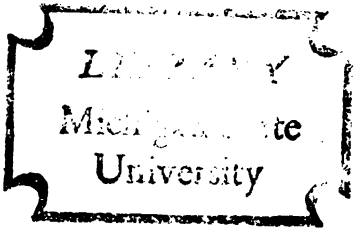
USE AND USERS OF THE KELLOGG FOREST: AN URBAN - ORIENTED AREA

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
JULIAN JAMES KIELBASO
1968



This is to certify that the

thesis entitled

USE AND USERS OF THE KELLOGG FOREST:
AN URBAN-ORIENTED AREA

presented by

Julian James Kielbaso

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Forestry

Major professor

Date Sept. 19, 1968

ABSTRACT

USE AND USERS OF THE KELLOGG FOREST:
AN URBAN-ORIENTED AREA

By

Julian James Kielbaso

Recreation potentials of urban forests have been generally overlooked. Numerous examples of urban forests exist in Europe but are almost nonexistent in the United States. For possible illumination of this idea, a convenient case was available for study at Michigan State University's Kellogg Forest, a 600-acre research forest between Battle Creek and Kalamazoo, Michigan. About 350,000 people live within 25 miles of this Forest. A largely denuded area when acquired in 1932, Kellogg Forest has been planted to trees in a large number of research and demonstration projects.

Special points to note about Kellogg Forest are its man-made aspects, the dedication to several purposes, the willingness to cut when necessary for management or research objectives, supervision of the area which is apparent to all visitors, and the compatability of research and management objectives with recreational use.

No advertising is done to attract people to Kellogg Forest. Visitor facilities are maintained at a minimum and have been permitted to deteriorate gradually, but regular cleanup is part of the management program.

On this unencouraged basis, Kellogg Forest was visited by about 38,000 persons in 1967, when 245 interviews were made. The users were divided as follows: motorists, 49 per cent; picnickers, 24 per cent; hikers, 13 per cent; fishermen, 2 per cent; hunters, 2 per cent; and miscellaneous, 10 per cent. Hunting and fishing are permitted in the Forest on a sign-in, sign-out basis.

Visitors to Kellogg Forest are of higher socio-economic status than the average population from which they come. Users also tend to be younger than the average population. Automobiles entering the Forest had an average of four persons in them. Most visitors were from the generally urbanized areas of Kalamazoo and Battle Creek.

Distance appears to be a limiting factor for use of the Forest, since only 10 per cent of all visits were from more than 25 miles away.

The most important satisfaction sought at Kellogg Forest is the opportunity to observe woodland scenery. Second is the opportunity to rest and relax. The third-ranked satisfaction is allowing children to play in the woods. Many interviewees volunteered that "nature" was an important reason for their visit. Most persons return

several times per year and also tell other friends about the Forest. Many users take pride in showing the Forest to their guests. Most persons learned of Kellogg Forest from a friend or family member or while driving by it.

Differences in socio-economic characteristics, as well as in certain attitudes and satisfactions sought, were found between various user groups.

At present use rates, recreation and research are compatible uses of Kellogg Forest. Reasons for the compatability include supervision by a Resident Forester at the Forest entrance; the many explanatory signs along the road; the variety provided by the many research projects; and the fact that visitors have a sense of responsibility while on the Forest since there is no fee and they feel as guests rather than customers.

Many persons desire the natural aspects of a forest not provided by more developed parks. In the future, there will be a much broader urban sprawl and more of the population will be even more removed from nature. Now may well be the best time to prepare to make the environment more hospitable for these people.

The Kellogg Forest is fulfilling a definite need for recreation in an urban setting, and may well form the pattern for developing similar areas near large urban centers. Such recreational use also appears to be fully compatible with major research objectives on such an urban-oriented forest.

USE AND USERS OF THE KELLOGG FOREST: AN URBAN-ORIENTED AREA

By

Julian James Kielbaso

A THESIS

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

DOCTOR OF PHILOSOPHY

Department of Forestry

1968

ACKNOWLEDGMENTS

The author wishes to express his sincere appreciation to the several persons whose cooperation and assistance made this study possible: particularly Dr. Lee M. James under whose direction and guidance this study was made, also the guidance committee for their timely suggestions and constructive criticism--Drs. R. S. Manthy and V. J. Rudolph of the Forestry Department, and Dr. M. H. Steinmueller of the Department of Resource Development.

A special word of gratitude is also due to Mr. Walter Lemmien, Resident Forester at Kellogg Forest who made many valuable contributions to the study as well as his crew at the Forest--Mr. D. England and Mr. A. Holtman.

Special gratitude is due the author's wife, Gloria, who spent many hours in discussion of the problems and still more untold hours of clerical assistance, not to mention her encouragement on many an occasion.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Recreation, particularly outdoor recreation, continues to play an increasingly important role in the American life style. Some of the more obvious reasons for this situation are the expanding population and its urbanization, increasing real per capita income, longer non-work periods, increasing mobility, and some changes in living patterns. It might even be argued that in the not-too-distant future, Americans will be trained to use leisure.

Forests have always played an important role for Americans seeking outdoor recreation, and there is reason to expect their importance will increase. Since 1943, total visits to National Forests have increased each year, and in 1967 totaled 149,647,100 visitor days. The number of visits tripled between 1955 and 1964, increasing at a rate faster than either population or Gross National Product. Dramatic increases in recreational use have also taken place on other federal forests, state and municipal forests, and public parks largely characterized as forests.

Much of the outdoor recreational use that has developed around forested areas has been directed to forests of large size, but small forests can play a significant role in recreational use.

Small forests, located near centers of population, may attain far greater value to society than the larger, more distant forests. Perhaps the greatest value of forests in the urban environment is their role in air conditioning. The ability of trees to clean the air and ameliorate temperature has been known a long time. The urban forest may serve as a filter to buffer man from the sights and sounds and smells of civilization. Forests serve as local reservoirs and sources of clean water, and they offer protection against soil erosion and flooding. Water influences, in fact, were the historic justification for establishment of the National Forests in eastern United States. Forests also serve as the habitat for many forms of bird and animal wildlife.

The green masses of the forests offer soothing relief for human nervous systems, counteracting the irritating effects of the many colors present in our cities, especially the reds. Forests are able to absorb sounds, and by counteracting the excessive noises of urban centers may help to reduce the incidence of human deafness.

Property values are enhanced greatly by proximity to a wooded area. Real estate agents often indicate that

lots with trees sell for $500 to $1,000 more than lots without trees. People are willing to pay for a location close to woodland. They recognize values of natural beauty, protection against intense sunlight and heat, inspiration, and variety to the urban scene. The variety of plant and animal life within the forest is also a source of great satisfaction to many people.

The forest serves as a source of recreation or re-creation for man to break up the rigors of the work-a-day world. This recreation may take various forms from communing, to walking, or observing, or hunting, or fishing--in short, any activity, which serves to refresh the body or the mind.

Large forests are severely limited, by virtue of size, to locations away from population concentrations. However, it is the unique quality of the small forest that its location is much more flexible and may be near population centers as well as away from them. The small urban forest may or may not be used for timber production, but it offers more opportunities for enhancement of environmental values than have been generally realized.

This opportunity is being more and more appreciated as evidenced by the fact that the Citizens' Advisory Committee on Recreation and Natural Beauty has as recently as June 12, 1968 recommended that an urban and community forestry program be created in the United States Forest

Service which would encourage research and training in the direction of urban and community forestry.

The Forest Service of the United States Department of Agriculture has also proposed a program of grants-in-aid to the states and local governments for urban forestry.

For illumination of this idea, a convenient case was available for study at Michigan State University's Kellogg Forest. This 600-acre research forest is located in an urban environment mid-way between Battle Creek and Kalamazoo. Managed by the University's Forestry Department primarily for research in wood production, Kellogg Forest has been open to recreational use by the public for many years. Recreational use has been growing and now represents a major function of the Forest.

The case study undertaken at Kellogg Forest, which is the focus of this thesis, was directed to the following objectives:

(1) to determine the volume of use of this urban-oriented forest managed primarily for research in wood production;

(2) to determine the recreational activities participated in by users while at Kellogg Forest;

(3) to describe the users of Kellogg Forest and to compare them with the general population in the region;

(4) to make comparisons between user groups;

(5) to determine satisfactions derived by users while on the Forest;

(6) to determine user attitudes on various questions regarding Kellogg Forest;

(7) to observe the possible role of an urban-oriented forest in helping to fulfill the recreational needs of an urban population in search of leisure-time activities.

CHAPTER II

LITERATURE REVIEW

The Urban Forest

The introduction has already stressed the importance of forests in the urban environment. But urban forests are scarce. Forests have been pushed back from the cities. In 1826, Johann H. von Thunen wrote in Isolated State that forests should be located near cities for greatest location efficiency owing to the weight and bulk of timber. Time has passed, and former transportation restraints as well as limited demands on land for alternative uses no longer hold as rigidly as in his idealized model.

Might there be more to von Thunen's concept than is immediately apparent? Might there be reasons other than economies of transport, for maintaining forests nearer to the larger cities? Must our forest resources be large and contiguous for economical management or might they be nearer to population concentrations and more dispersed? The answers to these questions may be considered from two viewpoints: the economist considering efficiency and feasibility of timber production, and the planner attempting to provide a more desirable environment for an increasingly urbanized society.

Forest economists have generally conceded that timber production on small, private holdings is not yet feasible, due in part to the short-term objectives of owners and the long timber rotations. With the increasing emphasis on clear-cutting harvesting methods, this situation is not likely to improve.

Foster (1965) in a presentation entitled "Forestry and Megalopolis," addressed himself to the problem of forestry in the urban fringe. He noted that foresters supposedly could harvest 100,000 board feet of sawtimber from Boston itself on a sustained annual basis. He also made several recommendations on how to approach such an objective. Ultimately, the result would be to provide income to the owners, raw material for some small timber industries, and amenity values for many people. The forester's role in this environment will be different from his traditional one; foresters will have to "come out of the woods" as has been advocated by James (1968). Speaking to the Society of American Foresters in Seattle, Davis (1966) pointed out the same theme, that foresters should become more concerned with urban area forestry and its potentials.

The one great economic advantage of the urban forest is proximity to its potential market--exactly the theme of von Thunen more than 100 years ago. It may be time to re-evaluate his theory and bring forestry back

to the urban environs. Attesting to the economic advantages of such forestry, the village of Juriens, Switzerland, is a case in point. A village-owned forest of about 900 acres accounts for all taxes for the 400 inhabitants: no one pays a tax.

> The forest, on a hill back of the village, is criss-crossed by logging roads, making it easy for the people of Juriens to enjoy it. In the summer they picnic in it or sit in its cool shade. In spring and fall they go on hikes and in winter they can ski through it. The forest is an intimate part of their lives. They look on it as a living, growing thing of great beauty and they watch over it passionately (Fraley, 1967).

The Juriens forest meets the viewpoints of both the economist and the planner. Today, von Thunen would perhaps be known as a great planner since his theory of woodland near the city would correspond with urban planning theories as propounded by Sir Raymond Unwin (Creese, 1964), among others. Unwin advocates providing green areas for better living conditions within the urban environment.

Another Swiss example is the well-known and admired Sihlwald, the town forest of Zurich. The first forest working plan was made for this forest in 1680-1697, and as early as 1491 the boundaries of this historic forest were definitely demarcated (Illick, 1939, p. 278).

Fisher (1960, p. 34) states further:

> . . . all towns like Zurich are eager to keep their ownership. . . . But first of all, forests are considered as a most important recreation place for city dwellers and are therefore under a silvicultural management fitted to create park-like stands. Since such stand composition requires constant maintenance, the forests draw even more attention.

> In this connection it is noteworthy that forests of this type, not managed primarily for economic yield, nevertheless produce an annual net income of $15 to $20 per acre. It is generally true, however, that the income from such forests within the communities of the Swiss lowlands does not contribute more than about 10 percent to the total community budget.

The small village of Bassins, in the Jura Vaudois region of Switzerland has about 2,600 acres of communal forest which is highly prized, much like the Sihlwald, although it does not contribute substantially to the economy (Mayor of Bassins, 1950).

Ebner (1940) notes two German villages as good examples of the importance of community forests. Both Weissenburg and Freudenstadt are cited as important community forests. Another notable example is the Frankfurt City Forest in Germany. It is an 11,000-acre forest adjacent to 600,000 people, and serves as many as 40,000 visitors on an active day. People ride, hike, cycle, use the park areas or the restaurants and swimming pools. Two-thirds of the forest is used for wood production, one-third for recreation activities and the entire area for water supply (Harper, 1965).

This discussion has considered merely a forest on the urban fringe without regard to an accepted designation for it. Urban forest may well be the most appropriate term since such a forest is quite near to or at least greatly affected by urban populations. The Lockwood Conference (Waggoner and Ovington, 1962) would seemingly

prefer to call it a suburban forest. As Stephens (1962) noted at that conference "the suburban forest . . . is that part of our forest land which is man oriented. . . . and a backdrop against which man carries out his daily activities."

Europeans have written regarding this type of forest at times but usually refer to it as amenity forest or protection forest.

It is quite interesting to observe that the British usually refer to amenity forests and in one case (Shaw, 1964) four forms of amenity are defined: (1) near perspective, (2) distant perspective, (3) small arboreta or forest plots, and (4) picnic sites and forest vantage points.

On the other hand, the French, German, and Russian writers usually refer to protective forests, often being much more specific regarding the health and betterment of society. Many writers have addressed themselves to the protection and welfare functions of the forest, discussing the role of forests in mitigating some of the evils of modern life such as pollution, crowds, noise, and traffic (Bättig, 1961; Gathy, 1962; Eyer, 1962; and Nesterov, 1964).

Trees, and more specifically, masses of trees have been termed green air conditioners and compared by function to our mechanical air conditioners. Such terms as

precipitation, narcosis, oxidation, transpiration, and re-odorization may apply to either system (Robinette, 1968).

Ryle (1963), a Britisher, has written that "forests are for the health, wealth, and happiness of the human race. Too often the second purpose has been considered with the omission of the others." Pursuing this theme further, Sinden and Sinden (1964) in indicating that urban areas in England are in need of open spaces, say that we should evaluate the present situation, and in so doing, consider the "people profit" as a social value derived from forests.

Aside from being urban or suburban, amenity or protective forests, the forested areas near cities may also be included under the concept referred to as open space--which is "that area within an urban region which is retained in or restored to a condition in which nature predominates" (Strong, 1965). The report from which this statement is taken, while not forestry oriented, acknowledges the benefits to be derived from forested lands as open spaces. Among the benefits attributed to open space in general is the value of low density and open space for mental and physical health (Strong, 1965, p. 2).

Edlin (1963) refers to open space in a more general way concerning types of amenity found in forests by referring to the senses of sight, hearing, smell, taste,

and touch. He then adds a new sense which he calls the "sense of individual movement" or the freedom to wander.

The urban forest can be composed of relatively small units and located close to centers of population. Several European cases of successful urban forestry have been cited. These forests produce protection and amenity values to society as well as the economic products normally expected. This same situation should be feasible in the United States, too. The Outdoor Recreation Resources Review Commission Report (1962) has indicated in its recommendations a great need for recreational opportunities near the metropolitan centers. The specific opportunity is not spelled out, but the tone of the report would imply more parks: parks of regional scope, well developed, and likely typified with trees. Urban forests with their protective and amenity values may well provide some of these satisfactions.

With increased affluence also comes a trend toward rest and relaxation without much sacrifice of the conveniences of home. Some persons seemingly prefer to make their outdoor vacation a "home-away-from-home," replete with showers and televisions, etc. A look at some state parks would indicate that this is the current value system of American outdoor vacationers. Nature for them is not so much a goal as a new setting for their home-away-from-home.

A report by Gregerson (1965) of camping practices in Michigan state parks is aptly summarized in this statement: "People not only don't seem to want to get away from it all--they take it with them. Electric frying pans, irons, television sets, and other electrical appliances are standard equipment with many campers." Etzkorn (1965) found a similar situation in California campgrounds. In his study, campers wanted as campground improvements such things as "ice machines, laundries, etc." These facts could undoubtedly be observed in parks in every state and might erroneously lead to the conclusion that this is what everyone wants--"open air mass recreation" (Gregerson, 1965).

At the other end of the scale is the wilderness recreationist who may be satisfied with nothing less than complete isolation from all human influences. In 1964 the national forests had 99 areas in wilderness categories comprising 14,617,461 acres and used to the extent of 973,800 visits (U. S. Forest Service, 1965, p. 92). This is a use ratio of approximately one person per 15 reserved acres per year. Such wilderness use comprises less than 1 per cent of all national forest recreation visits.

The above are two extremes of persons seeking outdoor recreation: the mass-recreationist and the wilderness purist. Within the Forest Service may be seen a

tendency to provide various sorts of "campgrounds for many tastes" (Wagar, 1963). Camp-sites range from central campgrounds, somewhat like state parks, to small back-country camps, with several intermediates in development. This is an attempt to satisfy almost anyone desiring to camp. The rationale for this sort of varied opportunity provision is shown well by Wagar (1966) in Figure 1 which demonstrates how a greater proportion of users may be satisfied by not attempting to satisfy a single average, but instead by providing facilities along a continuum from simple to elaborate.

In a similar vein, Gould (1961) has proposed developing a concept of "recreation complexes."

> It is essential that a satisfactory selection of outdoor recreation activities is made available to those who use recreation facilities. . . . A concept is needed that will visualize the task of planning recreation facilities as a whole and not just in pieces or fragments. . . . In short, variety is the spice of outdoor recreational activity--something to suit all tastes (Gould, 1961).

The same reasoning is appropriate for day-use activities, assuming that some persons prefer simple facilities and others elaborate facilities. The well-equipped state parks are examples of the one extreme, but for the other end of the scale, it is difficult to find examples. Day-use parks are normally well developed and more park-like than forested. What of the persons who may want to get close to nature? These would be

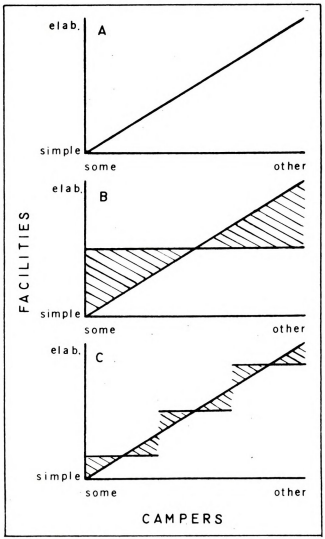


Figure 1.--(A) Some campers want simple facilities while others want more elaborate facilities. (B) If all facilities are aimed at the average desire, the wishes of most people will be missed by the amount shown in shading. (C) However, if just a few different opportunities are provided, the amount by which most people's desires are missed can be greatly reduced (adapted from Wagar, 1966).

persons who obviously regard nature as having a different significance than would Etzkorn's (1965) and Gregerson's (1965) campers. These persons would probably shy away from overdeveloped areas, preferring a simpler, more natural environment.

It has been noted that forests may well have their place near population centers for economic as well as amenity values. A place has been shown in the system for day-use areas far less developed than most presently are, i.e., forested areas near cities to be managed as forests and as "natural" recreation areas.

Socio-Economic Characteristics of Recreationists

Questions need to be raised about the recreational usefulness of the urban forest. Case studies are needed, and these can be guided by approaches used in the past few years by researchers who have studied users and their characteristics on at least two national forests and other public and private campgrounds.

Perhaps the most readily available fact to determine is the visitor's residence. Studies have normally ascertained origin in terms of county or state. Examples of this type are found in Milstein (1966), Johnson (1961), and King (1965). The concern of these studies has been a macro-model of origins and destinations of visitors.

Each study reviewed almost invariably concerns itself with the socio-economic characteristics and/or status of the visitors. Most have had major concern with these traits of the users per se. Titles such as "A look at private campground users" (McCurdy and Mischon, 1965), "Characteristics of family campers . . ." (King, 1965), "Visitor characteristics and recreation activities" (Wagar, 1963), and others, are project reports on just this topic. Most are concerned with camping areas.

An attempted ranking of socio-economic data, based on observations of other research, might look as follows:

(1)	Age	(5)	Occupation
(2)	Sex	(6)	Family Life Cycle
(3)	Income	(7)	Urban-Rural Residence
(4)	Education	(8)	Race

Some of the selections and rankings may easily be debated, but for the current purpose the approach seems fairly reasonable. Basically, these data are to be used primarily as population parameters so that they may give added clues to other questions or hypotheses which may be asked.

Age was considered by Palmer (1967) in determining that most hunters are between the ages of 25 and 54. Other studies have also dealt to some extent with age. Sessoms (1964) indicates that type of recreation pursued

is related to age--"the older one becomes, the more passive his pursuits." Sessom's work is a compilation of other studies.

Sex may play a significant role. Palmer (1967) determined that 98 per cent of hunters are male. Burch (1965) also considered sex to a greater extent. He noted that in differentiating play types, there are some types which may be called man's play, woman's play, and joint ventures.

Income and education have significance as policy determinants as well as parameters of the population. As King (1965) noted, "The socio-economic characteristics of these families indicate that they are probably above average in political awareness and activity." Burch and Wenger (1967) also considered income in discussing differences between camping styles of Oregon campers. Some persons have speculated that hunters, for instance, are from lower income and education classes, whereas Palmer (1967) found them to be definitely middle class. Wagar's (1963) results show a wide range in these characteristics, but weighted a little more toward the upper classes than chance would dictate.

