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TRENDS IN SEASONALITY
OF MICHIGAN STATE PARK USE

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By

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ABSTRACT

TRENDS IN SEASONALITY
OF MICHIGAN STATE PARK USE

By

Kathryn Marie Rottmann

Outdoor recreation areas have traditionally absorbed the vast majority of their camping and day use between Memorial Day and Labor Day. Recently there has been speculation that use patterns of park areas are shifting.

This study investigates use patterns by documenting trends in seasonal use of Michigan State Parks for both camping and day use between 1968 and 1978. In addition, the research explores site characteristics and locational factors which may be influencing attendance levels and rates of change during the off-season.

Results of the research indicate that there has been a general increase in off-season use. Summer levels declined in their share of total use. Parks which averaged greater percentages off-season use include those located off the Great Lakes, greater than 25 miles from Interstate 75, with modern campgrounds only, away from urban centers, and offering hiking trails.

DEDICATION

I wish to dedicate this thesis to my fiance, Geoff, whose moral support provided the inspiration to see the study through its darkest moments to completion.

ACKNOWLEDGEMENTS

I wish to convey my sincere thanks and appreciation to my advisor, Dr. Daniel Stynes, for his advice and counsel, his personal interest and concern, and his eternal patience.

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CHAPTER I

INTRODUCTION

The human race has long been governed by patterns in nature. Because of these patterns we have developed habits which enable us to cope more successfully with day to day living. Daily cycles such as sunrise and sunset act as guidelines for us. Similarly, the cycle of the moon has provided us with a means of stabilizing our activities and accomplishing what we set out to do. Patterns are also found in the four seasons of the year. Seasonality, in short, whether it be short-span or long run is a phenomenon caused by the changing of our surroundings which causes our actions to differ at any two moments in time.

Seasons are evident in recreation as in other patterns of life. These seasons are mostly controlled by two distinct factors: environment and tradition. Skiing, swimming and boating, for example, are dependent on the appropriate weather conditions. On the other hand, the seasons for activities such as fishing, hunting, baseball and football are largely independent of the calendar seasons and are determined by society. Summer has traditionally been the season for outdoor recreation. Activities at facilities such as state and national parks are influenced by such environmental and traditional factors as warm weather, vacation schedules and the school calendar. In the past, off-season use of outdoor recreation areas has been limited to such

specialized activities as hunting and fishing. Recently the off-season use of such areas has increased and has become more broad based.

This project was undertaken to investigate changing patterns of seasonal use in outdoor recreation and causes contributing to such changes. Seasonal attendance information gathered at Michigan State Parks over an eleven year period was used as a data base for the project.

Day use and camping attendance levels were documented, seasonal trends in use were established, and hypotheses were tested to determine why some parks attract more off-season use than others. The results of this project will be helpful to recreation administrators and planners in predicting future use levels and patterns with greater accuracy, and in setting forth effective off-season policies.

Background and Perspective

Recreation use patterns can be studied in several spans of time. For example, any day may be broken down into hour-long segments to investigate the flow of people into an outdoor recreation area. This hourly attendance will give an indication of the short-term demand for the area. Weekly patterns of use may be studied to learn more about longer term cycles. A typical week-long cycle shows high demand on weekends and lower on weekdays. Obviously this corresponds to the work week. Within the calendar year seasonal variations in use levels occur. This represents still another cyclical pattern. These variations can be analyzed to learn more about how attendance will vary within one year and from one yearly period to the next.

This study deals with seasonal use patterns; how they vary within the yearly cycle, and their differences and similarities from one year to the next. Like the shorter term use fluctuations, the seasonal cycles and the trends from year to year respond to many elements. These elements, or causal forces, can be roughly categorized as environmental and social.

Environmental forces have a great effect on the seasonal and long-term fluctuations in use of outdoor recreation areas; and on many of man's other activities as well. The physical expression of the seasons depend both on the orbit of the earth around the sun and the geographical location on earth (Strahler, 1965; 23). For example, it is cold in Michigan during the month of January, but it is warm in Argentina. The seasons have long acted as a guide for mankind in that as the season changes so does the weather. Historically, fall is the harvest time, winter a time to stay indoors, spring planting time and summer, if you have time, a time for vacation. Since summer has the most favorable climate, we expect a higher use of outdoor recreation areas in summer than in the other seasons. The environmental factors affecting recreation areas from one year to the next are more subtle, but generally also weather-related. For example, a limited snowfall discourages attendance at a ski area in the winter; and an early warming trend in the spring entices people outdoors. Trends over the period of a decade or more, on the other hand, are more likely to be controlled by social forces such as changing traditions and tastes.

