Forest	2	.63%
Potawattamee Trails - Silver Lake	1	.31%
Marshall & Duojack - MSU	1	.31%
Russ Forest	2	.63%
Dunbar	1	.31%
Yogi Bear	1	.31%
Hobur Campground	1	.31%
Chef Center	1	.31%
Paul Smith College Woods	1	.31%
Baker Woods	1	.31%
Todd Farm	1	.31%
Scott's Mill by Scotts, MI	1	.31%

APPENDIX D



1. Interview # ___ ___ ___

2. Date: _ _/_ _/_ _ 3. Day: (1)S (2)M (3)T (4)W (5)T (6)F (7)S

4. Time: (1) 8-10AM; (2) 10-12PM; (3) 12-2PM; (4) 2-4PM; (5) 4-6PM; (6) 6-8PM

5. Location in Forest: (1) Exit _____ (2) Picnic area _ (3) Other _____

6. Temperature: ___ ___ ___

7. Comments: (1) clear (2) cloudy (3) ptly cloudy (4) rain (5) snow (6) other _____

INTRODUCTION - Hi! My name is _____. I'm working at the Forest this year. We're trying to get information about visitors to the Kellogg Forest. Do you have a few minutes to answer some questions about your visit today? Your answers will all be confidential. Thanks.

8. How many people were in your group today? ___ ___ ___ (number)

How many 9. Preschoolsers (0-5 years) ___ ___ ___ were there in your group?
10. Children (6-12 years) ___ ___ ___
11. Adolescents (13-17 years) ___ ___ ___
12. Adults (18-60 years) ___ ___ ___
13. Seniors (60+) ___ ___ ___

14. Group type:
(1) Alone _____
(2) Family with children under 18 _____
(3) Family with children over 18 _____
(4) Family and friends with children under 18 _____
(5) Family and friends with children over 18 _____
(6) Family and friends without children _____
(7) Friends _____
(8) Organized group (specify) _____
(9) MSU affiliated (specify) _____
(10) Couple _____
(11) Other (specify) _____

15. Did you stop for any information on your way into the Forest today?
(1) NO (2) Yes (3) On previous occasions (4) Visit often & don't need any
(5) Other (specify)_____

16. Did you notice the sign for Visitor Information?
(1) NO (2) YES (3) On previous occasions

17. How did you first find out about the Kellogg Forest?
(1) Family or Friends (2) Entrance Sign (3) Newspaper (4) Radio or TV
(5) MSU (6) KBS (specify)_____(7) Don't remember
(8) School (9) Live there (10) other (specify)_____

18. Have you recommended this place to anyone in the past 12 months? (only if repeat)
(1) NO (2) YES (3) Can't remember

19-21 People come to the Forest for a variety of reasons. I'd like to find out your motives for visiting today. Would you please complete the following sentence: I cam here today because I wanted to:

(01) Teach my family about nature _____
(02) Do something with my children _____
(03) Spend time with family and relatives _____
(04) Explore a new area _____
(05) View the scenery _____
(06) Observe wildlife _____
(07) Learn more about nature _____
(08) Cool off _____
(09) Get away from the crowds and home ____
(10) Rest/Relaxation _____
(11) Exercise _____
(12) Hunt _____
(13) Fish _____
(14) Show family/friends forest _____
(15) socialize _____
(16) leaf collecting _____
(17) enjoy nature/surroundings _____
(18) enjoy creek/wade _____
(19) lost _____
(20) other (specify)_____
(21) the Forest as classroom (org. grps)

22-27 What was your primary reason for choosing to come to the Kellogg Forest to _____ (insert answer from previous question) instead of somewhere else?