Occupation has also been noted in several studies. Burdge, Sitterly, and So (1962) for example, used occupation as a guide to social status using the commonly employed and accepted North-Hiatt Occupational Scale

(Nosow, 1962). Differences in attitudes and beliefs were then correlated with this status. They found particular recreation activities to be associated with social classes. As one example, they found that hunters were from the lower classes as contrasted to Palmer (1967) above. Burch and Wenger (1967) utilized occupation in their comparisons of camping style. Occupation may be useful in considering time of visit or length of stay as well as purpose of visit. Clawson (1966) has considered this concept in connection with a discussion concerning what the make-up of leisure time will be and its consequences.

Family life cycle is a concept not found as often. Sessoms (1964) noted in a literature review, that several studies demonstrate that family recreation patterns are associated with family stage. In a 1965 study McCurdy and Mischon noted that 55 per cent of campground users consisted of a single family. Also noted was the fact that most camping families consist of parents 25-44 years old and at least one child younger than twelve. Burch and Wenger (1967) utilized this concept by considering the number of children per family as the family stage.

The next factor to consider is with rural-urban residence. This may well be included with origin information already mentioned. Several persons have considered

place of residence, to some extent, in their studies (Palmer, 1967; Sessoms, 1964; and Burdge et al., 1962). Burch and Wenger (1967) also considered size of present home community, home community before age eighteen, and any shift of home community from childhood to present. One major problem in such a delineation is definition of rural, suburban, and urban. There is sufficient confusion in the literature to indicate that place of residence may not yield clear answers. Palmer (1967) defined urban as any city, town, or village, and rural as any place outside of such a community. He could not compare his estimates with U. S. Census Bureau data, however, since the Census Bureau includes only locations with 2,500 persons or more as urbanized. Nevertheless, determining which portion of the population is most likely to participate in various recreational activities may have sound implications for forest management and advertising for recreational areas. Cushwa et al. (1965), for example, were able to utilize such information in making attendance predictions.

Concerning race, Palmer (1967) found that non-white hunters have more difficulty locating a place to hunt than whites. This type of information is not often indicated in recreation research.

As a brief resume of demographic considerations, Ferriss (1963) noted:

> In identifying predictors of recreation behavior, the authors, Mueller and Gurin (1962) made a multivariate analysis of background factors associated with participation in outdoor activity. They found sex, age, income, occupation, family cycle, size of place of residence, race, region, and education, significantly associated with level of participation in outdoor recreation activity, even when each of the other factors was held constant (Ferriss, 1962).

Katz and Lazarsfeld (1964) introduced an interesting concept in Personal Influence which concerns determining how important person-to-person communications are in decision-making for the consumption process. They were interested in discovering if advertising or word-of-mouth was most effective. It amounts to asking, "How did you hear of product Y?" Also, "Did you tell anyone else about product Y?"

Beardsley and Duncan (1965) concerned themselves with attitude of recreationists to a state park visitor fee. McCurdy and Miller (1968) inquired as to visitor awareness of a fee, how visitors learned of the fee, their understanding of the fee, and their acceptance of it.

Satisfaction is a more difficult criterion to determine. Reid, Hall, and Barlowe (1962) conducted a study dealing with the problems of user satisfactions. Questions were asked regarding specific facilities. Another approach might be an open-end question. One study approached user satisfaction by utilizing photographs to allow users to choose which facility would be their choice under price

constraints at various levels (Shafer, 1964). This might also serve as a sensitivity model in decision-making. Chappelle (1968) indicated a problem of trying to obtain photographs depicting specific conditions in a satisfactory manner.

Wagar (1964), in dealing with uses of wildlands and satisfactions, developed conceptual graphs in which he plotted user satisfaction against numbers of other persons present for various activities. For most needs which commonly motivate outdoor recreation, the quality of satisfaction tends to lessen as the number of participants increases. The graphs demonstrating this are shown in Figure 2. No data were presented to support these graphs.

Burch (1965) classified his observations of outdoor recreation activities as types of play and categorized them as symbolic labor, expressive play, subsistence play, unstructured play, structured play, and sociability. This seems to be another dimension for measuring motivations and values received from outdoor experiences. What people really do when "on site" may be quite different from what they say they do. Burch (1964) discusses observation as a research tool. The results he obtained in the 1965 article show the efficacy of this tool, but trained observers are required for valid results. Observation is also the method used by Whyte (1965) in Street Corner Society and by many other sociologists. Karnig (1966)

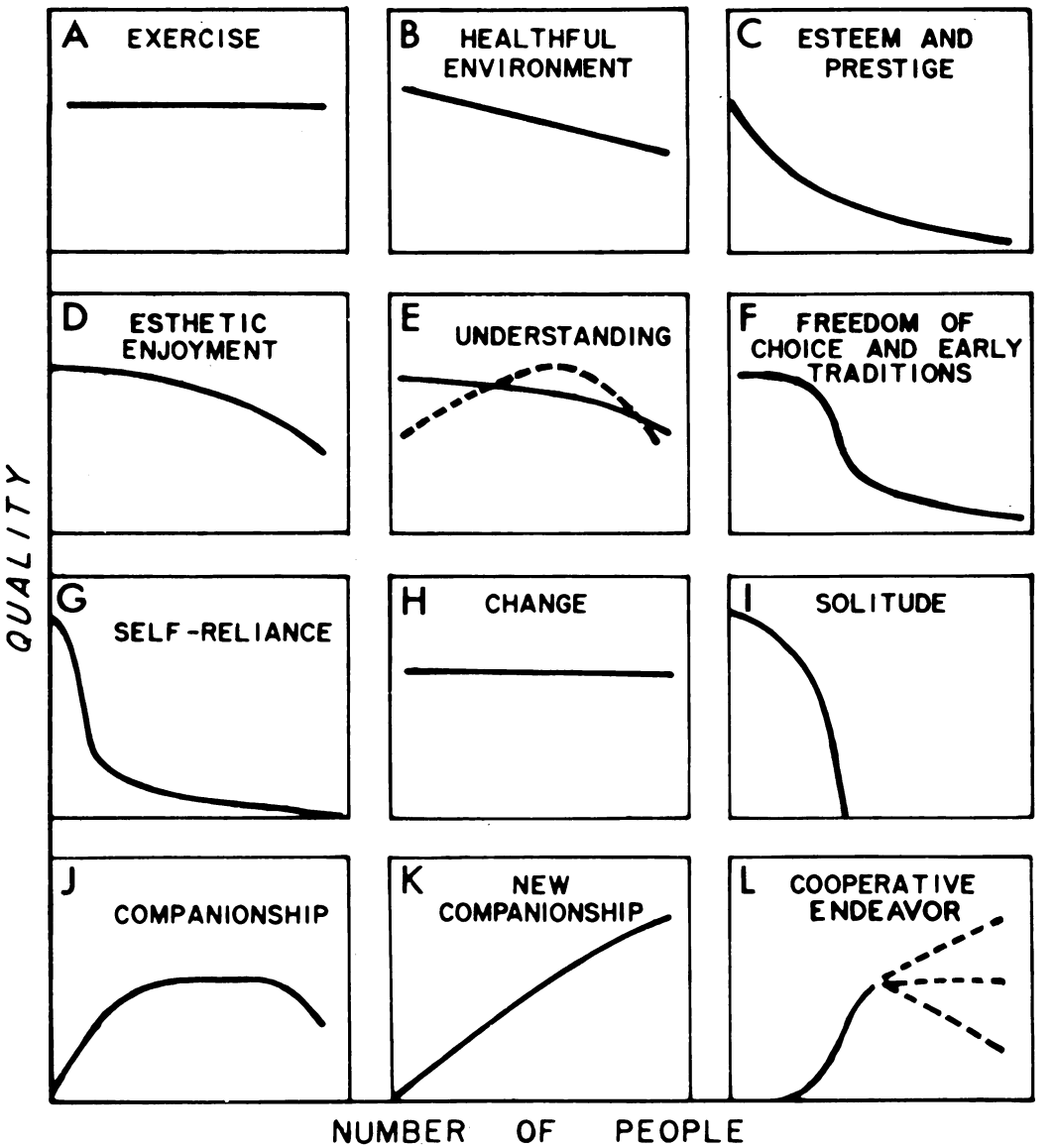


Figure 2.--Effects of crowding on the quality which results from satisfaction of the needs that commonly motivate outdoor recreation. On the horizontal axes, number of people increases to the right. On the vertical axes, quality increases with height (adapted from Wagar, 1964).

classified visitors by activity while on the Black Rock Forest. King (1966) classified activities in determining the time budget of campers on the Huron-Manistee National Forest. Cushwa et al. (1965) used activities in their prediction method for the George Washington National Forest.

CHAPTER III

THE STUDY AREA

This study of the recreational use of the Kellogg Forest is an interesting case illustrating the use of an urban forest. Kellogg Forest is a man-made, small forest located between two urban centers, readily accessible, and made available to the general public. The recreational use of the Forest which has developed over the years is an interesting subject of study in itself; but, more importantly, it suggests a unique role in meeting recreational needs that urban forests might serve in many urban areas.

Kellogg Forest

Kellogg Forest is a 600-acre intensively developed research forest in Sections 21 and 22 of Ross Township, T1N, R9W, Kalamazoo County, Michigan. Ross is the northeasternmost township of Kalamazoo County. Kalamazoo and Calhoun Counties are in the second tier of counties north of the Indiana border in southwestern Michigan. Figure 3 is a location map of the Kellogg Forest area.

In 1932, W. K. Kellogg donated to Michigan State University an initial 280 acres of mostly abandoned farm

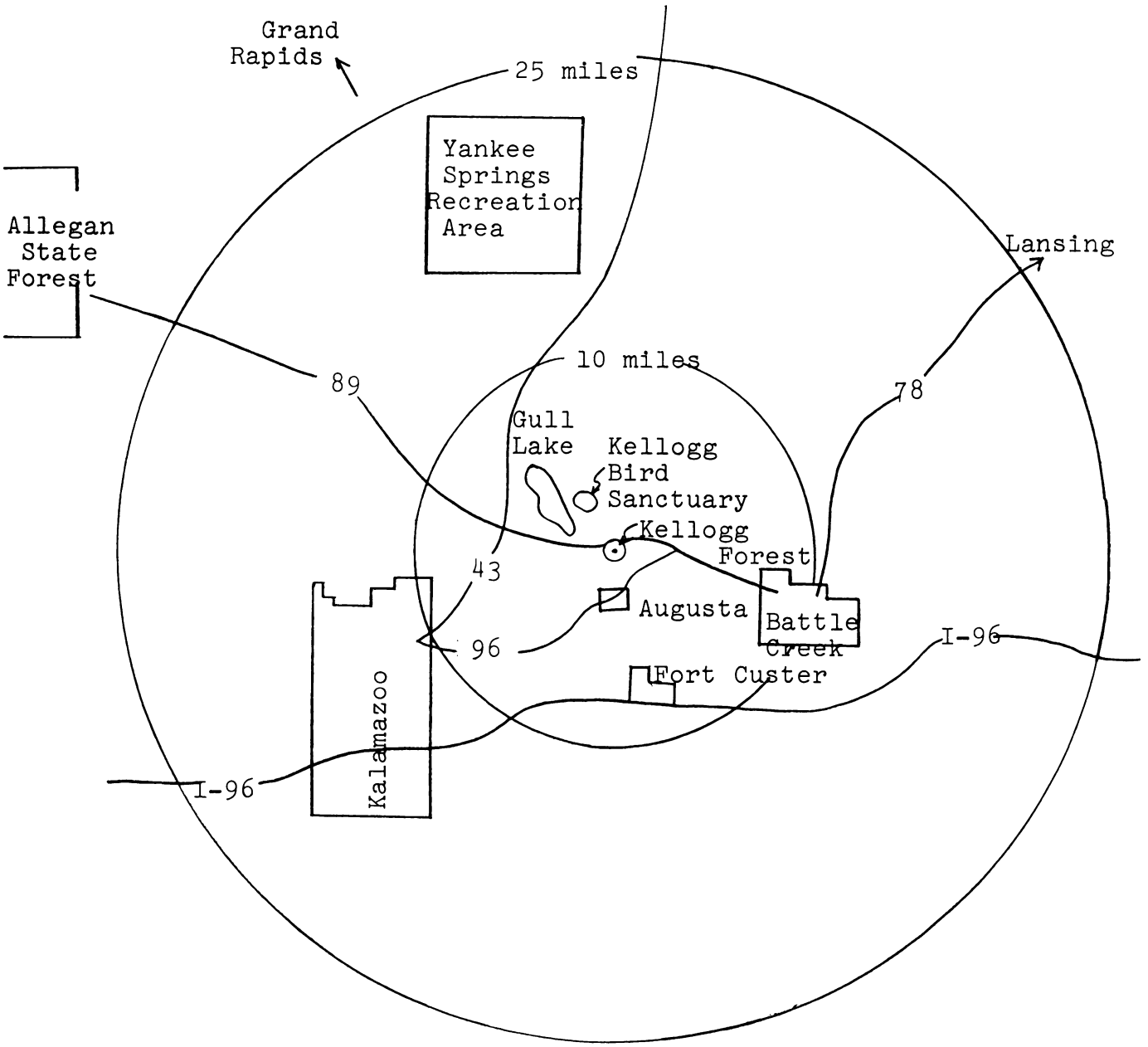


Figure 3.--Location of Kellogg Forest and other important areas within designated distances of the Forest.

land. Subsequent gifts, purchases and exchanges increased the area to its present 600 acres. The original donor expressed the desire that the land be used to demonstrate reforestation of poorly managed land by proper conservation practices. Tree plantations were begun immediately, although research work has guided the plantings more than the idea of demonstrations. By 1938 though, nearly 200 acres of open land had been planted. Many of the persons interviewed remember the Kellogg Forest of those early days.

The topography of the forested land is variable, ranging from wet marsh in the creek valley to well drained upland hillsides. This provides a physical variety pleasing to visitors.

In 1940, a Multiple Use Program was initiated to better demonstrate the more complete use of forest lands. A gravel road was built, a picnic area begun, trail-type signs erected, and the forest opened to the public. Use by the public has increased steadily. Some forest research was begun as early as 1932, but not until 1947 was major emphasis placed on this aspect. Between 1947 and 1957, several long-term projects were established, ranging from studies of soils, thinning and pruning, entomology, plant pathology, and silviculture, to Christmas tree shearing, and herbicide treatments. In the same period several research projects were undertaken in

connection with trout production and wildlife management. Augusta Creek, coursing through the forest, has been improved by more than 100 improvement structures and appropriate plantings along the stream. Most research, however, has been related primarily to forest production practices. In 1958, an ambitious forest genetic improvement program was begun and continues today, leaving little of the open land still unplanted.

Since 1941, hunting and fishing have been permitted on a sign-in, sign-out basis. Consequently, numbers of sportsmen and their take can be tabulated quite accurately. Until 1960, all the hunting was for small game, but in 1960, the Michigan Conservation Department authorized deer hunting in the area and so Kellogg Forest was opened to deer hunting.

Except for 70 acres of woodland included with the original grant to Michigan State University, Kellogg Forest is a man-made forest (Figure 4). This fact in itself is interesting, and some of its implications will be discussed later. The forest is divided into management units designated as compartments. The various compartments are described in the Visitor's Guide to Kellogg Forest (Appendix A). Figure 5 is a map of Kellogg Forest.

The picnic area is contained primarily in Compartment 17, but also in portions of 8 and 12 (Figure 6). The major portion of the forest is located on the east

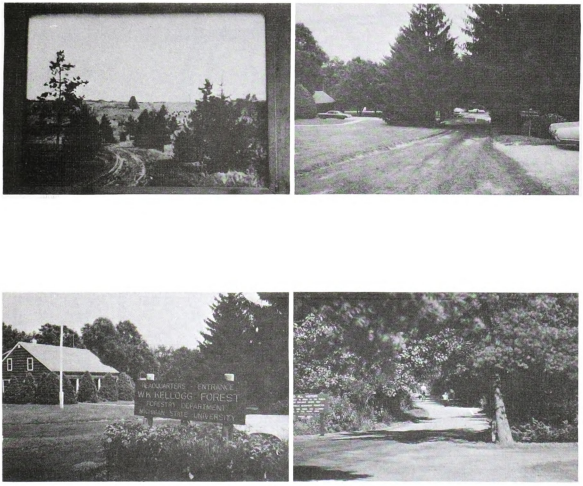


Figure 4.--Aspects of a man-made forest. (A) Kellogg Forest as it appeared around 1935, (B) Same scene as "A" in 1968, (C) Kellogg Forest Headquarters as seen at entrance, (D) Visitors enjoying a man-made forest.

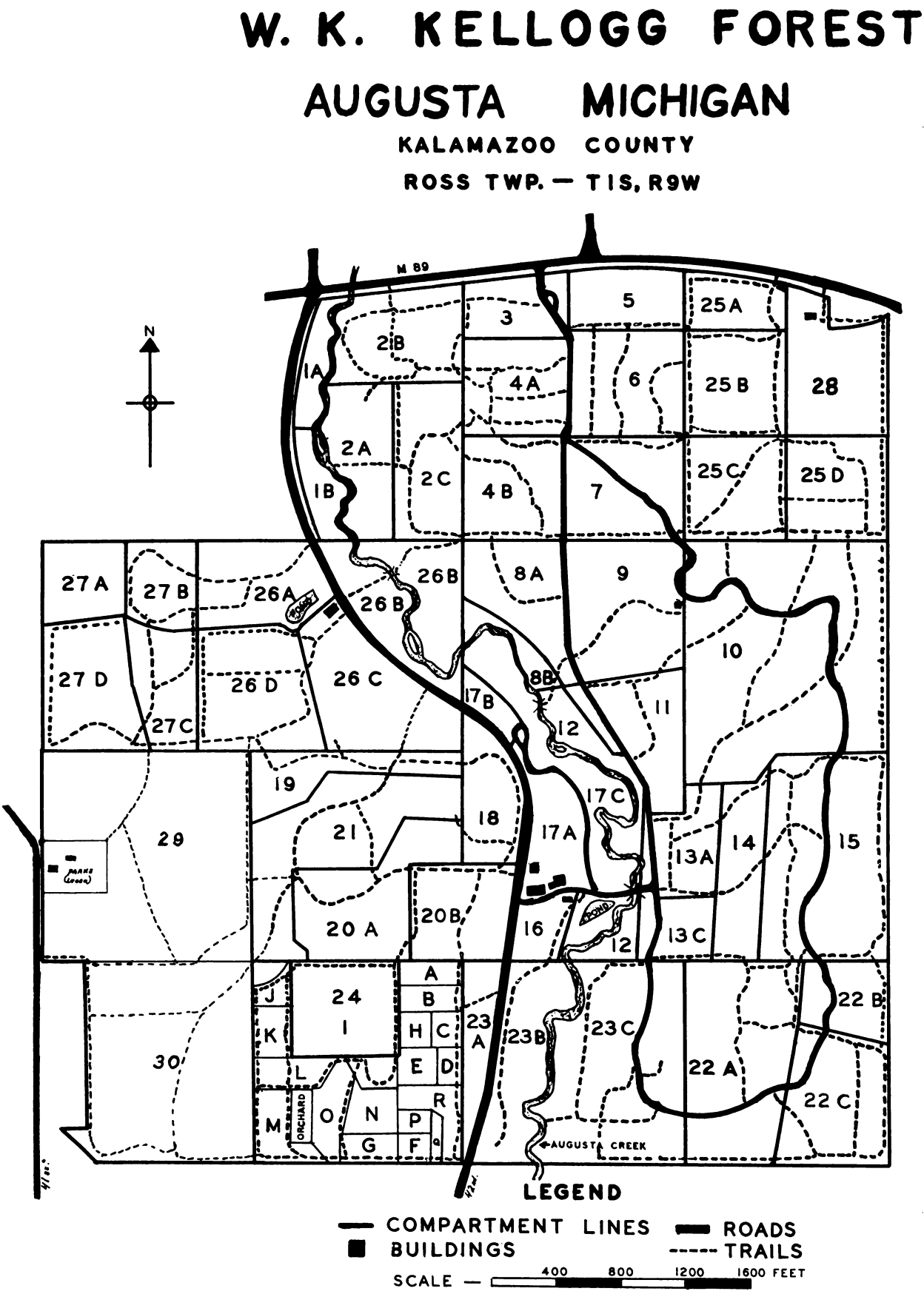


Figure 5.--Map of W. K. Kellogg Forest.

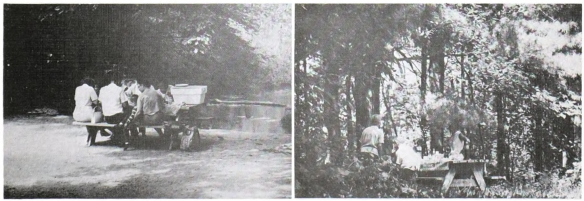


Figure 6.--Scenes in picnic area of Kellogg Forest.

side of Forty-Second Street. This is the side which also includes Augusta Creek, the picnic area, and the forest road (Figure 7). The forest road traverses the forest for about three miles, winding through the various compartments illustrating many types and practices. Many rustic signs provide information about the research work in progress (Figure 8). At the highest point, McCrary Memorial shelter is located; a distance view can be obtained from this point (Figure 9).

As mentioned earlier, the 1.8 miles of Augusta Creek in the Forest have been improved for trout fishing. Each year, the Michigan Conservation Department stocked legal size or "keeper" trout in the Creek, but discontinued this practice a few years ago. More recently, only fingerlings have been planted.

The picnic area strung out along the creek, has fourteen tables and accompanying charcoal grills. In the late 1950's the University administration made a decision to permit the facilities to deteriorate in hopes that people would stop using them. Some of the tables and benches are now approaching the point of being unusable. However, people still use all the facilities (Figure 10).