The tie between the physical environment and man's thoughts and deeds has long been discussed by both philosophers and scientists.

Huntington (1945; 318) stated:

> Seasonal patterns of modern life, which everyone recognizes, is set by the effect of the seasons upon our physiological activity as well as by more obvious external effects, such as seasons of production on farms and hinderances to movement because of snow, rain, wind, low temperature, and floods.

This philosophy clearly indicates that the changes in physical surroundings affect the way people approach life. Such external effects are often the basis of man's celebration of holidays such as Thanksgiving and Easter, and the timing of other cyclical patterns such as the school calendar. Whybrow (1979; 95) reinforces the theory of a physical/psychological tie stating,

> Our environment is periodic. In fact, the daily cycle of the light and dark and the familiar rhythm of the seasons in New England, both generated by the play of the sun upon the spinning earth are evidence of a periodic change which has countless mirror images throughout our environment and within ourselves. Rhythmic patterns tied to these daily and annual events are commonplace and fundamental to all living systems, and yet they attract surprisingly little attention in our own day and age.

The importance of this environmental/social connection is that the environment (seasons) is the causal force. Thus we can expect future social changes to be influenced by our surroundings.

Traditions are created and continued by man as a means of stabilizing an everchanging physical world. To reinforce the rhythmic patterns of the physical environment, society maintains its own calendar of events. Perhaps traditions began as a human acknowledgement of physical forces. Many religious holidays were formed around the harvest of the crop, the rebirth of life in the spring, and the hibernation of life during the cold months. These traditions continue to evolve with the

changes man makes in the world around him.

Recreation is heavily influenced by the traditions and other social forces of society. Because recreation occurs during leisure hours the timing of holidays and large periods of free time such as summer vacation for school children, is most important. Changes in traditional patterns for work and school may have direct effects on outdoor recreation areas.

The school calendar has historically evolved to keep time with society. School is generally in session from September to June with vacations for holidays sprinkled in between. Rose (1977) suggests that the development of the year-round school schedule may increase the use of outdoor recreation areas on a year-round basis. Attending school during summer months will disperse leisure time throughout the off-season. This may be a major influence on future use patterns in outdoor recreation areas.

Like the academic schedule, the work schedule is based on tradition, is evolving, and will have an impact on the use of outdoor recreation facilities. Over the past century the work week has changed from a twelve hour day, six days a week to the present five day forty hour week. This has given the average working man an additional 32 hours of leisure time per week. The institution of paid vacations and their increase has had a similar effect. Trends toward further increases in leisure time and changes in their scheduling are already evident in the four day work week (Conner and Bultena, 1979) and flexitime work hours. As the time spent in work has decreased, an orientation away from the place of employment and towards recreational pursuits has developed.

One of the most important social forces affecting outdoor recreation is this shifting from a work-oriented to a leisure-oriented society. In Puritan times idle hands were thought to be the devil's playground. A good man was one who worked hard and long. A more liberal philosophy slowly evolved as religious influence began to subside and the government enacted laws protecting human rights. Today the amount of leisure time available to most members of society is more comparable to the hours of work per week. Because society is more accepting of leisure, even perhaps aware that it is an important element of life, people have greater control of their own leisure time. It is possible to provide for a family and still enjoy time for personal pleasures. Employers acknowledge this by providing alternative work schedules such as the four day work week (see McEvoy, 1974). Workers may now choose their own work hours to some extent, thereby creating time periods suitable for fulfilling personal recreation preferences. As work patterns change recreation areas will feel the effects. This effect may be especially profound in off-season use.

"Leisure is available today in widely varying amounts and degrees, according to such factors as age, social status, and occupation" (Kraus, 1971; 313). As a result of the increase in leisure hours, society responds to these new needs by providing greater opportunity to use leisure hours to their best advantage. The acquisition and development of outdoor recreation areas is a part of this response. Clearly, it is necessary for more areas and facilities to become available in a time of increasing need if supply is to keep up with demand. As greater

numbers of people avail themselves of the use of such areas more are needed.