22. Location (1) It was close
(2) It was on the way

23. Fee: (1) None required

24. Environment (1) Cool
(2) Quiet
(3) It's a good place to. .
(4) It's a beautiful setting
(5) natural environment
(6) Has creek
(7) Other (specify)_____
_____

25. Educ: (1) Trees labeled
(2) Demo Forestry site
(3) Other (~~specify~~) Educ
(4) Other _____

26. Site: (1) Many trails
(2) maintained facilities (specify)_____
(3) Picnic area
(4) Other (specify)_____
_____

27. Other (1) Few other people
(2) Explore a new area
(3) other (specify)_____

28. Is this your first visit to the Forest?
(1) NO (2) Yes

29. Do you expect to come back?
(1) NO (2) Yes (3) Maybe If no, why not? _____

30. How often have you visited here in the last 12 months? __ __ __ (Total number of visits including todays)

Could you estimate the number of times in each season (last 12 months only) you have visited here? Mark below.

Which activities have you done here in the summer, fall, winter, and spring? Mark activities.

		NUMBER		ACTIVITIES	
31.	Summer	____	____	35-38	_____/__ __/__ __/__ __/__ __
32.	Fall	____	____	39-42	_____/__ __/__ __/__ __/__ __
33.	Winter	____	____	43-46	_____/__ __/__ __/__ __/__ __
34.	Spring	____	____	47-50	_____/__ __/__ __/__ __/__ __

51. What was the total amount of time you spent at the Forest? ____ ____ ___ Total
(1) 0-29 min (2) 30-59 min (3) 60-119 min (4) 120-179 min
(5) 180-299 min (6) 300 min or more

What activities have you participated in today at the Forest? Circle activities, then would you approximate how much time you spent in each activity?

	ACTIVITY	TIME IN MINUTES		ACTIVITY	TIME IN MINUTES
52.	(01) Picnicking	___	61.	(10) Foraging	___
53.	(02) Driving	___	62.	(11) Photography	___
54.	(03) Bicycling	___	63.	(12) Wildlife Watching	___
55.	(04) Trail Bike Riding	___	64.	(13) Wading/Creek Hiking	___
56.	(05) Hunting-Small Game	___	65.	(14) Snowmobiling	___
57.	(06) Hunting Deer	___	66.	(15) X-Country Skiing	___
58.	(07) Fishing	___	67.	(16) Exercise	___
59.	(08) Hiking	___	68.	(17) Leaf collecting	___
60.	(09) Horseback Riding	___	69.	(18) Other (specify)	___

70. Have you done other activities than what you expected to do today?
(1) NO (2) Yes (3) Don't Know

71. What were they? _____/___ ___/___ ___/___ ___

We are interested in knowing if you were satisfied with the facilities in the Forest. Would you tell me whether you were satisfied or dissatisfied with the following facilities that you used.

GENERAL

72. Parking _____(1) Dissatisfied (2) Satisfied (3) No Opinion (4) Didn't Use
73. Road Conditions _____(1) Dissatisfied (2) Satisfied (3) No Opinion (4) Didn't Use
74. How would you rate the number of other people you saw today?
(1) too few (2) OK (3) too many (4) No opinion

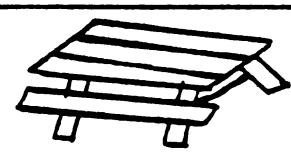
75. Approximately, how many people did you see today? ___ ___ ___ (number)

Comments on DISSATISFACTIONS: _____

_____

_____

** GO TO SPECIFIC ACTIVITIES OF RESPONDENTS **

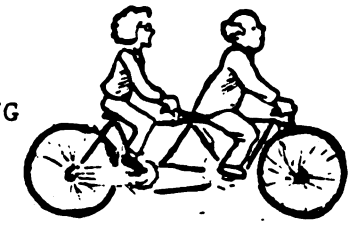


* If respondent has been PICNICKING

76. Picnic Tables ____ (1) Dissatisfied (2) Satisfied (3) No Opinion (4) Didn't Use
77. Water Pumps _____ (1) Dissatisfied (2) Satisfied (3) No Opinion (4) Didn't Use
78. Toilet Facilities _(1) Dissatisfied (2) Satisfied (3) No Opinion (4) Didn't Use
79. Grills/Firerings__ (1) Dissatisfied (2) Satisfied (3) No Opinion (4) Didn't Use
80. Garbage Facilities (1) Dissatisfied (2) Satisfied (3) No Opinion (4) Didn't Use