According to Walter Lemmien, the Resident Forester, the man-hour recreation management requirements for the Forest in 1967 were as indicated in Table 1. The total of 872 hours is about 12 per cent of the man-hours required for management of Kellogg Forest.

Figure 7.--Scenes along Augusta Creek and road in Kellogg Forest. (A) A view of Augusta Creek, (B) Road winding through hardwood stand in Compartment 22, (C) Trail entrance to road in Compartment 22--such entrances often serve as starting points for hikes, (D) Road through pines in Compartment 7.

Figure 8.--Examples of rustic signs seen in Kellogg Forest.

Figure 9.--(A) McCrary Memorial, (B) View from McCrary Memorial.

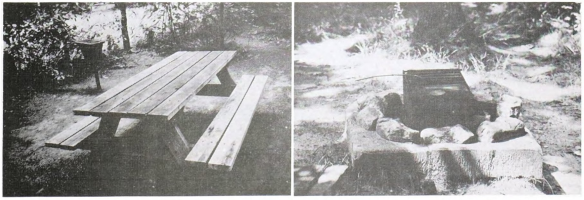


Figure 10.--Examples of picnic facilities at Kellogg Forest.

TABLE 1.--Annual man-hour requirements of various recreation-providing activities--Kellogg Forest, 1967.

Activity	Man-hours
Road and trail maintenance	168
Public relations[a]	67
Overtime supervision[b]	375
Signs	109
Picnic area maintenance	98
Fish and wildlife	55
	872

[a]Primarily conducting tours.

[b]Primarily weekends.

Visitor Source Area

In order to understand the recreational services provided by Kellogg Forest, it is necessary to consider first the characteristics of the "visitor-shed" or region from which the bulk of visitors come.

According to the 1960 Bureau of Census data, a population of about 65,000 is within ten miles of Kellogg Forest. Within the 11-25 mile zone, the population is approximately 350,000 (Table 2).

Calhoun and Kalamazoo Counties are seemingly quite near to an "average" county in Michigan, and perhaps even to the United States average. The United States Information Service selected Kalamazoo as the typical American city twice between 1956 and 1961. A story has even been attributed to movie producer, Sam Goldwyn, concerning a time when he was told that his latest picture was a flop in New York. He replied, "I don't care what it does in New York. How did it go in Kalamazoo?" (Kalamazoo Gazette, 1961, p. 5). With these few facts in mind, it appears that the population characteristics of the counties from which users come are "average" populations.

Battle Creek, the major source of visitors to Kellogg Forest, has a population of 44,169. It is the breakfast food center of the nation. The Kellogg Company, Post Cereals Division of General Foods Corporation, National Biscuit Company, and the Ralston Purina Company, are some

TABLE 2.--Population by county within specified distances of Kellogg Forest,[a] 1967.

Governmental Unit	Population
Within 10 miles	
Barry County	5,024
Kalamazoo County	21,232
Calhoun County	39,181
Total	65,437
Within 25 miles	
Barry County	31,738
Kalamazoo County	169,712
Calhoun County	138,858
Allegan County	19,276
Total	359,584

[a]Source: United States Bureau of Census, 1962.

of the best-known firms located in Battle Creek. Other manufacturers are Eaton Manufacturing Company, Oliver Farm Equipment Company, Michigan Carton Company, Clark Equipment, and many other smaller firms.

Battle Creek is the home of Kellogg Community College. It is also the home of the internationally recognized W. K. Kellogg Foundation as well as the Battle Creek Sanitarium which has been in continuous operation for 99 years. The private art collection of the late C. W. Post may be seen daily at the Postum Club House near the Post Products plant.

There are several major parks in the Battle Creek park system, John W. Bailey Park is the scene of annual national amateur baseball tournaments. Irvin Park is a beautifully landscaped area with rock gardens, winding drives, lagoons, and picnic grounds. Binder Park, four miles southeast of the city, offers golf, camping, picnicking, toboganning, and skiing. Willard Park at Goguac Lake, has an excellent beach, picnic area, playground and bathhouse facilities. Leila Arboretum, a 205-acre tract of rare plantings, also contains the Kingman Memorial Museum of Natural History which houses many interesting and rare exhibits.

Kalamazoo is a city of 82,089. It is one of the important paper manufacturing centers of the country, with an annual production of more than three million tons.

It is prominent in the manufacture of drugs--Upjohn Pharmaceutical Corporation is located here. Unlike many other cities, it is not dominated by durable goods manufacturing. Because of this diversification, it has more economic stability than most cities.

Kalamazoo College and Western Michigan University are both in Kalamazoo, and Nazareth College is in nearby Nazareth. An Art Center features a collection of twentieth century American art. A Public Museum has exhibits of natural and local history featuring Pioneer and Egyptian rooms.

Many public parks and several golf courses provide a source of relaxation and recreation. The Milham Park Zoo is a popular attraction. Most like Kellogg Forest is the Kalamazoo Nature Center, a 400-acre preserve featuring area plant history and emphasizing nature study through nature trails and exhibits. Subtropical plants similar to those that once thrived in Michigan grow in a controlled climate Sun-Rain Room, which is complete with 100 tons of boulders. An interpretive center, nature trails, and wild and domestic animal displays are open most of the year.

A little to the north, and about mid-way between Battle Creek and Kalamazoo is Kellogg Forest. The rural country surrounding the area is devoted to general farming, raising of celery, pansies, peppermint, and orchard fruit culture.

Since the two counties, Kalamazoo and Calhoun, were glaciated and have typical morainic topography, many hills, kettle-lakes, and bogs or marshes may be found interspersed with rolling farmland. About four miles to the northwest of Kellogg Forest is Gull Lake, called by some the "Geneva of Michigan," which serves as a fishing and boating resort. There are two public township parks on the lake providing picnic areas, beaches, and boat launches. Gull Lake was early developed as a hotel resort with day-long steamer trips to the end of the lake and back, a 10-mile round trip. The Kellogg Biological Station of Michigan State University fronts on Gull Lake. Today, the shoreline of Gull Lake is mostly residential with some estate-type holdings remaining from earlier developments.

To the east of Gull Lake, about one-fourth mile and about three and one-half miles from Kellogg Forest is Wintergreen Lake where the Kellogg Bird Sanctuary is located. The Sanctuary is primarily a bird refuge, research area, and outdoor teaching laboratory which has a yearly attendance of about 200,000 people. There are many lakes and streams in the area with many of the smaller streams boasting fine trout fishing. The Kalamazoo River is also an important stream. It is sufficiently polluted to exclude trout, though many other fish species tolerate it. The Yankee Springs Recreation Area of more than 4,000

acres is about 17 miles north of Kellogg Forest. It affords opportunity to participate in almost any form of outdoor recreation from swimming to hunting.

Fort Custer Recreation Area is primarily a public hunting site on land released from the Fort Custer Military Reservation. A state park is proposed on this site eventually, but at present, it is an undeveloped area.

Allegan State Forest is another sizable area affording a diversity of the more undeveloped outdoor recreation activities. It is about the same distance as Yankee Springs, but has less developed facilities as attractions.

There are two township parks on the north shore of Gull Lake which afford swimming and picnicking primarily, plus limited camping and limited boat-launching facilities.

Many other small city parks are available in the surrounding cities as well as roadside parks and public fishing sites provided by the State.

The above is an indication of alternate facilities available in the general area of Kellogg Forest.

CHAPTER IV

METHODS AND PROCEDURES

Sampling

During the summer of 1967, 245 persons (heads of parties) were personally interviewed while on the Kellogg Forest. Two were not usable in some calculations.

The sample allocation was an early problem to be resolved. The frame was to be the people who visit Kellogg Forest. Visitors were selected at random while on the Forest. The sampling was a stratified sample among the various user groups at the Forest for recreational activity.

The initial problem was that very little was known about this population, either by totals or by characteristics. The only current counts were for fishermen and hunters from the previous year. Numbers of other users were recorded only in 1955 (Lemmien and Geis), twelve years earlier when other users were recorded as either picnickers or as "visitors." It was believed that the picnicker group would still hold, but that "visitors" might well include hikers and other miscellaneous groups.

Some major assumptions were made. Hunters and fishermen totals would be used as known for 1966. For others, the 1955 data would be used as a basis for the sample but divided equally between motorists and hikers, a distinction not made in 1955. To allow for the possibility, a miscellaneous group was included. With these admittedly gross figures the problem then was to arrive at an acceptable allocation of 200 interviews among the user groups. In view of time and funds available, 200 was deemed an adequate sample size. The initial allocation was based on rather old data. It was observed that some changes appeared necessary for precision. As time permitted, improvements were made in the sampling so that a total of 245 interviews was obtained.

The actual sampling was done on a quota basis according to the original scheme with some adjustments being made as the original estimates were discovered to be out of proportion. Since the hunting classes called for such low samples, the number of interviews was substantially increased to gain precision in the data.

Estimation of Attendance

For a more accurate measure of actual attendance at Kellogg Forest for the year, the prime device was use of three highway traffic counters obtained from the Michigan State University Highway Traffic Center. The counters were set to count cars entering the Forest,

those entering the picnic area, and those proceeding on the forest road. Hourly periods were selected at random in which counters were checked for accuracy and counts were made of the number of persons in each passing car.

At random periods of an hour, all cars leaving the area were stopped briefly to determine activity while in the Forest and the length of stay. This sample provided the breakdown of total attendance participating in the various activities.

Use of the counters could only be arranged for the period from June 26 through December 31. Estimates of use for the January-June period were made from records kept by the Resident Forester and systematic counts made by the forest crew at random, hour-long periods beginning May 7. Early year use was deliberately estimated on the low side to avoid biasing attendance in a positive direction.

Since hunters and fishermen visit on a permit basis dependent on their cooperation in signing the register, an accurate count could be made of these groups so that no estimate was necessary except to determine how many actually drove across one of the traffic counters.

The Interviews

Interviews were first attempted on site, particularly for the picnickers. It was not difficult to gain rapport with this group, but at the site there was no sense of urgency and conversation would wander and last for an hour on many occasions.

The questionnaire used was three pages in length (Appendix B). Several points were quite specific, so that it was necessary to follow the questionnaire directly rather than attempt to obtain needed information without reference to the questionnaire. At no time did the writer get the feeling that this procedure interfered with the interview. Most people were more than willing to cooperate. When names and addresses were requested at the end of interviews, all cooperated, and some even offered telephone numbers.

The questionnaire was designed to record the makeup of the party by sex, age, activity, value of the trip, time spent, frequency, distance traveled, where knowledge of Forest was obtained, whether it was part of another trip, and general socio-economic factors of the party head.

Questionnaires were hand-tabulated and summarized by user groups. Numbers and percentages were calculated for purposes of comparisons.

The general statistical analysis and its interpretation included the chi-square statistic which tested whether or not the observed departures of frequencies between independent sample groups were significantly different from those expected frequencies exactly proportionate to the total number in the studied categories and sample groups. Dixon and Massey (1957, p. 225)

refer to this analysis as a contingency table. In this study, a difference is usually considered significant or real if it has a departure from the expected values as large or larger than could occur by chance not more than 1 per cent of the time (0.1 significance level). Significance level will normally be indicated when reference is made to the statistics. If a contingency table is said to be significant, it implies that there is some significant effect of dependence in the statistics.

This method of analysis avoids most errors of varying sample size that might be caused by using percentages that are easily calculated. For several contingency tables not all classifications could be utilized in the test owing to limited expected frequencies. Dixon and Massey (1957, p. 225) have said in this regard that the chi-square statistic will be valid if "two" is the minimum expected frequency or if not more than 20 per cent of the cells have an expected frequency of less than "five." When there were inadequate expected frequencies based on this standard, as indicated above, the analysis was performed on the classes with sufficient frequencies.

CHAPTER V

USER GROUPS AT KELLOGG FOREST

Description of Groups and Activities

The major user groups at Kellogg Forest--picnickers, motorists, hikers, fishermen, hunters, and miscellaneous--and their activities are described in capsule form below.

Picnickers

As implied by the category, the major activity or reason for being at Kellogg Forest is to picnic. This group is likely to participate in more activities than other groups. They are likely, in addition to picnicking, to go for a short hike and drive along the road which tours the Forest. Their hike is likely to be across the creek, up a hill, and to the overlook and back. Adults are likely to stay at the picnic area while the children "explore."

Motorists

This group tends to be an older group touring by auto and stopping off at the Forest to drive through, perhaps stopping occasionally--especially at the McCrary Memorial. Many merely drive through rapidly without stopping, and then leave. There speed is such that one

wonders what they can gain. Yet still others stop and walk around, absorbing the environment much more. The average period spent at Kellogg is quite short compared with other groups.

Hikers

This classification is quite seasonal, visiting the forest primarily in the fall after the hot, muggy, insect-filled days have passed. They drive along the road until they find a suitable parking place (usually a trail entrance) and then begin hiking. Many just wander the woods trails, and many were observed staying on the road, getting dusty from the passing cars. Their use of the woods was too dispersed to try to follow, so little can be said of this phase. Many were families with parents showing and teaching the children about the outdoors. Many were collecting leaves for high school biology classes and stayed along the road where many trees have identifying labels. This was one of the younger visiting groups.

Fishermen

Fishing is not a large use relatively, but the participants tend to be of higher socio-economic status than others. It is a select group because they are trout fishermen. They would appear to be the aristocracy of the fishing breed. There are three sign-out sheets

located strategically along the creek. Most cooperate in signing and recording their catches. Their hours are primarily early morning and late evening, as well as early season.

Hunters

This class is composed of both deer and small game hunters. Their use is restricted by state hunting regulations. Largest numbers attend during the early part of the respective seasons. The two subgroups are the two youngest groups to visit Kellogg Forest--many students are active in this sport.

Miscellaneous

This class is a catch-all of varied users. Generalizations for the whole group do not mean much due to the variety of uses and small sample size. Activities include photography, leaf collecting, mushroom collecting, insect collecting, reading, and bird watching. Leaf and cone collecting are likely the chief activities in the miscellaneous group.

Sample Allocation

The actual sample was selected from the above user groups based on what background information was available at the time. The initial allocation is shown in Table 3. As has been noted in Chapter IV, the need for reallocation

TABLE 3.--Allocation and actual sampling of recreationists by user class.

User Class	Estimated Number in Class	$\sqrt{n}$	Sample Allocated[c]	Actual Sample	Per Cent Difference[d]
Picnickers	6,044[a]	78	54	51	-6
Motorists	3,000[a]	55	38	58	+34
Hikers	3,000[a]	55	38	51	+25
Fishermen	700[b]	27	19	20	+5
Hunters (Deer)	222[b]	15	11	24	+12.5
Hunters (Small Game)	660[b]	26	18	26	+31
Miscellaneous	1,000[a]	32	22	15	-47
		288	200	245	

[a] Based on 1955 data.

[b] Based on 1966 data.

[c] Allocated according to maximum possible binomial variance. For example, allocation to the hiker class was computed as:

$$\frac{55}{288} \times 200 = 38.$$

[d] $\frac{\text{allocated - actual}}{\text{actual}}$

became apparent. Calculations similar to those of Table 3 were made on the basis of final results to show how the final sampling scheme worked (Table 4). The indicated differences between allocated and actual samples are not considered serious since only three are on the negative side.

Attendance Patterns

The estimated attendance at Kellogg Forest for 1967 is 32,024 for recreational visits plus several thousand others in special groups which will be mentioned later.

Table 5 indicates the numbers participating in various recreational activities on the Forest. The heaviest uses of the Forest are by the driving, picnicking, and hiking groups in that order. Motorists are twice as numerous as picnickers. However, when converted to actual time spent on the Forest, the relationship is just about reversed; picnickers participate about twice as long as drivers.

Figure 11 depicts the general yearly cycle of overall use of the Forest. It can be seen that the season of use is from about late April continuing through to about late November. The December-April period receives little use since during most of this time the Forest is blanketed with snow. Very few people enter the area at this time and then only on foot. Some persons hike and others are interested in photography during this period.

TABLE 4.--Allocation re-estimated at end of study.

User Class	Estimated Number in Class	$\sqrt{n}$	Sample Allocated	Actual Sample	Per Cent Difference
Picnickers	7,800	89	54	51	- 5.8
Motorists	15,500	125	76	58	-31
Hikers	4,100	64	39	51	+23
Fishermen	800	29	18	20	+10
Hunters (Deer)	211	15	9	24	+62
Hunters (Small Game)	504	23	14	26	+46
Miscellaneous	3,100	56	34	15	-126
		401	244	245	

TABLE 5.--Distribution of recreational use of Kellogg Forest by use groups according to number of visits and time spent at forest--1967.

	Visits[a]		Time	
	Number	Percent	Hours	Percent
Picnickers	7,781	24.30	19,219	40.5
Motorists	15,562	48.59	10,738	22.7
Hikers	4,077	12.74	7,420	15.6
Fishermen	807	2.52	2,078	4.3
Hunters	715	2.23	1.967	4.2
Miscellaneous	3,081	9.62	6,085	12.7
All users	32,024	100.00	47,506	100.0

[a]An additional 5,940 people visited Kellogg Forest in specialized organized groups.

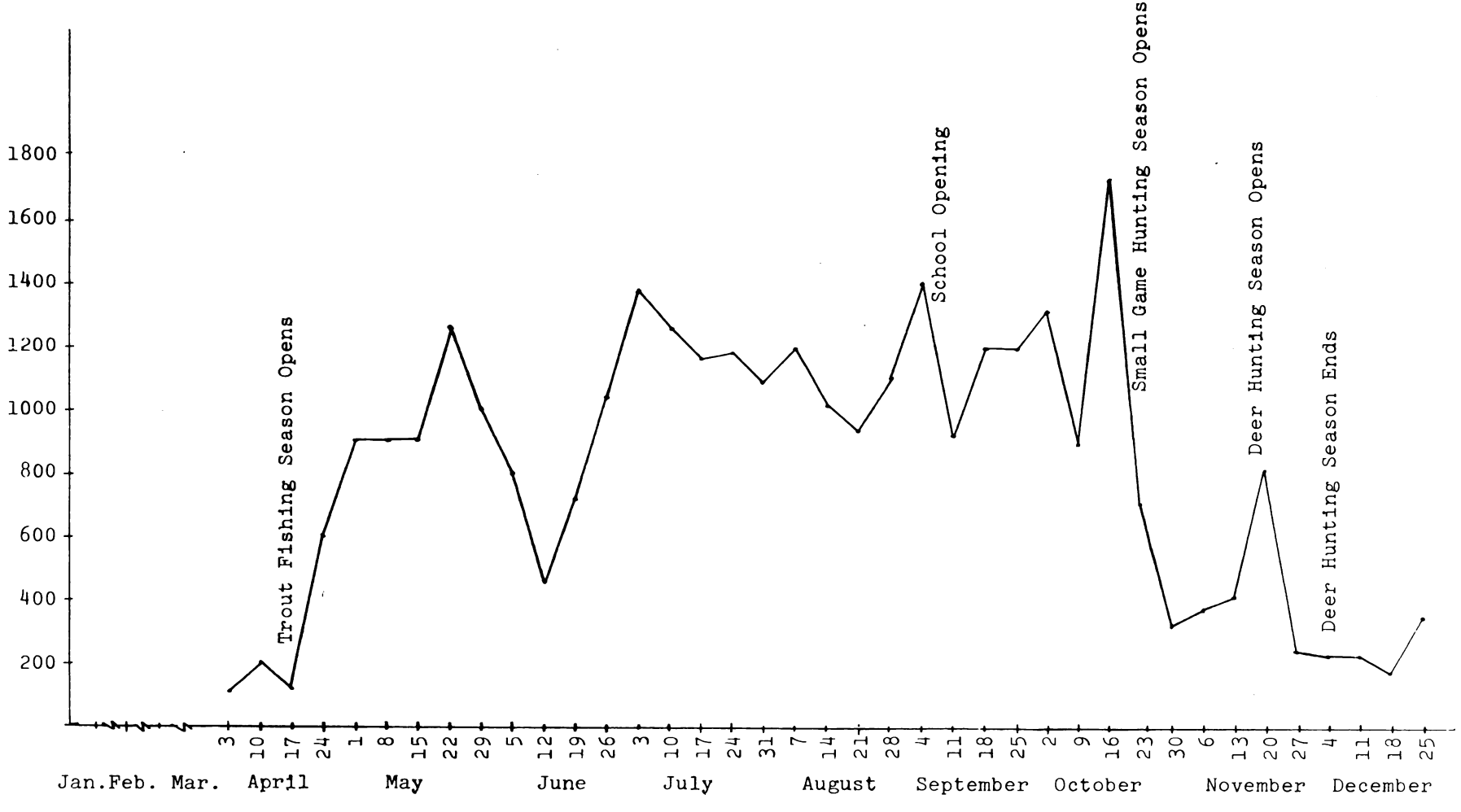


Figure 11.--Weekly totals of visitors to Kellogg Forest, 1967.

Late in April the trout fishing season opens. After the winter at home, fishermen are anxious to "wet a line." The Forest is opened but one night during the year and this is the night before trout season opens. The fishermen will then be able to start as early as possible in the morning. This is probably the biggest single day for fishing during the whole season. The fishing cycle is one in which there is a great concentration during the first week or two of the season followed by a gradual reduction in numbers. The first two weeks account for about 50 per cent of fishing use with 13 per cent in the next three, so that the first thirty-three days or 18 per cent of the 185-day season account for 63 per cent of the fishing pressure.