Along with availability of outdoor recreation areas is accessibility. In recent times there has been more concern voiced that such areas and facilities should be accessible to everyone. This implies that areas should be situated so that residents of urban centers have equal opportunity to enjoy the outdoors. The invention of automobiles enabled people to move greater distances with less trouble. Mass transportation has also helped. Nolan (1978) states the importance of accessibility when selecting a site for an outdoor recreation attraction. These include natural features, geographic location, proximity to other attractions and availability of services. Obviously, the success of the area depends a great deal on how many people come to the site, and this often depends on how easily it can be reached. The accessibility factor takes on added importance when considering the use of an area on a year-round basis. Off-season months provide special problems for accessibility. For example, are the roads cleared of snow and are they constructed in such a way that spring rains will not wash them away?

Awareness of the outdoors continues to grow as a greater concern for the quality of life increases. The ecology movement of the 1960's was a major influence on the general awareness of the out-of-doors experience. The use of outdoor recreation areas and facilities increased tremendously during this time period. Use began to extend beyond the summer months into the off-seasons.

The intuitive approach to understanding how this shift in use has and will affect these areas is no longer enough. There is a need to

empirically test the accuracy of statements and hypotheses regarding off-season use. This is the basis for the study undertaken.

In addition to the environmental awareness taking place there has been an increase in interest in outdoor sports. This may influence off-season use as well. The popularity of cross-country skiing has encouraged greater use of outdoor recreation areas during the winter. Likewise ATVs (All Terrain Vehicles) have had an impact during other seasons. These and other sports are encouraging greater overall use, as well as a more uniform use of recreation areas in general.

Man's ability to control his environment also encourages off-season sports. The improvement of cold and foul weather clothing enables a sportsman to enjoy his activity in spite of the weather. Highly sophisticated equipment such as snowmobiles may also be having an impact on off-season attendance. As new equipment is invented and old equipment improved there are more reasons to use outdoor recreation areas during the entire calendar year.

Administrators also play a role in affecting the trends toward greater off-season use. In several ways they can control the amount of use at an area during any time of the year. For example, in 1961 the Michigan State Parks Division instituted a fifty cent Daily Motor Vehicle Fee for park users. That year the total park use plummeted dramatically (see Figures 2 and 3). Conversely, off-season use could be encouraged by lowering or eliminating the use fees during these periods (Clawson and Knetsch, 1966; 178). Making the facilities available on a year-found basis is also important. For instance, keeping the rest rooms

open and parking lots plowed enables the user to use the site regardless of the weather conditions.

The government has played a role in influencing off-season outdoor recreation area users by providing financial assistance in the form of Land and Water Conservation Fund* grants to develop facilities which may be constructed for year-round use.

This study seeks to gain a better understanding of the magnitude and controlling factors affecting off-season use. Understanding why use patterns occur and change as they do is more important than ever. This is a time of cost accountability and budget austerity. Making the most effective use of an area may be the difference between saving and wasting a resource.

The Study

The study was undertaken to gain a better understanding of seasonal user patterns at outdoor recreation areas. Specifically, the focus is on off-season use. Because of the availability of information and use of state parks by previous studies of a similar nature the Michigan State Park System was selected as a data base.

The Michigan system is comprised of approximately ninety areas and more than 223,000 acres of land. Park areas are situated throughout the

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*The LWCF Act of 1965 (PL88-578) amended in 1968 (PL90-401)
. . . provides for grants to states, and through them to political subdivisions, for planning, acquisition and development of public outdoor recreation areas and facilities.

entire state. Attendance at these areas has increased from 17 million people in 1968 to 23 million people in 1978. According to the Division of Parks, part of the increase can be attributed to higher attendance levels at parks during traditionally "slow" months. For these reasons the system was deemed an excellent data base for testing off-season use patterns.

Objectives of the Study

1. Document day use and camping levels at Michigan State Parks by season from 1968 through 1978.
2. Establish trends in seasonal use (winter, spring, summer, fall).
3. Test hypotheses as to why some state parks attract more off-season use than others based upon locational factors and site characteristics.