Other Comments _____

_____



* If respondent has been DRIVING, BICYCLING OR TRAIL BIKE RIDING

81. Width of Road ____ (1) Dissatisfied (2) Satisfied (3) No opinion (4) Didn't Use
82. Pullovers _____ (1) Dissatisfied (2) Satisfied (3) No opinion (4) Didn't Use
83. Number of animals seen_____ (1) Dissatisfied (2) Satisfied (3) No opinion (4) Didn't Use

Comments on DISSATISFACTIONS: _____

_____

_____

84. Did you stop at any of the pullovers on the Auto Trail?
(1) NO (2) YES

85-87 Would you show me where they were on this map? Mark section.
(85) Lookout/(86) __ __/(87)__ __

88. Did you use the Self-Guiding Trail pamphlet?
(1) NO (2) YES (skip to 90)

89. Did you know one was available? (skip to comments)
(1) NO (2) YES

90. Was the pamphlet satisfying for you to read and use or, unsatisfactory to read and use?
(1) Unsatisfied (2) Satisfied (3) No Opinion

91. Could the pamphlet be improved in any way?
(1) No (2) Yes (3) Don't know (skip to comments)

92. How could it be improved? (1 answer)
1. Clearer instructions
2. Clearer layout
3. Less technical information
4. Relating the information more clearly to Forest landmarks
5. More interesting information
6. Shorter
7. Other (specify) _____

_____

Do you have any other comments on the Self-Guiding pamphlet?

_____

_____

Other Comments: _____

_____

* If respondent has been HUNTING OR FISHING

93. Maintenance of trails _____ (1) Unsatisfied (2) Satisfied (3) No opinion (4) Didn't Use
94. Directional Signs _____ (1) Unsatisfied (2) Satisfied (3) No opinion (4) Didn't Use
95. # of animals seen _____ (1) Unsatisfied (2) Satisfied (3) No opinion (4) Didn't Use

96. Approximately, how many animals did you see? ___ ___ number

97. Your success at hunting/fishing (1) Unsatisfied (2) Satisfied (3) No opinion (4) Neutral

How successful were you today?

98. Anglers: (1) Number of Keepers ___ ___ (2) Number of Nonkeepers ___ ___

Hunters: Number of animals taken: 99. Deer ___ ___
100. Small game ___ ___
101. Pats ___ ___

102-106 Would you show me on this map the areas of the Forest you have been in today?

Mark Section: 102 ___ ___/103___ ___/104___ ___/105___ ___/106___ ___

Comments: _____

_____

* If respondent has been HIKING, HORSEBACK RIDING, BERRY PICKING, X-COUNTRY SKIING, ET AL.

107. Maintenance of trails ___ (1) Unsatisfied (2) Satisfied (3) No opinion (4) Didn't use
108. Directional Signs _____ (1) Unsatisfied (2) Satisfied (3) No opinion (4) Didn't use
109. Slope of the trails _____ (1) Unsatisfied (2) Satisfied (3) No opinion (4) Didn't use
110. Number of animals seen __ (1) Unsatisfied (2) Satisfied (3) No opinion (4) Didn't use

111. Approximately, how many animals did you see? ___ ___ (number)

Other comments: _____

_____

112. Have you been walking on a trail, walking on the road, or both?
(1) Trail (2) Road (3) Both (4) Neither, through woods

113. Did you use a trail map or pamphlet to guide you?

(1) No (skip to comments) (2) Yes

114. Which one did you use?
(1) Trail map (2) Self-Guiding Auto pamphlet (skip to comments)

115. Was the map satisfactory for you to read and use or, unsatisfactory to read and use?
(1) Unsatisfactory (2) Satisfactory (3) No Opinion

116. Could the map be improved?
(1) NO (skip next question) (2) Yes (3) Don't Know (skip next question)

117. How could the map be improved? (1 answer)
(1) Clearer layout
(2) Relate the map more clearly to forest landmarks
(3) More signs on the trails to show directions
(4) Other (specify) _____
(5) Other (specify) _____

Do you have any other comments on the trail map? (skip to 122 if respondent has not been on Auto Trail)

_____
_____

* For respondents who have HIKED/ETC on the road using Self-Guiding pamphlet.