As the weather becomes consistently more enjoyable, the weekends begin to receive more visitor use. After the winter, many persons are anxious to take advantage of good weather to get outside again. A few mushroom hunters visit the Forest early. People begin to drive through as soon as spring begins in the Forest.

Picnicking then becomes prominent with some rather heavy use during the warm days, especially weekends, of spring. Again, there appears to be a concentration early in the season with a gradual lessening as the summer progresses. This is not nearly as pronounced as the fishing cycle.

The summer period receives rather constant, consistent use from picnickers and motorists. Hikers may visit the Forest in the spring, but usually do not continue long into the summer because the mosquitoes and deer flies make it uncomfortable along with heat and humidity. As the fall approaches, insects decline and temperatures become cooler, and the hikers again appear. They are concentrated shortly after schools reopen for fall. Many schools in the area require leaf collections for science or biology classes and Kellogg Forest is a good place to collect them. Many people hike as well as drive in search of leaves for their collections. Parents may be seen climbing precariously to collect a leaf from a "rare" tree while the child sits in the car waiting. After this initial assault, hiking and driving begin to decline except for days featuring beautiful weather. The busiest week of the year followed an all-week rain that ended with beautiful clear fall days for Saturday and Sunday. It was as if it were the last chance to get out for the winter or just a chance to get out after being "cooped up all week." Several persons may be found collecting pine cones beginning in September and continuing until late November.

The hunters are the prominent group at the end of the year. They behave much like the fishermen by concentrating on the first few days and then tapering off as the season moves on. There are two high points

corresponding to the opening of small game and deer seasons. The small game season continues through February, but few hunters participate during this period.

In addition to the yearly cycles of visitation to the Forest, pronounced weekly cycles of visits are also evident. Table 6 depicts the usage for weekdays, Saturdays, and Sundays.

It may be seen from Table 6 that 40 to 50 per cent of visitor use is on Sunday; 16 to 23 per cent on Saturdays, and 30 to 44 per cent during the week. The most notable change during the season is the drop from 44 per cent to 30 per cent on weekdays from pre- to post-Labor Day--the dividing date between vacation and school attendance.

There is some cyclical nature to the daily use also. Weekdays have very little use until noon when a few persons arrive for picnics. Then there is a lull until 5 or 6 p.m. when more persons come to picnic and drive through until closing time at dark. The weekend use is somewhat different in that people arrive a little earlier and continue on until dark with more coming at about 5 to 6 p.m.

Fishermen pursue their sport very early and very late in the day, with few during mid-day. Hunters also concentrate their use early in the day, but not as early as the fishermen.

TABLE 6.--Weekly pattern of visitor attendance as evidenced by car counter crossings at Kellogg Forest, 1967.

Period	Weekdays		Saturdays		Sundays	
	Visits	Per Cent	Visits	Per Cent	Visits	Per Cent
June 26 to Labor Day	1,320	44	484	16	1,196	40
October 5 to October 20	473	29	378	23	761	47
October 21 to December 31	410	31	299	22	605	46
Full season	2,203	37	1,161	20	2,562	43

Success of sportsmen at the Forest cannot be considered good the past few years. For fishermen, Figure 12 shows that success in past years has dropped from a high in 1964. The reason for this low success ratio is a result of the Michigan Conservation Department's policy change and the subsequent stocking with only fingerling trout since 1965. The success ratio dropped sharply initially to a very poor catch of 369 trout in 1966. As the fishing success dropped so did the numbers of fishermen. A "marked" improvement is shown in 1967 when 807 fishermen landed 821 trout--an indication that Augusta Creek is returning to its former quality as a trout stream as the fingerlings attain legal size. Several fishermen said that these stocked fingerlings are better fishing challenges than the planted "keepers."

The success of hunters is not good either. Table 7 shows number of hunter visits as well as rabbit kill for the period from 1964-1965 to 1967-1968 seasons. A striking relationship may be seen between number of deer hunters and hunters actually seeing deer. Both have tended to drop in recent years. After a successful deer season in 1964-1965 when sixteen deer were bagged, (this includes does), the success rate has been becoming poorer, so that in each of the past two hunting seasons, only one deer was bagged.

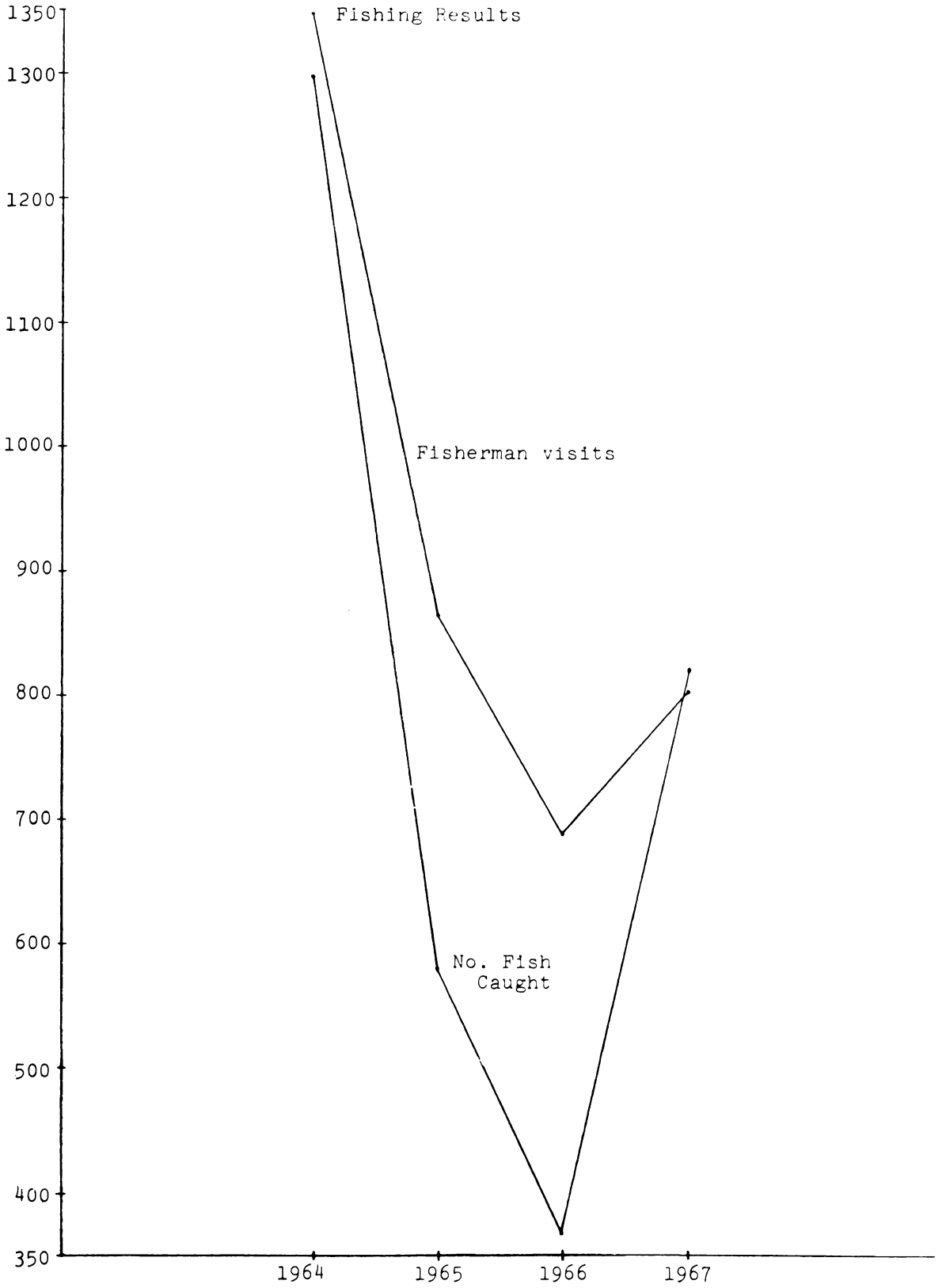


Figure 12.--Fishermen visits and number of fish caught at Kellogg Forest, 1964-1967.

TABLE 7.--Game taken by species and number of hunter visits at Kellogg Forest for 1964-1968 seasons.

Item	1964-65	1965-66	1966-67	1967-68
	Number of animals taken			
Rabbits	72	96	87	72
Fox Squirrels	20	34	24	14
Red Squirrels	6	1	4	--
Partridge	4	19	2	15
Pheasants	1	1	2	--
Woodcock	1	13	--	1
Ducks	--	--	3	--
Muskrats	14	20	20	--
Racoon	6	3	9	--
Mink	2	2	--	--
Fox	--	--	--	1
Deer (with bow)	1	--	--	--
Deer (with gun)	16	6	1	1
	Number of hunter visits			
All small game	536	543	660	504
Deer (bow)	111	139	30	21
Deer (gun)	517	325	192	190
Total Hunters	1,164	1,007	882	715

Small game has seen some fluctuations, but none so obvious as the deer and fishing success ratios show. Table 7 is a summary of hunting statistics for the past four years. Though there is a wide range of game bagged, the total bag is not large for any species. During the past four years a decrease in the number of hunter visits has occurred which is likely to be a result of the lowering success ratio.

Table 8 is a summary of the 1967-1968 hunting season and serves to indicate the group makeup and time spent hunting. Hunter groups average about 1.7 persons and they hunt for about two and one-half hours.

Purpose of Other Visits to Kellogg Forest

Each interviewee was asked if he visited the Forest at other times to participate in activities which he would not be engaging in on this visit. The results are shown in Table 9.

The point should be kept in mind that visitors were also asked to mention all the activities they participated in while on this visit. This may be why so few of the picnickers answered "yes," since a great number participated in two or more activities while visiting at the time of the interview. On the other hand, motorists, for example, might just be motoring on this occasion, but on other occasions they might hike or picnic.

TABLE 8.--Characteristics of hunters and hunter groups by game animal hunted--Kellogg Forest, 1967.

	Small Game	Deer	
		Gun Hunting	Bow Hunting
Number of hunter groups	280	122	17
Total number of hunters	504	190	21
Hunters per group	1.80	1.56	1.23
Hours hunted	1,172	481	43.5
Hours hunted per hunter	2.32	2.53	2.07

TABLE 9.--Answers to question: Do you sometimes visit Kellogg Forest for purposes different from today's trip?

	Yes	No
	Per Cent	
Picnickers	30	70
Motorists	52	48
Hikers	57	43
Fishermen	65	35
Hunters (Deer)	67	33
Hunters (Small Game)	50	50
Miscellaneous	84	26
All users	54	46

It is obvious that persons visiting Kellogg Forest do so for a number of different reasons at different times. A chi-square test shows a significant result at the .025 level, and the apparent significant groups are picnickers and miscellaneous (Appendix Table C-1).

The picnic group participates in several activities on a given visit, and so they are not likely to come for many other activities, especially since hiking and driving often are included in the picnic package. On the other hand, persons in the miscellaneous class would seem to visit on the given day for a single special purpose such as cone or leaf collecting, which probably precludes the other possibilities.

An important conclusion is that persons come to Kellogg Forest at other times for other reasons in 54 per cent of the cases. It is not an area for just one activity, but a place to return to and do different things at different times.

Other Sources of Recreation in Kellogg Forest Region

Use of a recreation facility means little if it is the only source of recreation within easy access of persons using it. As response to a question to determine other sources of recreation within easy access, available to Kellogg Forest visitors, about thirty other locations were indicated. Some of these were indicated

on only a few occasions. Table 10 is a listing of those mentioned more than ten times by the interviewees.

Many areas were so indefinite that they could not be tallied. For example, a fisherman might say he fishes all the streams in Kalamazoo County, or a hunter hunts on farms around Battle Creek, or a picnicker stops at roadside parks. Nevertheless, Table 10 does give a notion of some of the more important recreational alternatives within the range of users of Kellogg Forest. The important point here is that people do frequent Kellogg Forest even though there are many alternatives for them in the same general area.

Kellogg Bird Sanctuary was mentioned often by all groups but hunters. Yankee Springs had a good representation by all but fishermen.

Visitor Party Characteristics

Time spent at Kellogg Forest by parties is dependent upon activity as indicated in Table 11.

The motorist group is the most significant, being heavily weighted to the short time period. However, even disregarding the motorist contribution to chi-square, there is still significance indicated (.005) with hunters and hikers being most significant by their staying longer than expected (Appendix Table C-2). This general point has already been noted in Table 5 which compared percentage of visits with per cent of time spent.

TABLE 10.--Areas near Kellogg Forest visited for recreational activities by ten or more respondents, 1967.

Recreational Facility	Number of Times Indicated
Kellogg Bird Sanctuary	78
Yankee Springs Recreation Area	44
Gull Lake Township Parks	31
Binder Park (Battle Creek)	23
Fort Custer Recreation Area	18
Milham Park (Kalamazoo)	16
Kalamazoo Nature Center	15
Goguac Lake (Willard Park) Battle Creek	15
Allegan State Forest	14

TABLE 11.--Percentages of various users staying for designated time periods--Kellogg Forest, 1967.

User Group	1 Hour	1-2.9	1-4.9	5+[b]
Picnickers	6[a]	60	25	9
Motorists	81[a]	19[a]	0[a]	0
Hikers	12[a]	72[a]	14	2
Fishermen	10	55	20	15
Hunters (Deer)	12	42	35	12
Hunters (Small Game)	12	42	42	4
Miscellaneous	20	53	27[a]	20
All users	27	49	19	5

[a]Contribute 5 or more to chi-square.

[b]Not included in chi-square calculations.

Statistics for interviewees do not represent the population of visitors. A far more realistic assessment is found in the age-sex data of the party, and not merely of the head of party. For example, 88 per cent of the interviewees were male and 12 per cent female, but visitor parties show a ratio of 52 per cent male--48 per cent female.

Party data (Table 12) show most obviously that for Kellogg Forest, fishing and hunting are decidedly male activities; picnicking, motoring, and hiking are very slightly weighted toward women; and the miscellaneous class is heavily weighted to women.

Table 12 indicates the 1-12 and 22-45 ages are the most frequent, accounting for 34 per cent and 38 per cent respectively for a total of 72 per cent of all visitors. The 12 per cent visits in the 13-21 year class is most nearly what is expected. Perhaps the combinations are explained partially by the fact that most visitors are families with young children. Thus the adults will be in the 22-45 year age bracket most commonly, and the children usually between 1-12 years of age.

Kellogg Forest is a family recreation site. Overall, 50.5 per cent of parties (single persons make up a party when interviewed) were single-family parties and 34.8 per cent were two-family parties so that 85.3 per cent were one- or two-family parties (Table 13).

TABLE 12.--Age and sex of visitors to Kellogg Forest by user group, 1967.

User Group	Age Classes					
	1-12	13-21	22-45	46-65	65+	All Ages
	Percentage of user group					
Picnickers						
Male	21	3	16	5	2	47
Female	17	7	18	8	3	53
Motorists						
Male	15	3	16	9	3	46
Female	16	5	19	9	5	54
Hikers						
Male	21	4	20	2	0.5	48
Female	23	8	19	2	0.5	52
Fishermen						
Male	16	10	45	16	0	87
Female	3	0	10	0	0	13
Hunters (Deer)						
Male	6	27	56	11	0	100
Female	0	0	0	0	0	0
Hunters (Small Game)						
Male	12	33	44	10	0	99
Female	0	0	1	0	0	1
Miscellaneous						
Male	14	0	17	5	0	36
Female	15	11	28	7	0	64
All users						
Male	18	6	21	6	1	52
Female	16	6	17	6	3	48

TABLE 13.--Numbers of families per user group at Kellogg Forest, 1967.

User Group	Number of Families									
	1	2	3	4	5	6	8	9	10	Total
	Per Cent									
Picnickers	41	32	17	2	2	--	2	--	4	100
Motorists	38	46	12	2	--	2	--	--	--	100
Hikers	55	37	4	--	2	--	--	2	--	100
Fishermen	100	--	--	--	--	--	--	--	--	100
Hunters (Deer)	76	14	10	--	--	--	--	--	--	100
Hunters (Small Game)	32	50	18	--	--	--	--	--	--	100
Miscellaneous	43	43	7	--	7	--	--	--	--	100
All users	50.5	34.8	10.5	.9	1.2	.4	.4	.4	.9	100

In the two-family class, as well as others with more than two families, are such parties as two unmarried persons, a family with a neighbor's child, grandparents with grandchildren, as well as groups of unrelated adults. It was observed that many grandparents bring their grandchildren to see the Forest.

In addition to the uses of the Forest described to this point, many groups visit the Forest as an organized effort (Table 14). Some have arranged to have a tour of the Forest guided by the Resident Forester. In 1967, a total of 1,905 persons in fifty-seven groups were escorted in this way. Nearly all (approximately 95 per cent) include a picnic lunch as part of the trip.

Other groups come only for a picnic, often as a side trip from the Bird Sanctuary where picnicking is not permitted. The addition of these groups swells the number to 126 and a total of 5,040 people. These are groups which check in at the office to be sure they are permitted to visit the area. Other groups occasionally stop in without informing the Resident Forester. There are also the groups brought by Reverend Elmer Deal from the Gull Lake Christian Youth Camp on Sundays. Each week during the summer he makes two bus trips with forty to fifty boys and girls, separately, to run and hike from the parking area to the McCrary Memorial at which a brief hymn and prayer session is held before they return

TABLE 14.--Organized groups visiting Kellogg Forest, 1967.

Group	No. of Groups	No. of People
Groups given guided tour		
Elementary-High School	41	1,435
College	10	350
Other	6	120
	57	1,905
Groups eating at picnic area but not given guided tour	69	3,135
All groups visiting Kellogg Forest	126	5,040

for their week at camp. He brought each group on the Sunday of their arrival at camp, and in this way seemingly set the stage for the week's training. In the course of the summer, he brought about 900 youngsters ages 7-14 to Kellogg Forest for about one-half hour each.

Due to the large numbers of visitors in a bus, and the fact that it records on the counter as only one vehicle, most of these various groups of visitors are not accounted for accurately in the traffic counter method. Thus, at least another 5,940 persons probably visit Kellogg Forest beyond the estimated 32,024.

The size of the average party interviewed was 3.75 persons. Table 15 indicates the average party size of the various user groups. These data substantiate earlier observations. Picnicking, motoring, and hiking are the user groups with large party size. The data also imply that these activities are primarily family activities whereas hunting and fishing are basically individual activities.

Although the average party size interviewed was 3.75, a more systematic sampling of numbers of persons per car entering indicates an average car to have 4.0 passengers. This number was used in determining total attendance from traffic counter crossing information.

TABLE 15.--Average party size of user groups at Kellogg Forest, 1967.

User Group	Average Party Size
Picnickers	5.43
Motorists	4.10
Hikers	4.50
Fishermen	1.55
Hunters (Deer)	1.42
Hunters (Small Game)	1.96
Miscellaneous	3.87
All users	3.75

A comparison of Kellogg Forest visitor data was made with the 1960 Census Data for Calhoun and Kalamazoo Counties for sex and age (Table 16). It proved to be very highly significant (.001). Only three of the ten cells provided minor contributions to the chi-square. All others were large enough that they could individually prove highly significant. These seven cells are indicated in Table 16 by a footnote. This type of footnote occurs in several of the tables that follow. Such a designation is helpful in indicating the specific categories in which each sample group is most likely to be different from the other groups and therefore leads to a better understanding of the data. In Table 16 the value 50 is used, but in most other tables the cells contributing two or more to the chi-square value are indicated.

Table 16 shows most obviously that the age groups 44-65 and 65+ are not represented in this sample nearly as often as would be expected from the population data. The visitor population is weighted toward the younger age groups except that the 13-20 group was represented about as much as expected as were women 20-44 years old. A conclusion is that Kellogg Forest has a decidedly younger group of visitors than would be expected from the census data for the counties of origin.

TABLE 16.--Number of visitors expected[a] and estimates based on sampling by age and sex[b]--Kellogg Forest, 1967.

Age Years	Males		Females	
	Observed	Expected[a]	Observed	Expected[a]
1-12	5,764	4,643[c]	5,124	4,579[c]
13-20	1,921	1,953	1,921	2,081
20-44	6,725	5,220[c]	5,444	5,348
44-65	1,921	2,946[c]	1,921	3,010[c]
65+	320	1,217[c]	960	1,505[c]

[a]Based on Table 27 of U. S. Census of Population, "Michigan General Population Characteristics," U. S. Bureau of Census PC (1)-24B, 1960. This is the number expected if the sample had been distributed precisely the same as the Kalamazoo and Calhoun County populations.

[b]Chi-square 2,390, 4 degrees of freedom, .001 significance level.

[c]Cell contributes more than 50 to chi-square.

Head of Party Characteristics

Now that party composition has been discussed, let us turn to a consideration of the major portion of the questionnaire--specifically the party head. Characteristics are applicable only to the head of party, although in many cases the head chose to confer with other party members on some questions, particularly those dealing with attitudes.

Age

The first consideration for party head characteristics is age. Table 17 shows the several "average" ages of the party heads. The most significant fact is that the hunters are a much younger group than other users of Kellogg Forest. The oldest groups are picnickers and motorists whose mean ages are 41, whereas hunters are 31.9 and the overall mean of all users is 37.8.

Sex

The sex of the party head, as might be expected, is usually male. Among picnickers, 85 per cent of the heads of party are male; motorists, 79 per cent; hikers, 90 per cent; fishermen, 100 per cent; hunters, 100 per cent; and miscellaneous, 73 per cent. Overall, 88 per cent of the heads of party are male. Since most visits to Kellogg Forest are family groups, it is not surprising that party heads are males.