Importance of the Study

The study of use patterns has only recently attracted attention among recreation researchers and administrators. The attention has been generated by the need to redistribute use at outdoor recreation areas. This is due to the extremely high use of these areas during the summer season. The existing areas are in some cases no longer adequate to handle the demands made by summer users. Administrators realize that to increase capacity during the summer is economically illogical because the highly desirable areas in summer are idle, to a large extent, during the rest of the year. It is far more practical to attempt to use the existing areas more completely before building new ones.

The high concentration of use during summer months has resulted in overcrowding and dissatisfied users. In addition, deterioration of the physical environment has begun. This peaking of demand has been described by Clawson and Knetsch (1966; 157) as being "one of the most serious economic and management problems in the whole outdoor recreation field." "Peaking is defined as the concentration of a large proportion of visitation of recreation areas into a limited number of time periods" (Stynes, 1978; 1). "Development of use at off-peak times is one of the most promising means of maintaining recreation quality and at the same time increasing output" (Clawson and Knetsch, 1966; 170). But to make such development efficient and effective it is essential to understand what causes peaking of demand, where it is most likely to occur, and when.

This form of use patterning has received the greatest amount of attention. Researchers have sought to gain a better understanding of the peaking phenomenon by investigating its manifestations in several outdoor recreation settings. Beaman and Smith (1976) developed a method for decomposing use curves of a main-destination camping site into two distinct types. One is a smoothed curve which disregards short term fluctuations and is helpful in visualizing the seasonal use patterns. The other is not smoothed and shows the weekly use peaks as spikes. The tip of the spike represents the highest demand (use) of an area for that time period. This type of investigative study has contributed to a better understanding of peaking and how it relates to the seasonal use patterns of outdoor recreation areas.

There are two other studies pertaining to peaking which merit discussion. Both are of particular interest because they deal more directly with the data base selected for this study. Dice, Stynes and Lotz (1976) investigated the peaking phenomena related to commercial campgrounds in Michigan. The objective of the study was to "quantify the peaking phenomena and identify factors contributing to low peaking at campgrounds that are more successful in leveling the use peaks" (Dice, 1976; 2-3). The study concluded that there are specific campground characteristics and qualities which either promote or discourage peaking. Bilodeau (1977) applies similar methods to his analysis of Michigan State Park campgrounds. His work includes an investigation of the characteristics and magnitude of peaking at various sites. Both studies limit their focus to peaking tendencies during the summer months or season.

This study continues the effort to provide greater understanding of what causes various use patterns at Michigan outdoor recreation areas, and examines the distribution of state park use during all four seasons. This is the first of the three studies that discusses off-season use trends. The results of this study will help to explain what attracts people to parks, and outdoor recreation areas in general, during the off-season. This facilitates a redistribution of use needed to lessen the dramatic effects of peaking of demand during the summer months.

In the long run, redistribution of use serves three purposes. First, it promotes greater efficiency and effectiveness of management. This can be directly converted to monetary savings. For instance, personnel who are year-round employees will have their workload more

evenly distributed. Second, it will promote a wiser and more ecologically sound use of natural resources. The natural environment will suffer less from the effects of intensive use. And third, by making wise use of resources and effective use of management tools the users will be afforded a richer, fuller experience. Users will find park areas less crowded.

CHAPTER II

PROCEDURES

In this chapter the technical details of this project are described. This includes selection of data, definition of terms, coding and programming of data, checking of data, and the methods used to analyze the data for long-term trends and importance of site factors.

Data Collection

The project was completed in several phases. The first phase was to compile seasonal day use and camping figures from attendance information collected by the Michigan Department of Natural Resources/Parks Division. For each park in the system camping and day use attendance during each season of the year was calculated from State Park Weekly Report Forms. Data was punched onto computer cards for subsequent analysis. At the completion of this process each park had one card for each of the eleven years (1968-1978), each card containing four seasons of camping attendance, four seasons of day use attendance, total camping attendance and total day use for that year.

Trend Identification

This phase exposed and accentuated trends in seasonal use. Some of the tests conducted included combining off-seasons together and comparing park system use levels from year to year, comparing percentages of total use attributed to the off-season, and obtaining other indicators of off-season activity levels through combining various attendance figures recorded during the test period. The results were aggregated over all state parks to reveal statewide trends in both day use and camping. Totals were also analyzed to make yearly comparisons. For each curve a least squares linear regression line is also plotted, indicating the eleven year trend in use.