118. Was the Self-Guiding pamphlet satisfactory for you to read and use or, unsatisfactory to read and use?
(1) Unsatisfactory (2) Satisfactory (3) No Opinion

119. Could the pamphlet be improved in any way?
(1) No (2) Yes (3) Don't know (skip next question)

120. How could it be improved?
1. Clearer instructions
2. Clearer layout
3. Less technical information
4. Relating the information more clearly to forest landmarks
5. More interesting information
6. Shorter
7. Other (specify) _____
_____

Do you have any other comments on the Self Guiding pamphlet?

_____
_____

121-126 Would you show me on this map the areas of the Forest you have been in today?
Mark section: 121 ___ ___/122 ___ ___/123 ___ ___/124 ___ ___/125_ _ ___/126 ___ ___

Other comments _____
_____

127. Will or have you stopped at other places on your trip today?
(1) No (2) Yes (3) Don't Know

128-130 What places are they?
At Kellogg Biological Station:
(01) Kellogg Farm (02) Bird Sanctuary (03) Gull Lake Station
Others: Name and location 128. _____/___ ____
129. _____/___ ____
130. _____/___ ____

131-133 What are the other places you visit that you think are similar to the Kellogg Forest? (can do similar activities??)
(01) None (02) Bird Sanctuary (03) Binder Park (04) Yankee Springs
(05) Allegan Forest (06) Kalamazoo Nature Center (07) Gull Lake Township Park
(08) Fort Custer (09) Milham Park (10) Al Sabo (11) Kimball Pines
(12) Nat'l Forest _____ (13) Nat'l Park _____ (14) other (specify) _____

134. Would you name the agency that manages the Forest?

(1) MSU (2) KBS (probe) (3) Kellogg (4) Don't know (5) DNR (6) Other university (specify) _____ (7) Fort Custer St. Pk.
(8) Other (specify) _____

135. Would you name the primary purpose of this Forest?
(1) Research (2) Education (3) Conservation (4) Recreation (5) Forest Man.
(6) Preservation (7) Other (specify) _____ (8) Don't know

Any additional comments on your visit?

_____

_____

_____

In order to check that our information is representative, we need to know a little more about you. All this information will be kept strictly confidential.

136. How old are you? ___ ___ years

137. Gender of respondents: (1) Female (2) Male

138. What is the highest grade of school you have completed:

1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7+
(01) Grade School (02) High School (03) College

139. Race: (1) White (2) Black (3) Asian (4) Pacific Islander (5) Hispanic (5) Native American

140. What city or township do you live in? _____/_____ _____

141. What's your zipcode? ___ ___ ___ ___ ___

THANKS FOR YOUR COOPERATION!!

APPENDIX E

OBSERVATION PLAN

DATE_____

TIME_____

WEATHER_____

SITE: OVERLOOK_____

TRAIL(SPECIFY)_____

PICNIC AREA_____

OTHER_____

SITE# at Picnic Area_____

# of people_____

# of groups_____

GROUP TYPE:

alone_____
Family with children under 18_____
Family with children with children 18 & up____
Family and friends with children_____
Family and friends without children_____
Friends_____
Organized groups_____
MSU _____

AGE DISTRIBUTION:

Preschoolers_____
Children_____
Adolescents_____
Adults_____
Seniors_____.

ACTIVITIES

TYPE OF ACTIVITY # & AGE

COMMENTS :

VISITOR COMMENTS

Gender:_____
Age:_____

Where from:_____
Repeat or new_____
Activity_____

_____

_____

_____

****

Gender:_____
Age:_____

Where from:_____
Repeat or new_____
Activity_____

_____

_____

_____

_____

****

Gender_____
Age_____

Where from:_____
Repeat or new_____
Activity_____

_____

_____

_____

****

Gender_____
Age_____
Where from:_____
Repeat or new_____
Activity_____

_____

_____

_____

_____