TABLE 17.--Age of party heads visiting Kellogg Forest, 1967.

	Median	Range	Mean	Mode
Picnickers	40	18-67	41.1	40
Motorists	40	18-67	41.1	35
Hikers	37	17-67	36.4	40
Fishermen	39	15-50	36.8	35-40-48[a]
Hunters	29	17-64	31.9	28-38[b]
Miscellaneous	42	28-60	40.9	42
All users		15-67	37.8	

[a]Two each.

[b]Five each.

Occupation

Occupations of visitors, by group, are shown in Table 18. Only businessmen-professionals, and wage earners were selected for further analysis since the other occupation classes were represented by too few individuals.

A chi-square test was used to determine independence between occupation and participation in various activities. The resulting contingency table (Appendix Table C-3) shows significance at the .01 or 99 per cent level, indicating that the hypothesis of independence be rejected, or more simply stated, that activity is dependent on occupation.

Although little can be deduced from this particular statistical treatment regarding specific effects of individual groups, it is possible as discussed in relation to Table 16, to point out which cells contribute most to the chi-square and thus indicate generally where the differences are. Fishing and deer hunting are the largest contributors to the chi-square in Table 18. The implication is that fishermen tend to be professional-businessmen and hunters tend to be wage earners.

Income

The percentage responses according to income classes are shown in Table 19. A chi-square test, or contingency table using the same data with hunters

TABLE 18.--Heads of parties visiting Kellogg Forest classified by occupation, 1967.

User Groups	Businessmen or Professionals	Wage Earner	Housewife or Widow	Student	Unemployed	Retired	Other	All Occupations
	Per cent of user group							
Picnickers	32	49	2	6	2	7	2	100
Motorists	33	31	11	12	0	12	2	100
Hikers	35	41	4	8	0	8	4	100
Fishermen	60[a]	30[a]	0	5	0	0	5	100
Hunters (Deer)	8[a]	79[a]	0	13	0	0	0	100
Hunters (Small Game)	19	58	0	19	0	0	4	100
Miscellaneous	27	53	20	0	0	0	0	100
All users	31	46	5	9	1	6	2	100

[a]Cell contributes 2.0 or more to chi-square value.

TABLE 19.--Percentages of heads of parties of various user groups into designated family income categories--Kellogg Forest, 1967.

User Groups	Income Level		
	Below $10,000	$10,000-$15,000	Over $15,000
	Per cent of user group		
Picnickers	60	19	21[a]
Motorists	58	37	5
Hikers	47	37	16
Fishermen	35[a]	50[a]	15
Hunters (Deer)	83[a]	17[a]	0[a]
Hunters (Small Game)	85[a]	11[a]	4[a]
Miscellaneous	67	27	7
All users	60	29	11

[a]Cell contributes more than 2 to chi-square.

grouped together, shows a significant degree of activity-dependency based on income.

This contingency table, Appendix Table C-4, demonstrates the .005 significance. The major deductions from it are:

1. Picnicker groups tend to have more than a proportional share of persons with incomes of $15,000+.
2. Fishermen tend to be disproportionately highly composed of persons in the $10,000-$15,000 income category.
3. Hunters are disproportionately low-income visitors.

Although this analysis was significant, there was some question on directions of deviations from expected values in some of the other income categories. In an attempt to clarify these, another contingency table was used (Appendix Table C-5) based on only "greater than" and "less than" $10,000 income. This also produced significant results. Most significant again were the tendencies for hunters to be in the low income group and the fishermen to be in the high income group. Another major contributor to the chi-square statistic was the hiker group which tended to be from the higher income bracket. Picnickers, motorists, and miscellaneous groups were distributed about as expected in regard to income levels.

Not only are there significant differences between incomes of the various user groups, but there are also significant differences between Kellogg Forest visitors and the Kalamazoo-Calhoun County general population. There is significance at the .005 level indicating that the Kellogg visitors are from a segment of the county populations with higher incomes than the average for those counties (Table 20).

Education

Even though income and occupation are highly significant in determining recreational activity participation rates at Kellogg Forest, no definite relationships are detectable regarding educational level. Percentage distributions are indicated in Table 21.

Although it appears that the hunters represent a lower educational stratum, it is not a very significant difference statistically. Chi-square can be shown significant at only the .1 probability level (Appendix Table C-6). However, it does show that the hunters are the class with lowest educational attainment based on high-school-only education. It is then possible to compare the hunters with other groups in the higher educational level and obtain a significant difference. The picnicker class with the highest educational level is significantly different from the hunters at the .005 level, but with motorists at only the .01 level.

TABLE 20.--Number of sampled persons observed and expected[a] at Kellogg Forest by two-family income categories, 1967.

	< $10,000		> $10,000		Total
	Observed	Expected[a]	Observed	Expected[a]	
Kellogg Forest Visitors	147	203	98	42	245

Note: Chi-square = 90.11, 1 degree of freedom, significance level--.005.

[a]As expected from Calhoun-Kalamazoo County statistics from United States Census Bureau, 1962, Table 86.

TABLE 21.--Percentages of heads of parties of various user groups attaining different educational levels, 1967.

User Groups	Primary	Secondary	Junior College	College Graduate	Advanced
			Per cent of user group		
Picnickers	15	36	17	21	11
Motorists	12	41	14	26	7
Hikers	12	49	8	17	14
Fishermen	5	55	5	20	15
Hunters (Deer)	37	42	17	4	0
Hunters (Small Game)	27	50	4	15	4
Miscellaneous	27	40	0	20	13
All users	17	44	11	19	9

Based on the above, one may conclude that the hunter group is of lower educational attainment level, although not significantly different from all users--(.10 level). Considering ages of the various groups, it is apparent that hunters are the youngest visitor group on the Forest. This may indicate that as persons get older they do not hunt as much. On the other hand, it might indicate that the more educated hunt less. It may also be possible that as they become more educated, and earn higher incomes, they have access to their own or other private hunting areas and therefore have no need to utilize this open-access hunting area.

A significant difference in educational level exists between Kellogg Forest users and the Calhoun and Kalamazoo County populations as listed by the Census Bureau. Appendix Table C-7 indicates a great degree of difference (.005) between the county populations and Kellogg Forest users; the forest visitors are much higher in educational attainment.

It could be said that income and occupation, more than education, determine activity participation by visitors to Kellogg Forest. Most other studies reported education to be high for campers. This report concludes that all visitors to Kellogg are of higher education than the overall population, but there are no strong differences between user groups.

Marital Status

Eighty-two per cent of the persons interviewed were married; 16 per cent were single, and 1 per cent each were divorced and widowed (Table 22). It was most difficult asking persons if they were divorced. In this case, there may actually be greater numbers within the single class who should be in one of the others. Those who did indicate they were divorced, did so willingly so the results are assumed to be accurate.

Race

Most Forest visitors were white. Only four Negroes--one motorist, two fishermen, and one hunter--were interviewed, and this was a high proportion of all those visiting. A few whites commented that limited Negro use was a great asset of the Forest in general. This attitude was not mentioned often, nor was it solicited. The county populations are approximately 8 per cent Negro, whereas the Kellogg visitors are only about 1 per cent Negro.

Place of Residence

In determining location and distance of residence from Kellogg Forest, it was found that 21 per cent of the visitors live within 10 miles, and 69 per cent live between 11 and 25 miles from Kellogg. Overall, 90 per cent live within 25 miles (Table 23). About one out of every ten persons from the 10 mile

TABLE 22.--Marital status of heads of parties visiting Kellogg Forest, 1967.

User Groups	Married	Single	Divorced	Widowed
	Per cent of user group			
Picnickers	83	13	2	2
Motorists	81	19	0	0
Hikers	78	20	0	2
Fishermen	95	5	0	0
Hunters (Deer)	79	17	4	0
Hunters (Small Game)	81	19	0	0
Miscellaneous	93	7	0	0
All users	82	16	1	1

zone visited Kellogg Forest, and about one out of sixteen from the 11-25 zone visited Kellogg Forest during 1967.

A chi-square test was employed to determine if differences occurred between user groups in participation rates. This test, the results of which are given in Appendix Table C-8, indicates that picnickers tend to travel longer distances than the "average." Motorists appear to travel both longer and shorter distances more often than would be expected and the mid-distance less than expected. Hikers tend to travel the mid-distance (11-25) more than expected, and the extremes less frequently. Hunters as a group rarely travel more than 25 miles to reach Kellogg Forest.

A tabulation of interviewee origins shows that as much as 85 per cent of the use is from Calhoun and Kalamazoo Counties, with the remaining 15 per cent coming from many other counties, no one of which accounts for as much as 3 per cent. Only 1.6 per cent come from Barry County even though it is within four miles of the Forest. By far the heaviest use comes from the urbanized areas of Battle Creek and Kalamazoo.

A further analysis discloses that 51 per cent of all visitors are from Battle Creek, and 26 per cent from Kalamazoo. The remaining 23 per cent are from all other areas. This difference between Battle Creek and Kalamazoo

visitor origins is difficult to explain. Kalamazoo has a city and township population of 102,000 while Battle Creek has a city-township population of only 63,000. Battle Creek is perhaps 2-4 miles closer, but this is not an entirely satisfactory explanation since most persons did not believe another 20 miles would affect their attendance at Kellogg Forest.

A review of the same data utilized in Table 23, separated by city between Kalamazoo and Battle Creek shows no significant differences apparent between user groups, even though it indicates that Kalamazoo residents are somewhat more willing to drive the distance to Kellogg Forest. Perhaps this may be explained by the thought that since they had to drive a little farther they were more committed and hence, more willing to drive farther if necessary. A sociologist might liken it to cognitive dissonance.

Another possible explanation for the apparent discrepancy from what might be expected is the 400-acre Kalamazoo Nature Center which, although more formal than Kellogg Forest, may attract a large portion of the Kalamazoo residents interested in this sort of area. Many Kalamazoo residents indicated the Nature Center as a place they go whereas none from Battle Creek indicated a similar option, even though Battle Creek has the beautifully landscaped Irving Park, and the 205-acre

TABLE 23.--Distance traveled by various user groups to reach Kellogg Forest, 1967.

User Group	Miles					
	Less Than 10	11-25	26-50[a]	51-75[a]	More Than 75[a]	All Distances
	Per cent of user group					
Picnickers	11[b]	72	6[b]	7	4	100
Motorists	29[b]	50[b]	9[b]	5	7	100
Hikers	12	86[b]	0[b]	0	2	100
Fishermen	25	70	5	0	0	100
Hunters (Deer)[c]	33	67	0[b]	0	0	100
Hunters (Small Game)[c]	19	77	4[b]	0	0	100
Miscellaneous	27	67	0	7	0	100
All users	21	69	4	3	3	100

[a]Chi-square test uses a 26+ category only.

[b]Cell contributes more than 1.9 to chi-square.

[c]For chi-square analysis both hunter groups were combined as one.

Leila Arboretum, and the Museum of Natural History. These "nature centers" in both cities are more restrictive than Kellogg Forest, according to visitors who prefer the less formal Kellogg Forest.

Consider also the urban-rural classification with an intermediate suburban class. Unfortunately, this classification scheme is fraught with definitional problems. On the assumption that the individual's assessment would be a realistic one, each interviewee was asked which of the three categories best defined his residence. Comparison of the results (Table 24) with census data indicated good correspondence.

The results indicate that most persons (83 per cent) live in situations more or less urban, and that only 17 per cent consider their place of residence as rural. Some of these rural people were from farms proper, and some were from villages of small population density. Although a contingency table is not significant, the hiker segment appears to have a lower percentage in the rural class as compared to the others. This particular cell contributes a substantial part of what small chi-square value there is. It cannot be said, however, that there is any significant difference.

Expenditures for Recreation Visits

Estimated expenditures for travel to Kellogg Forest are shown in Table 25, based on a cost of six cents per

TABLE 24.--Place of residence of various user groups at Kellogg Forest, 1967.

User Group	Urban	Suburban	Rural
	Per cent of user group		
Picnickers	55	26	19
Motorists	45	34	21
Hikers	55	37	8
Fishermen	55	30	15
Hunters (Deer)	33	29	38
Hunters (Small Game)	46	46	8
Miscellaneous	53	33	13
All users	49	34	17

TABLE 25.--Travel costs for visitors to Kellogg Forest, 1967.

Distance Class	Average Mileage	Per Cent in Class	Number in Class	Cost per Trip	Total Cost
10 mi.	5	21	1,680	$ .30	$ 504.00
11-25	15	69	5,515	.90	4,963.50
26-50	35	4	320	2.10	672.00
51-75	60	3	240	3.60	864.00
75+	80	3	240	4.80	1,152.00
		100			$8,155.50

mile. Since about one-third of the visitors regard their visit as a part of some other trip and the whole cost would therefore not apply to this part, the estimation was kept on the conservative side. However, estimated travel expenditure is about the only possible way to attach any monetary value to the Forest for recreational use, except for the expenses for labor used in maintaining the Forest as listed in Table 1. If $3 is the average man-hour wage, there is a total of $2,616 devoted to recreation through the management of the Forest. Facilities have not been replaced or improved recently. Lemmien and Geis (1957) reported that picnic area equipment could be depreciated at $45 per year at that time. The depreciation value would be insignificant today.

In order to give an approximate overall value to Kellogg Forest for recreational use, the above two types of expenditures may be combined. On a per person basis, 33.7 cents is spent for each visit; 25.5 cents for travel and 8.2 cents for Forest maintenance. On a per car basis $1.345 is spent for each visit; $1.018 for travel and 32.7 cents for Forest maintenance. A total of $10,771.50 may be attributed to recreational use of Kellogg Forest.

CHAPTER VI

USER SATISFACTIONS

Interviewees were asked to respond to a series of proposed satisfactions that might be sought, and to rank, if possible, the three or four most important ones. The results were converted to an index[1] and ranked. The total of the indexes for a group of users is 100, since the last step of the index calculation was to convert it to a percentage.

Picnickers

The rankings attributed to the satisfactions gained by the picnickers are shown in Table 26. The attraction for woodland scenery is the strongest motivating force among picnickers. Close behind is the satisfaction of just relaxing. To let children play and to get away from crowds are next and of almost equal importance. Except for the attraction to woodland scenery, items

---

[1]This index is derived in the following manner: A value of 4 is attached to a first choice, 3 to a second, 2 to a third, and 1 to a fourth. These values were then totaled for each of the satisfactions for the user group being considered. These were then totaled for the entire user group and this total was divided into the individual satisfaction totals to yield the "index value" which is also a percentage figure.

TABLE 26.--Index values and rankings of satisfactions by picnickers at Kellogg Forest, 1967.

Rank	Index Value	Satisfactions
1	20.2	To observe woodland scenery
2	17.0	To relax
3	13.3	To give children chance to play in woods
4	12.0	Get away from crowds of people
5	9.2	Spend more time with family
6	7.3	Get together with friends or relatives
7	4.9	To observe wildlife
8	4.5	To study nature
9	4.3	Find change of scene
10	2.6	Cool off--get away from heat of home
11	2.6	Other
12	1.9	Commune with nature

specifically relating to nature rated low for picnickers.

Motorists

The rankings attributed to the satisfactions gained by the motorist group are shown in Table 27. The motorist group ranks woodland scenery very high. This satisfaction is twice as high, relatively, as the second choice, which is to relax. The next three choices are related to the attraction of nature to Kellogg Forest. Not until the sixth choice is a satisfaction reached which is concerned with people rather than nature. For the motorist group, nature was a very important part of their enjoyment of Kellogg Forest and contributed to their reason for coming.

Hikers

Hikers' rankings of satisfactions are presented in Table 28. As with previous groups, hikers rate woodland scenery high, again almost twice as high as the second-ranked choice which is to relax. Hikers, along with picnickers, rated third the satisfaction of allowing children to play in the woods. Then the purpose of teaching the children about the outdoors may be seen--to observe wildlife and to study nature were almost equally important.

Hikers rated getting together with friends or relatives last. They also rank highest in numbers of

TABLE 27.--Index values and rankings of satisfactions by motorists at Kellogg Forest, 1967.

Rank	Index Value	Satisfactions
1	34.6	Observe woodland scenery
2	15.7	Relax
3	7.8	Observe wildlife
4	7.0	Study nature
5	6.8	Find change of scene
6	5.4	Get together with friends or relatives
7	5.2	Get away from crowds of people
8	5.0	Spend more time with family
9	4.8	Give children chance to play in woods
10	3.0	Commune with nature
11	3.0	Other
12	2.0	Cool off--get away from heat of home

TABLE 28.--Index values and rankings of satisfactions by hikers at Kellogg Forest, 1967.

Rank	Index Value	Satisfactions
1	29.3	Observe woodland scenery
2	16.0	Relax
3	13.0	Give children chance to play in woods
4	9.5	Observe wildlife
5	8.8	Study nature
6	6.5	Spend more time with family
7	5.8	Get away from crowds
8	4.0	Commune with nature
9	3.3	Find change of scene
10	1.6	Cool off--get away from heat of home
11	1.6	Other
12	.5	Get together with friends or relatives

one- and two-family parties cited earlier (Table 13). They apparently prefer to operate almost entirely as family units.

Fishermen, Hunters, and Miscellaneous Users

The activities of fishermen, hunters, and miscellaneous groups are more restricted since these groups are actually in quest of some specific goal. The results for fishermen are listed in Table 29.

Disregarding the fact that fish are the main quarry, we can see that the strongest first choice of any of the groups--to relax-- rates three times more weight than the second choice which is to get away from crowds of people. Except for the few fishermen accompanied by children, satisfactions for the group are strongly weighted toward quiet, relaxation, and observing nature. None of the fishermen showed any interest in the choices related to getting together with other persons. Their visit seems to be a chance to relax in solitude and observe nature along the stream.

Hunters had considerable difficulty ranking their choices of satisfactions. The two hunter groups responded somewhat differently from each other and are therefore considered separately.

The deer hunter response is indicated in Table 30. Deer hunters view their activity as "just hunting" and

TABLE 29.--Index values and rankings of satisfactions by fishermen at Kellogg Forest, 1967.

Rank	Index Value	Satisfactions
1	39.0	Relax
2	12.3	Get away from crowds of people
3	11.6	Observe woodland scenery
4	10.3	Observe wildlife
5	9.6	Find change of scene
6	6.2	Give children chance to play in woods
7	4.1	Commune with nature
8	2.7	Study nature
9	2.0	Cool off--get away from heat of home
10	2.0	Other
11	0.0	Get together with friends or relatives
12	0.0	Spend more time with family

TABLE 30.--Index values and rankings of satisfactions by deer hunters at Kellogg Forest, 1967.

Rank	Index Value	Satisfactions
1	24.5	Other--primarily to "just hunt"
2	17.5	Relax
3	14.0	To observe wildlife
4	11.9	Observe woodland scenery
5	9.8	Study nature
6	4.9	Cool off--get away from heat of home
7	4.9	Give children chance to play in woods
8	4.9	Get together with friends or relatives
9	3.5	Commune with nature
10	2.1	Spend more time with family
11	1.4	Get away from crowds of people
12	.7	Find change of scene

this is their primary reason for being in the woods. Since this option was not provided for, it was recorded as "other." There may be two reasons why such a general, ambiguous choice should rank so high. First, the tool (the list of choices) was not sufficiently refined to afford a good choice. Secondly, deer hunters may not have so many subtle satisfactions in mind. To them "hunting is hunting" and it is done for its own intrinsic satisfaction. This may well explain why so many responded to the list with the comment "just to hunt."

The second choice of deer hunters--to relax--may well reflect the usual mode of deer hunting, which is to sit perfectly still and wait. The third choice, to observe wildlife, is probably closely related to the first choice; the two choices, in fact, might justifiably be combined. Other groups enjoy seeing wildlife in a different vein from the hunter group, since the hunter's seeing wildlife is a prerequisite to reducing the game to possession.

Opportunities to be with other persons is quite insignificant for the deer hunter whose average party size is even smaller than for the fishermen; the deer hunter at Kellogg Forest is usually a lone hunter.

The results of interviewing the small game hunters are shown in Table 31. Many of the same satisfactions are applicable to small game hunters as well as deer

TABLE 31.--Index values and rankings of satisfactions by small game hunters at Kellogg Forest, 1967.

Rank	Index Value	Satisfactions
1	22.7	Observe woodland scenery
2	20.4	Other--"just to hunt" primarily
3	15.3	Observe wildlife
4	10.8	Relax
5	8.0	Get together with friends or relatives
6	6.8	Get away from crowds of people
7	5.7	Give children chance to play in the woods
8	4.0	Spend more time with family
9	2.3	Study nature
10	1.7	Find change of scene
11	1.7	Commune with nature
12	.6	Cool off--get away from heat of home

hunters, but the ranking is different. Woodland scenery rates first, the second and third choices, to "hunt" and "to observe wildlife" are related since game must be seen to be bagged. Relaxing is the fourth choice, and this lower ranking may reflect the fact that the walking involved in most small game hunting is not quite as relaxing as the less active deer hunting, but nevertheless, is rated quite highly.

A desire for sociability is indicated, but a distaste for crowds of people is of significant importance. Some ranking is given to the desire to give children a chance to play in the woods; this likely means that the hunter allows his son to hunt rather than to play. Spending more time with the family may also imply hunting with a son or relative.

The miscellaneous group of forest users is a sample of fifteen diverse users. The results are quite similar to the overall rankings. Since their responses were so similar to those of all users combined, they are not discussed separately.

All User Groups

An attempt was made to rank satisfactions for all users. In order to do this and avoid unbalanced weighting due to sample size, all classes were weighted so as to represent the same sampling intensity within groups, in this instance 10 per cent. Using the conversion

factors[1] and the same procedure as for the individual groups, a similar ranking was obtained which roughly represents satisfactions of the average visitor. The results are shown in Table 32.