Analysis of Possible Causal Factors

The final phase made use of these patterns and trends to determine what factors might encourage or discourage off-season use at state parks. Site characteristics such as facilities available and the size of the park, as well as locational factors such as proximity to urban centers and placement on Great Lakes waters were examined for their effect on off-season use.

Selection of State Park Data

Attendance at the Michigan State Parks was selected as a data base for this project for several reasons. First, it was readily and conveniently available at the state office, and the cooperation of the Parks

Division was secured. Second, the attendance data had been recorded in such a manner that could be conveniently coded for computerization. The data was represented by the Parks Division as being consistent and accurate. Third, part of the data (1968-1972) had already been compiled in the desired form for an in-house study by the Recreation Services Division of the Department of Natural Resources.

The previously assembled data covered the years 1967 through 1972. Raw figures for 1973 through 1978 were compiled by hand from state park records and combined with them. An eleven year period from 1968 through 1978 was selected as an appropriate time-span for the study. Eleven years was thought to be long enough to represent current trends in seasonal uses, and would be long enough to smooth out year-to-year seasonal abberations due to such factors as weather and gas shortages. On the other hand, the eleven year period is short and recent enough that the method of collection by the park personnel would be reasonably consistent over the study period.

Definition of Terms

Several of the terms used in this study require definition; in particular 'season' and 'off-season'. The term 'season', as used here, represents the four recreational seasons as defined by the Recreation Services Division for their in-house study. The term 'off season' is used to denote the three seasons other than summer. These seasons roughly correspond to the calendar seasons, but vary in length and in the dates that bound them. The dates used are tabulated in Table 1.

Table 1. Starting and Ending Dates of Seasons Used in Study

Year	Winter	Spring	Summer	Fall
1968	1/1-3/17;11/4-12/31	3/18-5/26	5/27-9/8	9/9-11/3
1969	1/1-3/16;11/3-12/31	3/17-5/25	5/26-9/7	9/8-11/2
1970	1/1-3/15;11/2-12/31	3/16-5/24	5/25-9/13	9/14-11/1
1971	1/1-3/14;11/1-12/31	3/15-5/23	5/24-9/5	9/6-10/31
1972	1/1-3/19;11/6-12/31	3/20-5/28	5/29-9/3	9/4-11/5
1973	1/1-3/18;11/5-12/31	3/19-5/27	5/28-9/9	9/10-11/4
1974	1/1-3/17;11/4-12/31	3/18-5/26	5/27-9/8	9/9-11/3
1975	1/1-3/16;11/3-12/31	3/17-5/25	5/26-9/7	9/8-11/2
1976	1/1-3/21;11/8-12/31	3/22-5/23	5/24-9/12	9/13-11/7
1977	1/1-3/20;11/7-12/31	3/21-5/22	5/23-9/11	9/12-11/6
1978	1/1-3/19;11/6-12/31	3/20-5/28	5/29-9/10	9/11-11/5

Note that winter season is comprised of two periods. One period begins with the new year and ends in mid-March. The second period begins in early November of the same calendar year and ends on December 31. Attendance for the two periods of the winter season were collected and recorded separately by the Recreation Services Division. In this study the two were combined for a single winter attendance figure.

Table 2 illustrates how the length of the Recreation Services Division seasons varies greatly from one to the next. As is seen in the table, the winter season can be nearly three times as long as the fall season.

Leap Year is indicated on the table, but was not adjusted for in the analysis. The effect of the extra leap year day is negligible since it occurs during the slowest season (winter).

Table 2. Number of Days per Season Used in Study

	Year	Winter	Spring	Summer	Fall	Total
(L)*	1968	135	70	105	56	366
	1969	134	70	105	56	365
	1970	134	70	112	49	365
	1971	134	70	105	56	365
(L)	1972	135	70	98	63	366
	1973	134	70	105	56	365
	1974	134	70	105	56	365
	1975	134	70	105	56	365
(L)	1976	135	63	112	56	366
	1977	134	63	112	56	365
	1978	134	70	105	56	365

*(L) = Leap Year

Table 3 shows the dates on which Labor Day and Memorial Day fall during the study period. The summer season usually runs from the last Sunday in May to the first Sunday after the first Monday in September. Most of the time the two holiday weekends are included in the summer season, but, as the table shows, not always. This is significant because at some of the parks a large proportion of the use for the whole season will occur during these two weekends.