The first ranked satisfaction is definitely observing woodland scenery. This was also reflected in free responses such as "I like the woods," "the pines are tremendous," or "reminds me of the northwoods." Some persons make special trips to bring visitors to "see the woods." Many persons take personal pride in "showing off" Kellogg Forest.

Relaxation is ranked second, attesting to the general value of the forest environment as a relaxing environment or a place to go to reduce tensions. Several persons suggested the term "therapeutic effect" which is even a stronger feeling in this direction.

The remainder of the satisfactions received recognition in a fairly uniform way. There are no standouts except that the last three seem to be very low in priority, except for hunters indicating "other" quite highly.

Perhaps one of the most important observations of these twelve choices may be seen in the accompanying

---

[1]The conversion factor was arrived at by dividing one-tenth of the visitors in a user class by the number of interviews in that class. This factor was then multiplied by the value obtained by adding the points received by a statement as reflected by the weighting from one to four as discussed in footnote 1 on page 98.

TABLE 32.--Index values and rankings of satisfactions as determined for all users of Kellogg Forest, 1967.

Rank	Index Value	Satisfactions
1	29.6	Observe woodland scenery
2	16.7	Relax
3	8.3	Give children 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

composite table (Table 33), which indicates the ranking of index values assigned by user groups to the various satisfactions. If lines were drawn connecting each rank value in Table 33, a maze would appear which could only impress on the reader the fact that the various satisfactions merit different rankings for the various groups. As an example, "to cool off" ranks 12 for all users, but 6-7-8 for deer hunters. "To observe wildlife" rates from 7 for picnickers to 3 for motorists and both hunter groups. "Getting together with friends" ranges in rank from 12 for hikers to 5 for small game hunters. And so it goes. It is obvious that the forest yields different satisfactions to different persons, and what may be important for one person may not be for someone else.

An interesting comparison was made with Etzkorn's (1965) conclusions about public campground visitors in California. The California campers display "value syndromes" which may be ranked by relative dominance as: (1) rest and relaxation; (2) meeting congenial people; and (3) outdoor life. In contrast to the California campers, the responses of Kellogg Forest visitors, when converted to a similar "value syndrome," are ranked by relative dominance as: (1) outdoor life; (2) rest and relaxation; and (3) meeting congenial people. The Kellogg Forest visitors place much more emphasis on outdoor life, or nature, and much less on meeting congenial people than do the California campers reported by Etzkorn (1965).

TABLE 33.--Rank of index values attached to satisfactions by user groups.

Satisfaction[a]	Picnickers	Motorists	Hikers	Fisher-men	Deer Hunters	Small Game Hunters	Miscel-laneous	All Users
Observe woodland	1	1	1	3	4	1	1	1
Relax	2	2	2	1	2	4	2	2
Give children chance to play	3	9	3	6	6-7-8	7	5	3
Observe wildlife	7	3	4	4	4	3	3	4
Get away from crowds	4	7	7	2	11	6	7-8	5
Spend time with family	5	8	6	11-12	10	8	9	6
Study nature	8	4	5	8	5	9	3	7
Change of scene	9	5	9	5	12	10-11	6	8
Visit with friends	6	6	12	11-12	6-7-8	5	10	9
Commune with nature	12	10-11	8	7	9	10-11	7-8	10
Other (specify)	10-11	10-11	10-11	9-10	1	2	11-12	11
Cool off	10-11	12	10-11	9-10	6-7-8	12	11-12	12

[a]Satisfactions in this table are stated in condensed form. See Appendix B for questionnaire as presented.

CHAPTER VII

USER ATTITUDES

The open-ended questions were reviewed for those volunteering that nature was an important part of their visit. Table 34 presents the results of this analysis. This analysis indicates that over 30 per cent of those sampled volunteered statements about the significance of natural features of Kellogg Forest. In the Outdoor Recreation Resources Review Commission Study Report Number 20 (Mueller and Gurrin, 1962) such voluntary responses were weighted even more heavily than specifically evoked responses. In the current case they serve to emphasize more fully the importance of the natural environment to visitors of the Forest.

Attitude Toward Fees

The Kellogg Bird Sanctuary recently began charging a gate fee. The feasibility of a similar system at Kellogg Forest may be indicated in the responses to a question regarding the importance of free access. To obtain more realistic answers, the question was interpreted to reflect the person's willingness to pay from

TABLE 34.--Percentage of various user groups who volunteered in open-end questions that nature was an important reason for their visit to Kellogg Forest, 1967.

User Group	Per Cent of Class
Picnickers	32
Motorists	47
Hikers	39
Fishermen	10
Hunters (Deer)	8
Hunters (Small Game)	12
Miscellaneous	33
All users	31

25 cents to 50 cents to enter. The responses indicate that if a fee were charged, visits would be less frequent than they now are (Table 35).

Approximately 50 per cent stated that a fee would not make much difference to them. The motorists, who stay but about 20 minutes to an hour, and return more often than others, indicated they might reduce their visits if a fee was imposed. At the same time, though, they would probably be the least reluctant to pay some fee. Hunters said a fee would be an obstacle, more so than any other group. It should be noted that interviews were normally made as persons left the Forest, and that hunter success is rather low on the Forest. These facts might dispose hunters to be unwilling to pay any proposed fee.

Fishermen appear most willing to pay a fee. Fishermen's attitudes toward a fee most likely reflect that this group is from a rather high-income segment and that fishing success has increased during the past three years.

Table 35 indicates that 19 per cent of the users are unwilling to pay a fee, but on inquiry, many said it was a matter of the principle of charging to enter rather than the actual fee. Several persons engaged the author in lengthy discussions on this point. Judging from these discussions, it appears that they no longer visit the Bird Sanctuary, and that, by and large, local people no longer go there because of the fee.

TABLE 35.--Responses of various groups to question to determine importance of free access in making decision to come to Kellogg Forest, 1967.

User Group	Very Important	Fairly Important	Not Important	Total
		Per cent of user group		
Picnickers	21	28	51	100
Motorists	14	41	45	100
Hikers	18	27	55	100
Fishermen	15	25	60	100
Hunters (Deer)	25	17	58	100
Hunters (Small Game)	23	31	46	100
Miscellaneous	20	40	40	100
All users	19	31	50	100

Several interviewees also indicated that if a fee were charged, there would be some persons who would then think that they had some right to "litter" and "be picked up after."

Importance of Travel Distance

In order to determine how important the distance of Kellogg Forest is from the respondent's residence, each interviewee was asked if he would be willing to travel another fifteen to twenty miles to reach the Forest. A response of "very important" indicated an unwillingness to travel the additional distance; "fairly important" implied a degree of reluctant willingness; and "not important" implied willingness to travel the distance. The results are shown in Table 36.

A chi-square contingency table (Appendix Table C-9) was set up and found to be significant at the .025 level. Although this is not highly significant, it is enough to show some dependence between activity and response to this question. For this analysis, the two hunter classes were combined. The cells contributing more than two to the chi-square are indicated in Table 36. These show that motorists tend to consider distance unimportant, hunters tend to consider it very important, and the miscellaneous group considers it fairly important. To place these results in better perspective, 56 per cent

TABLE 36.--Responses of users to question about importance of travel distance to Kellogg Forest, 1967.

User Group	Very Important	Fairly Important	Not Important	Total
	Per cent of user group			
Picnickers	21	28	51	100
Motorists	7[a]	22	71[a]	100
Hikers	14	31	55	100
Fishermen	20	30	50	100
Hunters (Deer)	25[b]	8[b]	67	100
Hunters (Small Game)	42[b]	16[b]	42	100
Miscellaneous	13	47[a]	40	100
All users	18	26	56	100

[a]Contribute more than 2 to chi-square.

[b]Contribute more than 2 to chi-square when both hunter groups are combined.

of the visitors seem willing to drive another fifteen to twenty miles to reach Kellogg Forest and only 18 per cent would be unwilling to travel the extra distance. Responses of visitors from Kalamazoo and Battle Creek were separated and tested for differences, but they were not significant.

Exclusiveness of Visits to Kellogg Forest

Table 37 indicates the responses to the question: "Was Kellogg Forest the only destination of this trip?" A chi-square contingency test indicates slightly significant (.05) differences in the user groups with respect to their responses (Appendix Table C-10). Most of the differences are between the motorist and hiker groups. Motorists apparently stop in while on some other trip much more than any other group. It has been shown that their visit time is usually shorter than that of other groups in 52 per cent of the cases. Thus, their visits cannot be said to be always or almost always only a part of another trip.

For hikers, on the other hand, the Forest is their only destination more often than for any other group. The same may be said of the miscellaneous group. Kellogg Forest is the sole destination in 66 per cent of all visits. Kellogg Forest is significant enough in its own right to warrant a trip for this single reason.

TABLE 37.--Answers to question: Is this visit to Kellogg Forest part of some other trip today?, 1967.

User Group	Yes	No
	Per cent of user group	
Picnickers	34	66
Motorists	52[a]	48
Hikers	22[a]	78
Fishermen	25	75
Hunters (Deer)	38	62
Hunters (Small Game)	31	69
Miscellaneous	20	80
All users	34	66

[a]Cell contributes more than 2.0 to chi-square.

Source of Knowledge About Kellogg Forest

Table 38 shows that visitors to Kellogg Forest learned of its existence by personal communication rather than by any means of mass communication. Sixty-two per cent learned by direct word of mouth from family or friend, and another 6 per cent from school activities; a total of 68 per cent heard about the Forest by word of mouth.

Fifteen per cent first noted the Forest in passing by at some time or other. Ten per cent have known of the Forest for a long time, likely since its first plantings, and many, therefore, can be said to know it by common knowledge.

Only 7 per cent learned about the Forest by any means of impersonal, mass communications. This segment calls attention to the mass media available for learning about the Forest at present. The Detroit News had a travel section in a Sunday supplement during early summer of 1967 describing the Battle Creek-Kalamazoo area, in which the Forest was mentioned. Michigan State University mentions it occasionally in its Faculty Facts. One person said he saw it marked on a place mat at some restaurant, and a few hunters were told of the Forest by service station attendants. By far, families and friends are the greatest source of information directing persons to Kellogg Forest.

TABLE 38.--Source of visitor's knowledge about Kellogg Forest, 1967.

User Group	School Activity	Passing By	Friend	Family	Common Knowledge	Other
			Per cent of user group			
Picnickers	8	11	34	28	8	11
Motorists	7	29	33	15	9	7
Hikers	10	14	43	23	6	4
Fishermen	10	0	65	15	10	0
Hunters (Deer)	0	4	46	17	29	4
Hunters (Small Game)	4	15	46	19	0	15
Miscellaneous	0	7	20	40	27	7
All users	6	15	40	22	10	7

Visitors' Recommendations of Kellogg Forest to Others

Table 39 presents the responses to the question: "How often do you recommend Kellogg Forest to other persons?" Fifty-two per cent of those responding claim to have recommended the Forest to six or more persons, and another 32 per cent recommended it to between two to five persons. There are no significant differences among user groups in this respect.

The response implies strong visitor satisfaction with the Forest. Visitors are sufficiently impressed with the Forest to tell other people about it. In fact, only 16 per cent did not indicate telling more than one other person about the Forest, and in this way, they may be indicating some dissatisfaction; but this is not necessarily true. The total number interviewed has been reduced for this question by fifty-three persons, the number of those visiting the Forest for the first time. Of this number, forty-eight indicated that they would be returning. The remainder were mostly from long distances that would preclude the likelihood of returning and thus cannot be said to lack interest in returning.

Number of Visits to Kellogg Forest

As another gauge of the satisfaction of visitors, they were asked how many times they visited Kellogg Forest per year. Owing to the vagaries of human memory, the results serve only as a relative measure.

TABLE 39.--Responses of interviewees indicating number of persons to whom Kellogg Forest was recommended, 1967.

User Group	Number of Other Persons Recommended					
	0	1	2-5	6-10	11+	Total
	Per cent of user group					
Picnickers	5	8	29	29	29	100
Motorists	16	0	30	21	33	100
Hikers	9	7	33	28	23	100
Fishermen	20	0	30	40	10	100
Hunters (Deer)	5	0	45	35	15	100
Hunters (Small Game)	10	20	35	20	15	100
Miscellaneous	0	10	20	10	60	100
All users	10	6	32	27	25	100

Frequency of use is distributed quite well as indicated by column totals in Table 40. The most frequent occurrence is in the two to three times per year class. However, all groups are well represented. Even the smallest, the greater than ten visits per year group, represents 13 per cent of the respondents.

Chi-square analysis shows a significant difference at the .01 probability level (Appendix Table C-11). Picnickers appear in the three larger classes less frequently than anticipated; motorists appear in the 0-1 class more frequently than expected; and hunters appear in the 0-1 class less often than expected and more often than expected in the greater than 10 class.

Open-End Responses by Visitors

A meaningful impression of the users' opinions regarding Kellogg Forest is obtained from a review of their answers to open-end questions. It would be impractical to categorize such replies in great detail or to enumerate each one. Instead, they are grouped into appropriate related groupings and presented below. No indication of frequencies is attempted; the intent is to appreciate more fully the diverse motivation and attitudes of the visitors.

TABLE 40.--Frequency of visits to Kellogg Forest each year, 1967.

User Group	Number of Annual Visits					
	0-1	2-3	4-5	6-10	10	Total
	Per cent of user group					
Picnickers	24	27	35[a]	11[a]	3[a]	100
Motorists	27[a]	36	11	16	10	100
Hikers	19	28	19	23	11	100
Fishermen	10	15	15	35	25	100
Hunters (Deer)	0[a]	19	29	33	19[a]	100
Hunters (Small Game)	5[a]	30	10	25	30[a]	100
Miscellaneous	10	50	20	10	10	100
All users	17	29	20	21	13	100

[a]Cell contributes more than 2.0 to chi-square.

Nature

more natural and woodsy--plain nature--far more natural than others
like it rustic
don't improve--like the way it is
will like fall colors
not commercialized--not built up
Binder Park overly landscaped
one of few places to get back to nature--unspoiled
pines great--liked walk in pines
no other place as nice--not many places like this left--not enough like this
brings guests to get into some "back country"
likes Forest even though from Ontario
beautiful scenery--only scenic area of Battle Creek--one of most scenic spots in area
came to see sunset from Memorial--lookout most impressive--view
to learn some trees from labels
like bringing North country to the South--much like North woods--reminds of Canada
fresh air

Quiet and Peaceful

quiet and peaceful--relaxing--not rowdy
real pleasant--refreshing
therapy for wife--therapy for city life

Not Crowded

secluded here--privacy
less crowded--expect no crowds--State parks too crowded
nice to get into woods away from crowds (actually one of busiest days)
any more development would over-crowd--don't want crowds to spoil
people who now come love it and don't litter

Adequacy

very adequate--well planned--large area
too nice a place to criticize--like a lot
complained of rough road
nicer than Cook County Preserves--best part of whole Biological Station
better here than Yankee Springs or Detroit Metro Parks
some deer would add to thrill

preferred picnic site unless want to swim
prefer over other places around
nicest place around to hike--trails not too sophisticated
happy that place is clean and well-tended

Children

children like to walk here--kids love it here
chance to teach children about outdoors
brought granddaughter to show woods
good place to let kids unwind
get son in field for a while (hunter)

Negroes

happy no Negores here (only two)
colored at other park

Guests

beautiful place to show off--a place to bring guests and be proud of
a must when friends from Detroit visit--brought visitor from England
to show nieces from Texas
everyone they have brought likes it

Charges

no charge here--no fee
fee would take away from natural feeling here
not back to Sanctuary since fee charged

Access

most areas posted--easy access here
takes so much to get permission on private areas
nearby--can come after supper--can make for noon picnics

Wilderness

get wilderness feeling here
a wilderness

Variety

great variety on such a small area, of trees, of mushrooms
always something different--constant change of scene--change of scenery
like to see woods of different types
rain makes so different

Education

came to look at trees--marked nicely
Kalamazoo schools recommend for leaf collecting--good for leaf collecting
learn more here than at Bird Sanctuary

Fishing

easier for fly fishing here
small fish though--not as good as formerly
some pretty good fish
one of better fishing spots in area--nicest place around to fish
most streams featureless, but this one improved nicely

Hunting

close and often good for two or three squirrels
not much game--would like to see some stocked
get beagle chance to run
hunting is more than killing--as much for walk as hunting--exercise
good game cover

Improvements

concerned about rumor that forest may close to public
disappointed--looks neglected--dead trees--weeds--bumpy road--not clean anymore
nice not to find beer bottles
could have better signs to get here
picnic area needs upkeep (moldy tables, rusted burners)

Miscellaneous

many persons in Augusta do not even know of Kellogg Forest
would like alcohol permitted

good water
whole experience important
usually picnic and absorb environment--have picnicked in snow
usually stop by shortly when in area
good place to keep out of trouble
can bring dog here
first to come in Spring--last in Winter
like to hike without dressing for jungle--hike easily
get feeling of belonging and owning in the woods
much like European forests in management
would hate to see place like this ruined
good family spot

The above listing indicates that most people are quite pleased with Kellogg Forest as it is today and prefer that the Forest remain as rustic as it now is. Most prominent in the list are the remarks about how impressive nature is at the Forest. Some people likened Kellogg Forest to a wilderness and a few likened it to Canada. Others said it reminded them of the old, established, managed forests of Europe.

Peace and quiet and getting away from crowds were expressed often. Many people brought their guests to see the Forest. As would be expected in any group of people as large as the Kellogg Forest visitors, some people were not completely pleased. These comments were few in number and not of a seriously derogatory nature.

In general, most persons come to Kellogg Forest because of what it is now, and they are not interested in seeing it changed. If the Forest did change it would likely lose much of its present attraction for the persons

interviewed. From the above listing, it can be concluded that visitors are satisfied with Kellogg Forest as it is today.

CHAPTER VIII

SUMMARY AND CONCLUSION

Recreation receives increasing attention in the American life style. Forests are an integral part of this picture, but emphasis here is on the larger forested areas at some distance from the urban centers.

Recreation needs are greatest close to urban centers. Much emphasis is directed here, too, but the small urban forest has somehow been generally overlooked in the United States for its potential recreation role.

Numerous illustrations exist in Europe where forests are managed close to cities, supplying timber, water, recreation, protection, and amenity values. Such forests are almost nonexistent in the United States, yet the idea is a challenging one. Small forests near urban centers might well supply multiple values including recreation.

For illumination of this idea, a convenient case was available for study at Michigan State University's Kellogg Forest, a 600-acre research forest between Battle Creek and Kalamazoo, Michigan. About 65,000 people are within a ten-mile radius of the Forest, and 350,000

people live within twenty-five miles. A largely denuded area when acquired in 1932, Kellogg Forest has been planted to trees in a large number of research and demonstration projects. The Forest now consists of a variety of species and stand sizes. It has some native hardwood stands, but is mainly plantation, with no old growth, and little forest area that has reached 40 years of age. Thinnings for pulpwood are conducted regularly with no effort made to conceal the logging. In fact, rustic signs are used to describe management and research activities in the Forest.

Aside from its location in an urban area, the special points to note about Kellogg Forest are its man-made aspects, the dedication to several purposes, the willingness to cut when necessary for management or research objectives, supervision of the area which is apparent to all visitors, and the compatability of research and management objectives with recreational use. No advertising is done to attract people to Kellogg Forest. Visitor facilities are maintained at a minimum and have been permitted to deteriorate gradually, but regular cleanup is part of the management program. One road winds through the Forest with a turnout provided at the McCrary Memorial which is located at a place where a distant view is available. There are some forest access roads which serve as hiking trails.

Otherwise, the Forest is just simply there to be enjoyed as it is.

On this unencouraged basis, Kellogg Forest receives a great deal of localized use. In 1967, visits were estimated as some 32,000, plus about 6,000 other visitors in specialized, organized groups. These numbers suggest that a fairly large portion of the adjacent population visits the Forest.

The user groups are divided as follows: motorists, 49 per cent; picnickers, 24 per cent; hikers, 13 per cent; fishermen, 2 per cent; hunters, 2 per cent; and miscellaneous, 10 per cent. The miscellaneous group is highly varied, including uses such as photography, bird watching, and collecting of leaves, cones, mushrooms, and insects. Hunting and fishing are controlled on the Forest inasmuch as they are permitted on a sign-in, sign-out basis.

It it significant to note that a high degree of recreational use occurs on the Forest despite many alternative areas available for public recreation in the Kalamazoo and Battle Creek areas. The nearest alternative is the Kellogg Bird Sanctuary, about three and one-half miles from Kellogg Forest. It is probably the most popular alternative. Also available are Yankee Springs State Recreation Area, Fort Custer State Recreation Area, and Allegan State Forest. The latter

three are most like Kellogg Forest in their woodland aspects. Available also in the general area are swimming beaches and city parks such as the Kalamazoo Nature Center, as well as roadside parks and many streams and lakes.

A general observation regarding characteristics of visitors to Kellogg Forest is that they are of higher socio-economic status than the average population from which they come. Almost 40 per cent of the heads of parties visiting Kellogg Forest have at least attended college and another 44 per cent completed high school. Almost one-third of the heads of parties are businessmen or professionals.

Visitors at Kellogg Forest are from higher income strata than the average for Calhoun and Kalamazoo Counties. Forty per cent of the visitors at Kellogg Forest are from families with incomes over $10,000. The visitors at the Forest tend to be younger than the population of Calhoun and Kalamazoo Counties, with the 1-12 years and the 20-44 years groups being heavily represented and the groups older than 44 years represented by numbers much less than expected. Most visitors were white with only about 1 per cent Negroes.

Not all persons fit neatly into the overall averages. Differences were found between various user groups regarding several traits such as occupation, income, length of visit, distance traveled, and frequency of visits.

The average party interviewed consisted of 3.75 persons, although a tally of cars entering the Forest indicates an average of four persons per car. Most parties consist of one or two families or parts thereof.

Most persons (83 per cent) visiting Kellogg Forest are from residences which are either urban or suburban. Battle Creek and Kalamazoo are the two cities accounting for most visits (77 per cent) to Kellogg Forest. The suburbs of these two cities provide some additional visitors, since 90 per cent of all visits to Kellogg Forest are from distances not exceeding twenty-five miles.

It may be anticipated from the above data that use of this Forest will increase as incomes and education rise in the future. Also, as more persons become sub-urban dwellers and acquire the above socio-economic characteristics, and as free time increases, the appeal of a forest area such as Kellogg Forest will increase.

Distance traveled appears to be a limiting factor since only 10 per cent of all visits were from more than twenty-five miles away. At greater distances, which take more time and effort, the visitors apparently may prefer to go North to a larger forest.

The role of the urban forest is destined to be that of a nearby area for short visits from nearby centers of population. As leisure time increases, some in the form of shorter work days, such use will tend to increase.

A move to Daylight Saving Time allows more hours of daylight after work for recreational pursuits.

The opportunity to observe woodland scenery is the greatest satisfaction sought from a trip to Kellogg Forest. There are inherent characteristics found in the forest that attract people to observe it. Some of these may be found in comments such as "more natural," "not built up," "like the Northwoods," etc. To some persons this 600-acre forest appeals in much the same way as do the more extensive forests. These persons have a feeling of being in a wilderness when they are in a forest which lacks most of man's cultural structures, regardless of its size.

Aside from just observing nature, visitors gain a sense of relaxation while in the Forest as indicated by their frequent comments such as "quiet and peaceful" or "relaxing."

Most visitor parties are families, which results in ranking in third place the satisfaction of allowing children to play in the woods.

Kellogg Forest is visited by a rather restricted segment of the population not normally from the central urban core. It is not likely that an area such as Kellogg Forest will be utilized by persons from today's urban core. Certainly they should be considered in making other recreation facilities available, but at

the same time it must be acknowledged that there is a significant portion of the population that uses Kellogg Forest rather heavily. These persons are in better than average financial circumstances, but nevertheless demonstrate a need for recreation opportunities. It is not enough when concerned with recreation facilities to speak only of numbers and man-days of use, but consideration should also be given to the quality of the experience--to the degree of satisfaction obtained.

Aspects of nature in the satisfaction rating were volunteered by 31 per cent of all visitors, attesting to the importance attached to nature by the users of Kellogg Forest. As further indication of general satisfaction with their Forest experience, 70 per cent of the visitors return between two and ten times each year. Eighty-four per cent of all users have recommended the Forest to two or more of their acquaintances. Ninety per cent of persons making their first visit to the Forest indicate that they will likely return. For many persons in the area, a visit to Kellogg Forest is a must when friends visit from other areas. They take pride in showing the Forest to their guests.

Most persons first learned of Kellogg Forest by word of mouth. Approximately 68 per cent said they learned about the Forest from friends or family members. Another 15 per cent found the Forest while driving by it.

The Forest sign along the highway is not especially conspicuous. If it were desired to emphasize the recreational use of Kellogg Forest, it is likely that a great increase in visitors could be obtained by a more prominent and attractive highway sign. This is only to note a possibility and not to suggest a policy change, since most current users are quite content with the limited use the Forest now receives. To expand the present recreational use would make Kellogg Forest less desirable for them.

At present use rates, recreation and research are compatible uses of Kellogg Forest. There have been few problems as a result of recreational pursuits. There are several reasons for this compatibility. It is conspicuous at the Forest entrance that a Resident Forester is in charge, leaving no doubt that the Forest is supervised and managed. The Forest crew patrols the area during peak recreation periods. Their presence undoubtedly prevents many problems from occurring. Another major reason for the compatibility of recreational use and research is that many signs along the road explain what has been done or is being done. There is little doubt in the visitor's mind that he is a guest in the Forest, and as long as explanations of research projects are well made, the research activity is readily accepted and even sought after for its instructional value. The variety provided

by the many research projects undoubtedly impresses visitors in a favorable way. Further, the influence of free access to Kellogg Forest must not be overlooked. Several interviewees indicated that if a fee were charged, there would be some persons who would then think that they had some right to "litter" and "be picked up after." As it is now, visitors feel that they are guests who appreciate the opportunity to come. They have a sense of responsibility while on the Forest. That research and recreation are compatible uses of Kellogg Forest is a most important conclusion of this study.

Most parks in the Battle Creek-Kalamazoo area do not provide the same values that Kellogg Forest does. They are normally well developed, landscaped, and provide activity areas for games of various sorts. Unfortunately, in so doing, they oftentimes eliminate the natural forest aspects desired by many persons. This is not to say that all people want undeveloped natural recreational areas, but that a significant segment is interested in and will make use of a natural forest area. These people want to get away from crowds and have a sense of being alone. In using activity-oriented parks, the majority of the population may be satisfied, but not the nature-demanding group. As indicated in Chapter II, a greater proportion of users may be satisfied by providing a few different kinds of facilities along a continuum from simple to elaborate.

That the Kellogg Forest is utilized heavily is evidenced by the more than 32,000 visits during 1967. Kellogg Forest has a total area of 600 acres. About one-half of this area, the western half, is not utilized by visitors to any great extent. This concentrates most users on slightly more than 300 acres in the eastern half, or 107 persons per acre per year. Kellogg Forest probably has not reached its capacity at this rate of use. There were very few interviewees who complained of crowded conditions in the Forest. Many said that more people would over-crowd the Forest, but no one indicated that this point had been reached, even on rather busy days. Apparently when dispersed in the Forest, most visitors do not feel as close to others as they really are.

Although Kellogg Forest is a man-made forest, in the thirty-six years since its first plantings, it has grown to appear to many as a natural part of the landscape. Many visitors come to see "the woods" which are often likened to the "Northwoods." The area was abandoned agricultural land, and now it is a productive research forest being utilized by thousands of persons annually for outdoor recreation purposes.

In the future, there will be a much broader urban sprawl, and more of the population will be even more removed from nature. Now may well be the best time to

prepare to make the environment more hospitable for these people. Open areas should be set aside and dedicated for park development. In any such plans, it would appear to be advisable, based on results of this study, to include some areas for passive, woodland recreational opportunities. Not only may open areas be procured fairly easily and economically at this time, but programs can be implemented to maintain present wooded areas. A few cities already have municipal forests. Several others have restricted watersheds and water-well fields. Forest and watershed uses are certainly compatible objectives in managing a land area. Based on experience in the Kellogg Forest, it would appear that controlled recreational use is compatible with watershed objectives. Perhaps it is time to examine these watershed areas to see if they may serve a dual role, including recreational use. Although it is not likely to make a significant monetary contribution, wood production may be practiced to some extent on these areas, too.

The present use of Kellogg Forest for the dual objectives of forest research and recreation is made possible because of its location and its management program. It is obvious to visitors, but not in a detrimental manner, that the Forest is being managed and controlled by a Resident Forester. Less than $3,000 is devoted to the recreational aspect of forest use annually,

which is only 12 per cent of all forest management expenditures. No attempt has been made to encourage recreational use of the area, and yet, more than 32,000 visits were recorded in 1967.

The Kellogg Forest is fulfilling a definite need for recreation in an urban setting, and may well form the pattern for developing similar areas easily accessible to large urban centers. Such recreational use also appears to be fully compatible with major research objectives on such an urban-oriented forest.

LITERATURE CITED

LITERATURE CITED

Bättig, Von K.
1966. Die hygienische bedeutung des waldes fur die volksgesundheit. Schweizerische Zeitschrift Fur Forstwesen 112:652-666.

Beardsley, W. C., and Duncan, D. P.
1965. Camper reactions to fees and charges in Minnesota state parks. Minnesota Forestry Notes No. 161. School of Forestry, University of Minnesota, St. Paul, Minnesota.

Beazley, R. I.
1961. Some considerations for optimizing public forest recreational development and value. Journal of Forestry 59:644-650.

Bultana, G., Lucas, R., and Hathaway, W.
1961. A summary of social research. Outdoor Recreation in the Upper Great Lakes Area. Forest Service Station Paper No. 89. Lake States Experiment Station, St. Paul, Minnesota.

Burch, W. R., Jr.
1964. A new look at an old friend--observation as a technique for recreation research. U. S. Forest Service. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

_____.
1965. The play world of camping: research into the social meaning of outdoor recreation. American Journal of Sociology 70:604-612.

_____, and Wenger D., Jr.
1967. The social characteristics of participants in three styles of family camping. U. S. Forest Service Research Paper PNW-48. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

Burdge, R. J., Sitterly, J., and So, F.
1962. Outdoor recreation research. Natural Resources Institute of the Ohio State University, Columbus.

Chappelle, D.
1968. Notes from a seminar given by Dr. Daniel Chappelle to a joint Forestry-Resource Development Seminar, Michigan State University, February 22, 1968.

Clawson, M.
1964. How much leisure, now and in the future? Resources for the Future, Reprint No. 45. Washington, D. C.

_____, and Knetsch, J. L.
1966. Economics of outdoor recreation. Johns Hopkins Press, Baltimore, Md.

Creese, W.
1964. The planning theories of Sir Raymond Unwin. Journal of American Institute of Planners 30:295-304.

Cushwa, C. T., McGinnes, B., and Ripley, T.
1965. Forest recreation estimates and predictions in the North River Area, George Washington National Forest, Virginia. Bulletin 558. Virginia Polytechnic Institute, Blacksburg.

Davis, H. C.
1966. The significance of the forest environment to contemporary society. Proceedings, Society of American Foresters, Seattle, Washington.

Dixon, W. J., and Massey, F. J., Jr.
1957. Introduction to statistical analysis. McGraw-Hill Book Company, New York.

Ebner, A.
1940. German forests, treasures of a nation. German Library of Information, New York.

Edlin, H. L.
1963. Amenity value in British forestry. Forestry 36(1):65-89.

Etzkorn, K. P.
1965. Leisure and camping: the social meaning of a form of public recreation. Sociology and Social Research 49(1):76-89.

Eyer, H.
1962. The forest as a counter balance to the modern ills of civilization. Forstwiss Cbl. 81(1-2):1-11.

Ferriss, A. L.
1963. Applications of recreation surveys. Public Opinion Quarterly 27:443-454.

Fisher, F.
1960. Switzerland and its forests--a synthesis of middle European forestry ideas. School of Forestry, Oregon State College, Corvallis, Oregon.

Foster, C. H. W.
1965. Forestry and megalopolis. Proceedings, Society of American Foresters, Detroit, Michigan.

Fraley, P. C.
1967. The forest that pays the taxes. American Forests 73(1):25.

Gathy, P.
1962. La foret protectuce. Bulletin Soc. For. Belg. 69(3):150-167.

Gould, E. M., Jr.
1961. Planning a recreation complex. American Forests 67(8):30-35.

Gray, D. E.
1961. Identification of user groups in forest recreation and determination of the characteristics of such groups. Dissertation Abstracts XXII:3258.

Gregerson, H. M.
1965. Campurbia. American Forests 71(7):18-20.

Harper, V. L.
1965. The new forestry. Journal of Forestry 63:752-754.

Hendee, J. C.
1967. Recreation clientele--the attributes of recreationists preferring different management agencies, car campgrounds, or wilderness in the Pacific Northwest. Unpublished Ph.D. dissertation. University of Washington.

Illick, J. S.
1939. An outline of general forestry. Barnes and Noble, Inc., New York.

James, G. A., and Ripley, T. H.
1963. Instructions for using traffic counters to estimate recreation visits and use. Southeast Forest Experiment Station, U. S. Forest Service Research Paper SE-3.

James, L. M.
1968. Adapting foresters to the changing environment, address presented at Louisiana Polytechnic Institute and Mississippi State University, March.

Johnson, H. B.
1961. Geographic research in outdoor recreation: a case study of recreational usage of the Whitewater Valley, Minnesota. Outdoor Recreation in the Upper Great Lakes Area. Forest Service Station Paper No. 89. Lake States Forest Experiment Station, St. Paul, Minnesota.

Kalamazoo Gazette.
1961. Market facts--a picture of the Kalamazoo market. Kalamazoo, Michigan.

Karnig, J. J.
1966. Recreation use within the Harvard Black Rock Forest. Black Rock Forest Paper No. 26. Harvard Black Rock Forest, Cornwall, New York.

Katz, E., and Lazarsfeld, P. F.
1964. Personal influence--the part played by people in the flow of mass communication. Free Press of Glencoe, New York.

Kearns, F. W., James, L. M., and Pfeifer, R. E.
1962. An economic appraisal of Michigan's state forests. Forestry Division Tech. Publ. No. 2. Michigan Department of Conservation, Lansing, Michigan.

King, D. A.
1965. Characteristics of family campers using the Huron-Manistee national forests. U. S. Forest Service Research Paper LS-19. Lake States Forest Experiment Station, St. Paul, Minnesota.

_____.
1966. Activity patterns of campers. U. S. Forest Service Research Note NC-18. North Central Forest Experiment Station, St. Paul, Minnesota.

La Page, W. F.
1967. Camper characteristics differ at public and commercial campgrounds in New England. U. S. Forest Service Research Note NE-59. Northeastern Forest Experiment Station, Upper Darby, Pa.

Lucas, R. C.
1964. Wilderness perception and use: the example of the Boundary Waters Canoe Area. Natural Resources Journal 3:394-411.

Lemmien, W. A., and Geis, A. D.
1957. Recreational use of the Kellogg Forest. Mich. State Univ., Agr. Expt. Station, Quarterly Bulletin 39(4):701-706.

Mayor of Bassins.
1950. The communal forest of Bassins. Unasylva 4(1):12-13.

McCurdy, D. R., and Mischon, R. M.
1965. A look at the private campground user. U. S. Forest Res. Paper CS-18. Central States Forest Experiment Station, Columbus, Ohio.

McCurdy, D. R., and Miller, B. G.
1968. The recreationist at the Crab Orchard National Wildlife Refuge and his opinions on user fees. Southern Illinois University, Department of Forestry Pub. No. 1, Carbondale, Ill.

Merriam, L. C., Jr.
1963. A land use study of the Bob Marshall Wilderness Area of Montana. Forest and Conservation Expt. Station, School of Forestry, Montana State Univ., Missoula, Montana, Bulletin No. 26.

Milstein, D. N., and Reid, L. J.
1966. Michigan outdoor recreation demand. Tech. Report No. 6, State Resource Planning Program, Michigan Dept. of Commerce, Lansing.

Mueller, E., and Gurin, G.
1962. Participation in outdoor recreation. ORRRC Study Report 20. Superintendent of Documents, Washington, D. C.

Nesterov, V. G. (ed.)
1964. Les i dolgoletie celoveka (forests and human longevity) Iydatel stvo Lesnaja Promyslennost. Moscow.

Nosow, S., and Form, W. H. (ed.)
1962. Man work, and society, a reader in the sociology of occupations. Basic Books, Inc., New York.

Outdoor Recreation Resources Review Commission.
1962. Outdoor recreation for America. Superintendent of Documents, Washington, D. C.

Palmer, W. L.
1967. An analysis of the public use of southern Michigan game and recreation areas. Research and Development Report No. 102. Mich. Dept. of Conservation, Lansing.

Reid, L., Hall, J., and Barlowe, R.
1962. The quality of outdoor recreation as evidenced by user satisfaction--a report to the Outdoor Recreation Resources Review Commission. ORRRC Study Report 5. U. S. Gov. Print. Off., Washington, D. C.

Reid, L. M.
1965. Utilizing visitor preferences in predicting outdoor recreation demand. Addressed to National Research Conference, Penn. State Univ.

Robinette, G.
1968. Green air conditioners. Trees Magazine 28(4):16-18 and 22.

Ryle, G. B.
1963. The diverse uses of forests. Forestry 36(1):3-9.

Shaw, D. L.
1964. Forestry and amenity in Gwydyn forest park, Snowdonia. Quarterly Journal of Forestry 58:322-334.

Sessoms, H. D.
1964. An analysis of selected variables affecting outdoor recreation patterns. Mimeo reprint from Social Forces, Oct., 1964.

Shafer, E. L., Jr.
1964. The photo-choice method for recreation research. U. S. Forest Service Research Paper NE-29. Northeastern Forest Expt. Sta., Upper Darby, Pa.

_____.
1965. Socioeconomic characteristics of Adirondack campers. Journal of Forestry 63:690-694.

Sinden, J. A., and Sinden, L. B.
1964. A forest recreation survey: implications for future development. Scottish Forestry 18:120-127.

Stephens, G. R.
1962. Proceedings of the Lockwood Conference on the Suburban Forest and Ecology, Waggoner and Ovington (editors). Conn. Agr. Expt. Sta., Bul. 652.

Strong, A. L.
1965. Open space for urban America. Prepared for Urban Renewal Administration. Superintendent of Documents, Washington, D. C.

U. S. Bureau of Census.
1962. U. S. Census of population 1960. Volume I, Part 24, Michigan. U. S. Gov. Print. Off., Washington, D. C.

U. S. Forest Service.
1965. Outdoor recreation in the national forests. U. S. Department of Agriculture, Bul. 301.

Von Thünen, J. H.
1826. Der isolierte staat. With introduction by H. Waentig (Jena, Gustov Fisher, 1910).

Wagar, J. A.
1963. Visitor characteristics and recreation activities. U. S. Forest Service Research Paper NE-7. Northeastern Forest Expt. Sta., Upper Darby, Pa.

_____.
1964. The carrying capacity of wild lands for recreation. Forest Science, Monograph 7.

Wagar, J. A.
1966. Quality in outdoor recreation. Trends in Parks and Recreation 3(3):9-12.

Waggoner, P. E., and Ovington, J. D. (ed.)
1962. Proceedings of the Lockwood Conference on the suburban forest and ecology. Conn. Agr. Expt. Sta., Bul. 652.

Whyte, W. F.
1943. Street corner society. University of Chicago Press, Chicago.

APPENDICES

APPENDIX A

VISITORS' GUIDE

COMPARTMENT 14 – Planted in 1936 and 1937 to red, white, jack, and ponderosa pine, Douglas fir, red spruce, white spruce, European larch and Russian olive.

COMPARTMENT 15 – Planted in 1936 and 1937 to red, jack, ponderosa, pitch, Japanese red, Austrian and Virginia pine, black walnut, mulberry, Chinese elm, honeysuckle and dogwood. The Austrian pine was thinned in 1958 and the red pine in 1961.

COMPARTMENT 16 – Planted in 1932 to Norway spruce. In 1936 and 1937 black spruce and white spruce planted in the fail spots. European larch was planted on the east portion in the spring of 1937.

COMPARTMENT 17 – Planted to hybrid and grafted nut trees. Interplanted in 1937 with white pine, Douglas fir and white spruce. The extreme northern end planted to white pine in 1932. The picnic area is located in this compartment.

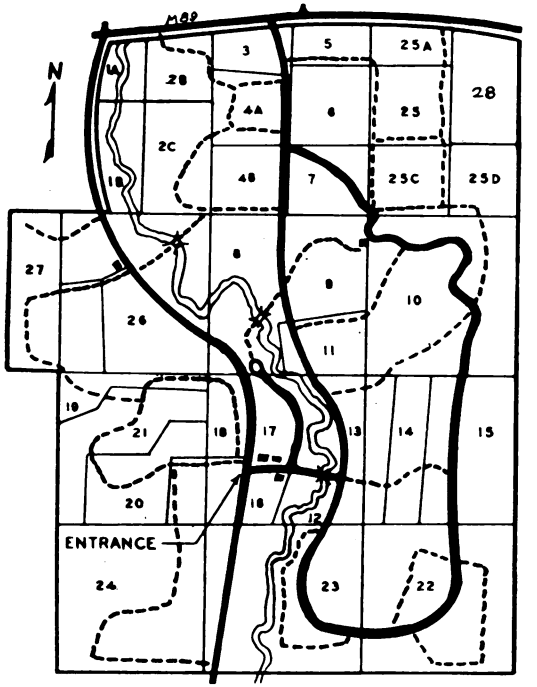
COMPARTMENT 22 – Planted in 1939 and 1940 to red, white, ponderosa, jack, Austrian and Scotch pine, Douglas fir, European larch, white oak, tulip poplar and several wildlife species. The natural woodlot in this compartment will not be cut but will be left as an undisturbed natural area.

COMPARTMENT 23 – Planted in 1939 to Norway, white and black spruce, creeping juniper, silver, sugar and Norway maple, tulip poplar, gray birch, red pine, limber pine, balsam fir, honeysuckle and dogwood. A fertilizer study was begun in 1961. White spruce genetic stock planted in 1963.

COMPARTMENT 25 – Red pine planted in 1950. Japanese black pine in 1950, Douglas fir planted in 1952. Hybrid pines were planted in 1953. European larch, Japanese larch and lodgepole pine planted in 1954.

COMPARTMENTS 18, 19, 20, 21, 24, 26 AND 27 total about 170 acres and are on the west side of the Augusta road. This area has been planted to various species and managed similar to the Compartments described. Since 1960, 14 genetic out-plantings have been made in these Compartments.

W. K. KELLOGG
EXPERIMENTAL FOREST
AUGUSTA, MICHIGAN
KALAMAZOO COUNTY, ROSS TWP.



LEGEND

PROPERTY LINE	ROADS
COMPARTMENT LINE	TRAILS
BUILDING	BRIDGES

Be Careful with Fire!

ONE CARELESS ACT CAN
WIPE OUT MANY YEARS' WORK

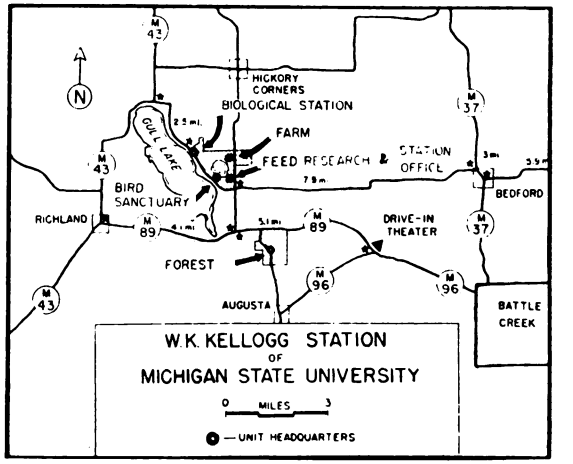
VISITORS' GUIDE

W. K. KELLOGG

EXPERIMENTAL FOREST

AUGUSTA, MICHIGAN

MICHIGAN STATE UNIVERSITY
DEPARTMENT OF FORESTRY
COLLEGE OF AGRICULTURE
EAST LANSING



The W. K. Kellogg Station in Kalamazoo County consists of the Kellogg Gull Lake Biological Station, Kellogg Bird Sanctuary, Kellogg Farm, Kellogg Feed Research and Kellogg Experimental Forest, owned and operated by Michigan State University.

THE KELLOGG EXPERIMENTAL FOREST

The Kellogg Experimental Forest consists of 530 acres of land donated to Michigan State University by the late Mr. W. K. Kellogg. The first gift of 280 acres was received in 1932. Because of erosion, caused primarily by faulty agricultural practices, all but a few acres had declined in productivity until in 1929, 275 of the 280 acres had been abandoned.

Mr. W. K. Kellogg, in donating this land to Michigan State University, expressed the desire that it be used to illustrate the rehabilitation and use of such eroded land by proper conservation practices. For that reason the tract is managed by the Forestry Department in the College of Agriculture.

The primary purpose of the Forest is research in forestry and allied fields. More than 45 research projects are now being conducted. These studies deal mainly with plantation establishment and management, hardwood management, genetics and tree improvement, insect and disease problems, soil and fertilizer studies and wildlife research. At the same time the tract is producing many valuable products, further erosion has been controlled and the Forest is being used for recreation by the public. Weather data is recorded daily. Tags, stakes, signs or labels attached to trees, posts or stakes are necessary for the work on the Forest. *Please Do Not Molest Them.*

RECREATIONAL USE

Fishing and hunting are permitted with certain provisions. Each hunter and fisherman is required to register before hunting or fishing and to check out each day before leaving. Since 1952 the average take of rabbits has been 161 a year, pheasants 7 a year, fox squirrels 21 a year. The number of hunters has increased steadily, 845 being registered in 1960.

The Augusta Creek, where it flows through the Forest, has been improved for trout fishing. Over 110 improvement structures have been built, seedlings and cuttings have been planted along the stream and legal sized trout planted each year. During the past five years the average take per year is 1368 trout.

Fires are allowed only in the picnic area located beside the creek. Picnic tables are available on a first-come first-served basis and none can be reserved.

Three miles of road wind through the Forest so that visitors may drive through and see the area without walking. Other woods roads also serve as foot trails for hikers.

The Forest is open to the public *during daylight hours only.* All visitors are requested to be out by dark.

COMPARTMENTS

The Kellogg Experimental Forest is largely a man made forest. About 460 acres of the tract were cleared for agricultural use by the former owners prior to 1932. Only about 70 acres were never cleared. Most of the cleared area has been planted to various species of trees and shrubs. To permit easy location of areas, the Forest is divided into Compartments as shown on the map – see other side.

COMPARTMENTS 1A, 1B, 2A – Unplanted except for stream cover and scattered ornamentals.

COMPARTMENT 2B – Wet land planting. Black, white and Norway spruce, scotch pine, European larch, tamarack and cottonwood planted on the furrow slice in 1958.

COMPARTMENT 2C – Planted in 1938 to Norway Spruce, Ash, European Larch, Locust and Multiflora Rose.

COMPARTMENT 3 – Planted in 1932 to Basswood, Red Oak and Norway Spruce. Replanted in 1937 and 1938 with Norway Spruce, Black Locust and Scotch Pine.

COMPARTMENT 4A – White pine planted in the fall of 1931 with very poor survival. Replanted to Scotch pine in 1935. The stand was thinned in 1951 and again in 1962. Five deer exclosures have been built to determine the effect of deer browsing on seedling growth.

COMPARTMENT 4B – Planted to white pine in 1932. Survival was poor. Natural white pine reproduction now present in the openings between the planted trees.

COMPARTMENT 5 – Red pine (Norway pine) planted in 1932 in a 10 x 10 spacing. Crop trees selected and pruned to 7 feet in 1947, to 12 feet in 1950 and to 17 feet in 1955. Thinned in 1961 removing 2,000 board feet of pine logs and 35 cords of pulpwood.

"Crop trees" are the trees intended for the final crop of sawlogs. These are the better trees and their lower limbs are removed with a saw to improve the quality of lumber produced. About 150 crop trees will be pruned per acre.

COMPARTMENT 6 – Planted in the fall of 1931 and spring of 1932 to red pine. In the east half the spacing is 6 x 6 feet and in the west half 8 x 8 feet. Crop trees have been pruned to 17 feet in height. The entire compartment was thinned in 1947 removing 21 cords of pulpwood; 2 cords per acre. The 6 x 6 portion was thinned again in 1954 removing 23 cords of pulpwood; 4½ cords per acre. The 8 x 8 stand was thinned again in 1958 and the 6 x 6 stand received its third thinning in 1962.

COMPARTMENT 7 – Planted in the spring of 1932 to red pine and white pine in alternate rows and alternate strips in an 8 x 8 feet spacing. Crop trees have been pruned to 17 feet in 3 steps. This compartment was thinned in 1957 removing 30 cords of pulpwood and 3,000 board feet of pine lumber.

The Osage orange hedge was planted about 1917 by the previous owner. It was thinned during the winter of 1940 and 1941, producing posts and wood for bow staves.

COMPARTMENT 8 – Planted spring of 1937 to red pine, white pine, ponderosa pine, European larch, white oak and wildlife species such as dogwood, privet, mountain ash and Siberean pea tree. All the pines have crop trees pruned to 17 feet. Plots of 8 rates of thinning were set up and thinned in 1960.

COMPARTMENT 9 – Planted in 1936 and 1937 to red and white pine, crop trees pruned to 17 feet in 1962. This compartment includes the steepest land on the forest. Thinned in 1961 and 62. Contains 9 thinning plots.

COMPARTMENT 10 – Contains 45 acres of natural woods. The eastern 18 acres were cut over and burned about 1923. The western 27 acres are being used in a management study to learn the effect of three cutting methods on the growth and regeneration of oak-hickory woodlots.

COMPARTMENT 11 – Planted in the spring of 1937 to red, white and jack pine, Norway spruce and seven wildlife species.

COMPARTMENT 12 – Mostly unplanted, will be used for wildlife and stream bank control.

COMPARTMENT 13 – A plantation of hybrid and grafted nut trees. Some trees have begun to bear. A wildlife food area is maintained between the nut trees. Remainder of the compartment planted in 1937 to red, white and jack pine, red oak, European larch, basswood, Douglas fir and several wildlife species.

APPENDIX B

OUTDOOR RECREATION MOTIVATION QUESTIONNAIRE

OUTDOOR RECREATION MOTIVATION QUESTIONNAIRE

Date_____ Location_____

Day_____ Weather_____

Time of Interview_____ Interviewer_____

State or National Sticker_____

1. Party Information

Sex (Age)	1-12	13-21	22-45	46-65	65 and over
Male					
Female					

2. Number families represented_____ (if institutional party go to No. 3)

3. Institutional Party (only)

   a. Primary School_____

   b. High School_____

   c. College_____

   d. Other (specify)_____

   _____

Head of Party--All remaining questions refer to head of party only.

4. Objective of Visit (Activity)

List in order of importance the activities you will participate in today.

1. Picnicking_____
2. Hiking_____
3. Driving_____
4. Photography_____
5. Fishing_____
6. Hunting (specify)_____
7. Bird Watching_____
8. Boating_____
9. Swimming_____
10. Other (specify)_____
_____

5. Objective (Satisfactions)

List your satisfactions sought from this visit in the order of their importance.

1._____To observe woodland scenery.
2._____To cool off--get away from heat at home.
3._____To give children a chance to play in woods.
4._____To spend more time with family.
5._____To get away from crowds of people.
6._____To relax.
7._____To observe wildlife.
8._____To study nature.
9._____To get together with friends or relatives.
10._____To find a change of scene.
11._____To commune with nature.
12._____Other (specify)
_____
_____
_____

6. Reasons for visit other than activity and satisfaction.

1. Free Access _____1 Very Important _____2 Fairly Important _____3 Not Important

2. Distance from Home _____1 Very Important _____2 Fairly Important _____3 Not Important

3. Other (specify)_____

7. How long do you intend to be here today?

1._____Less than 1 hour
2._____1-2.9 hours
3._____3-4.9 hours
4._____5 or more hours

8. Is this your first visit here?
Yes_____ No_____

a. If yes, do you expect to come back? Yes___ No___

If not, why?_____
Go to Question 10

b. If no answer Question 9.

9. How frequently do you visit here annually?

	Winter	Spring	Summer	Fall
Number Annually	_____	_____	_____	____

a. Are these visits for different reasons than today's?
(If so, specify)_____

_____

10. Is this visit part of a vacation period? Yes___ No____

11. Distance to area from home (miles)

1._____10 or less
2._____11-25
3._____26-50
4._____51-75
5._____75+

12. How did you first learn of this area?

1._____Newspaper
2._____Radio or TV
3._____Friend
4._____Family
5._____Recommendation from other recreation area
(specify)_____
6._____Other (specify)_____

13. Have you recommended this to others as a place to visit (applies to repeaters only). Specify how many.

1._____0
2._____1
3._____2-5
4._____6-10
5._____11 or more

a. Have you recommended against this place for someone? Yes___ No___
If yes, specify why:_____

14. What other areas do you visit for similar activities?

	Primary Activities	How Often Per Year?
Example:		
Gull Lake Township Park	Swimming and Boating	Three
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

a. Part of another trip? Yes___ No___

15. How do you compare this area with other areas visited for outdoor activities?_____

_____

16. Occupation

1._____Businessman or Professional
2._____Wage Earner
3._____Housewife or Widow
4._____Student
5._____Unemployed
6._____Retired
7._____Other (specify)_____

17. Residence

1. Urban (name)_____
2. Suburban (name)_____
3. Rural_____

18. Sex (1) Male_____ (2) Female_____

19. Race (1) White_____ (2) Negro_____
(3) Other (specify)_____

a. Age_____

20. Marital Status

_____Married _____Single _____Divorced
_____Widowed

21. Family Income Per Year:

1._____Below $10,000
2._____$10,000-$14,999
3._____$15,000 and up

22. Education Completed:

1._____Primary
2._____Secondary
3._____Jr. College
4._____College
5._____Advanced College

Years_____

23. Name_____

Address_____

_____

APPENDIX C

TABLES

TABLE C-1.--Number of sampled persons observed and expected by user groups and whether or not other visits are for different purpose than current visit--Kellogg Forest, 1967.

User Group	Yes		No		Total
	Observed	Expected	Observed	Expected	
Picnickers	12	21.4[a]	28	18.6[a]	40
Motorists	26	26.7	24	23.7	50
Hikers	27	25	20	21.9	47
Fishermen	13	10.7	7	9.3	20
Hunters (Deer)	14	11.2	7	9.8	21
Hunters (Small Game)	13	13.9	13	12.1	26
Miscellaneous	11	6.9[a]	2.0	6.0[a]	13
All users	116	116	101	101	217

Note: Chi-square = 15.38, 6 degrees of freedom, significance level--.025.

[a]Cell contribution is greater than 2.0 to total chi-square.

TABLE C-2.--Number of sampled persons observed and expected by user group and length of stay at Kellogg Forest, 1967.

User Group	1 hr.		1-2.9 hrs.		3+ hrs.		Total
	Observed	Expected	Observed	Expected	Observed	Expected	
Picnickers	3	14.3	32	25.7	18	12.9	53
Motorists	47	15.7	11	28.2	0	14.0	58
Hikers	6	13.8	37	24.8	8	12.4	51
Fishermen	2	5.4	11	9.7	7	4.8	20
Hunters (Deer)	3	6.5	10	11.6	11	5.8	24
Hunters (Small Game)	3	7.0	11	12.6	12	6.3	26
Miscellaneous	3	4.1	8	7.3	4	3.6	15
All users	67	67	120	120	60	60	247

Note: Chi-square = 129.45, 12 degrees of freedom, significance level--.005.

TABLE C-3.--Number of sampled persons observed and expected by user group and professional or wage earner--Kellogg Forest, 1967.

User Group	Professional		Wage Earner		Total
	Observed	Expected	Observed	Expected	
Picnickers	17	17.4	26	25.6	43
Motorists	19	15.0	18	22.0	37
Hikers	18	15.8	21	23.2	39
Fishermen	12	7.3[a]	6	10.7[a]	18
Hunters (Deer)	2	8.5[a]	19	12.5[a]	21
Hunters (Small Game)	5	8.1	15	11.9	20
Miscellaneous	4	4.86	8	7.1	12
All users	77	77	113	113	190

Note: Chi-square = 18.00, 6 degrees of freedom, significance level--.01.

[a]Cell contribution is greater than 2.0 to total chi-square.

TABLE C-3.--Number of sampled persons observed and expected by user group and professional or wage earner--Kellogg Forest, 1967.

User Group	Professional		Wage Earner		Total
	Observed	Expected	Observed	Expected	
Picnickers	17	17.4	26	25.6	43
Motorists	19	15.0	18	22.0	37
Hikers	18	15.8	21	23.2	39
Fishermen	12	7.3[a]	6	10.7[a]	18
Hunters (Deer)	2	8.5[a]	19	12.5[a]	21
Hunters (Small Game)	5	8.1	15	11.9	20
Miscellaneous	4	4.86	8	7.1	12
All users	77	77	113	113	190

Note: Chi-square = 18.00, 6 degrees of freedom, significance level--.01.

[a]Cell contribution is greater than 2.0 to total chi-square.

TABLE C-4.--Number of sampled persons observed and expected by user group and three family income categories--Kellogg Forest, 1967.

User Group	Income Category						Total
	$10,000		$10,000-$15,000		$15,000+		
	Observed	Expected	Observed	Expected	Observed	Expected	
Picnickers	32	31.88	10	15.29	11	5.82[a]	53
Motorists	32	34.29	21	16.45	3	6.26	57
Hikers	24	30.68	19	14.72	8	5.60	51
Fishermen	7	12.03[a]	10	5.77[a]	3	2.20	20
Hunters[b]	42	30.08[a]	7	14.43[a]	1	5.48[a]	50
Miscellaneous	10	9.02	4	4.32	1	1.64	15
All users	148	148	71	71	27	27	246

Note: Chi-square = 31.29, 10 degrees of freedom, significance level--.005.

[a]Cell contribution is 2.00 or more to total chi-square.

[b]Hunters combined to avoid more than acceptable number of expected values below 5.

TABLE C-5.--Number of sampled persons observed and expected by user group and two-family income categories--Kellogg Forest, 1967.

User Group	< $10,000		> $10,000		Total
	Observed	Expected	Observed	Expected	
Picnickers	32	31.7	21	21.1	53
Motorists	32	33.5	24	22.3	56
Hikers	24	30.5	27	20.3[a]	51
Fishermen	7	11.9[a]	13	8.0[a]	20
Hunters[b]	42	29.9[a]	8	19.9[a]	50
Miscellaneous	10	9.0	5	5.97	15
All users	147	147	98	98	246

Note: Chi-square = 21.206, 5 degrees of freedom, significance level--.005.

[a]Cell contribution is 2.00 or more to total chi-square.

[b]Hunters combined to avoid more than acceptable number of expected values below 5, and to be consistent with Table 3.

TABLE C-6.--Number of sampled persons observed and expected by user group and three classes of education at Kellogg Forest, 1967.

User Group	Primary		Secondary		College		Total
	Observed	Expected	Observed	Expected	Observed	Expected	
Picnickers	8	9.0	19	23.2	26	20.8	53
Motorists	7	9.9	24	25.4	27	22.8	58
Hikers	6	8.7	25	22.3	20	20.0	51
Fishermen	1	3.4	11	8.7	8	7.85	20
Hunters (Deer)	9	4.1	10	10.5	5	9.4	24
Hunters (Small Game)	7	4.4	13	11.4	6	10.2	26
Miscellaneous	4	2.6	6	6.6	5	5.9	15
All users	42		108		97		247

Note: Chi-square = 19.71, 12 degrees of freedom, significance level--.10.

TABLE C-7.--Number of sampled persons observed and expected at Kellogg Forest by four education attainment categories, 1967.

User Group	Primary		Secondary		1-3 Yrs. College		4 or More College		Total
	Obs	Exp[a]	Obs	Exp[a]	Obs	Exp[a]	Obs	Exp[a]	
Kellogg Visitors	42	134	108	68	27	24	70	21	247

Note: Chi-square = 201.4, 3 degrees of freedom, significance level--.005.

[a]Expected from Calhoun-Kalamazoo County Statistics from U. S. Census Bureau (1962).

TABLE C-8.--Number of sampled persons observed and expected by user group and three classes of distance traveled to Kellogg Forest, 1967.

User Group	10 miles		11-25 miles		25 miles		Total
	Observed	Expected	Observed	Expected	Observed	Expected	
Picnickers	6	10.9[a]	38	36.7	9	5.4[a]	53
Motorists	17	12.0	29	40.2[a]	12	5.9[a]	58
Hikers	6	10.5	44	35.3[a]	1	5.2[a]	51
Fishermen	5	4.1	14	13.8	1	2.0	20
Hunters[b]	13	10.3	36	34.6	1	5.1[a]	50
Miscellaneous	4	3.1	10	10.4	1	1.5	15
All users	51	51	171	171	25	25	247

Note: Chi-square = 28.09, 10 degrees of freedom, significance level--.005.

[a]Cell contribution is more than 2.00 to total chi-square.

[b]Hunters combined to avoid more than acceptable number of expected values below 5.

TABLE C-9.--Number of sampled persons observed and expected by user group and attitude toward importance of distance to Kellogg Forest, 1967.

User Group	Very Important		Fairly Important		Not Important		Total
	Observed	Expected	Observed	Expected	Observed	Expected	
Picnickers	11	9.6[a]	15	13.5	27	29.8[a]	53
Motorists	4	10.5[a]	13	14.8	41	32.6[a]	58
Hikers	7	9.3	16	13.0	28	28.7	51
Fishermen	4	3.6[a]	6	5.1[a]	10	11.2	20
Hunters[b]	17	9.0[a]	6	12.7[a]	27	28.1	50
Miscellaneous	2	2.7	7	3.8[a]	6	8.4	15
All users	45	45	63	63	139	139	247

Note: Chi-square = 22.81, 10 degrees of freedom, significance level--.025.

[a]Cell contribution is more than 2.0 to total chi-square.

[b]Hunters combined to avoid more than acceptable number of expected values below 5.

TABLE C-10.--Number of sampled persons observed and expected by user group and whether or not this visit is part of some other trip--Kellogg Forest, 1967.

User Group	Yes		No		Total
	Observed	Expected	Observed	Expected	
Picnickers	18	18.02	35	35	53
Motorists	30	19.7[a]	28	38.2[a]	58
Hikers	11	17.3[a]	40	33.7	51
Fishermen	5	6.8	15	13.2	20
Hunters (Deer)	9	8.2	15	15.8	24
Hunters (Small Game)	8	8.8	18	17.2	26
Miscellaneous	3	5.1	12	9.9	15
All users	84	84	163	163	247

Note: Chi-square = 13.78, 6 degrees of freedom, significance level--.05.

[a]Cell contribution is greater than 2.0 to total chi-square.

TABLE C-11.--Number of sampled persons observed and expected by user group and frequency of visits each year--Kellogg Forest, 1967.

User Group	0-1		2-3		4-5		6-10		10		Total
	Obs	Exp	Obs	Exp	Obs	Exp	Obs	Exp	Obs	Exp	
Picnickers	9	6.4	10	10.2	13	7.4	4	8.0[a]	1	5.0[a]	34
Motorists	12	7.6[a]	16	12.1	5	8.8	7	9.5	4	5.9	44
Hikers	8	7.5	12	11.9	8	8.6	10	9.3	5	5.8	43
Fishermen	2	3.4	3	5.5	3	4.0	7	4.3	5	2.7	20
Hunters[b]	1	7.1[a]	10	11.3	8	8.2	12	8.9	10	5.6[a]	41
All users	32	32	51	51	37	37	40	40	25	25	185

Note: Chi-square = 33.14, 16 degrees of freedom, significance level--.01.

[a]Cell contribution is 2.0 or more to total chi-square.

[b]Hunters are grouped and miscellaneous group not included in order to avoid more than acceptable number of expected values below 5.