Since attendance levels at the state parks can be quite volatile, it is important to be aware of the disparities in the data base. The length of the season and its bounding dates in relation to such factors as hunting, and fishing seasons and national holidays can cause the recorded attendance to vary from year to year without there being any real change. For example, if Labor Day weekend is recorded as part of

Table 3. Seasonal Placement of Memorial and Labor Day Weekends

1968	Memorial Day - May 27 Labor Day - September 2
1969	Memorial Day - May 26 Labor Day - September 1
1970	Memorial Day - May 25 Labor Day - September 7
1971	Memorial Day - May 31 - whole weekend in summer Labor Day - September 6 - not included in summer (Labor Day - Monday)
1972	Memorial Day - May 29 Labor Day - September 4 - not included in summer (Labor Day - Monday)
1973	Memorial Day - May 28 Labor Day - September 3
1974	Memorial Day - May 27 Labor Day - September 2
1975	Memorial Day - May 26 Labor Day - September 1
1976	Memorial Day - May 31 - whole weekend in summer Labor Day - September 6
1977	Memorial Day - May 30 - whole weekend in summer Labor Day - September 5
1978	Memorial Day - May 29 Labor Day - September 4

Note: Unless otherwise stated the whole weekend including Monday is included in the summer totals for Labor Day weekend.

Unless otherwise stated only the Monday of Memorial Day weekend is included in the summer season totals.

summer in one year and part of fall in the next attendance levels for fall may show a large disparity between the two years.

Computerization Process

The attendance information gathered was compiled on computer coding sheets by arranging columns to correspond with seasonal attendance totals. This was the first step in the process of preparing the data for analysis. From the code sheets the figures were keypunched onto FORTRAN cards and were verified to double check for errors. At this point any unusual looking figures were discussed with state park personnel. Preparation of the data base completed the first phase of the project.

Analysis of the data was done by using locally generated FORTRAN programs. These were designed to aggregate the attendance figures by season and for various subgroupings of state parks and to calculate percentages of use by season. Resulting figures for 1968-1978 were plotted to reveal trends in seasonal patterns of use over time. Off-season attendance levels were obtained by adding fall, winter, and spring levels. Computerization facilitated the handling of otherwise tedious, time-consuming tasks, performing them more quickly and more accurately.

Trend Analysis

Least squares regression procedures were employed to statistically determine attendance trends over the eleven year period. Slopes of the resulting linear regression lines were taken as measures of the rates of

change in seasonal use for both camping and day use. (See Freund, 1979 for more information on linear regression.)

Method Used to Analyze Site Characteristics

The final phase of the project sought to identify factors which might influence the extent of off-season use at parks in the system. For each hypothesized causal variable (characteristic) parks were divided into two categories, those with and without the given feature. By comparing the off-season attendance figures for each group possible relationships are indicated. This design is based upon the design used by Bilodeau (1978) in his study of characteristics which influence peaking at Michigan State Park campgrounds.

The comparison of seasonal use levels of parks in the two categories give an indication that the factor being tested either promotes or discourages off-season use of state parks. For example, the parks were divided between those which have frontage on the Great Lakes and those which do not. If the parks on the Lakes showed a higher percentage of off-season use then it was concluded that such placement was a contributing factor toward more off-season use. Before presenting the results in Chapter IV, some background information on the Michigan State Park System is provided in the next chapter.

CHAPTER III

THE MICHIGAN STATE PARK SYSTEM

This chapter describes the Michigan State Park System with particular emphasis on the factors relevant to the study. These include: park classification, attendance history, fee structure, promotion and data collection methods and limitations.

The Division of Parks is one of several within the Department of Natural Resources (The Department also includes a Division of Lands, Forestry Division, Waterways Division, etc.). The system of parks is composed of ninety-two parks and recreation areas which are distributed between the Upper and Lower Peninsulas. The parks range in size from 32 to 58,000 acres, with the total system boasting of more than 223,000 acres. Water is an important resource for recreation in Michigan with thirty-seven of the parks located on the Great Lakes and fifty-six located on inland lakes or streams (see Figure 1).

Classification of Parks

Over the years the classification system for parks has changed several times. It is a direct reflection of how the Chief of the Division approaches the administration of the system. In the recent past the system used no less than eight categories to classify parks,

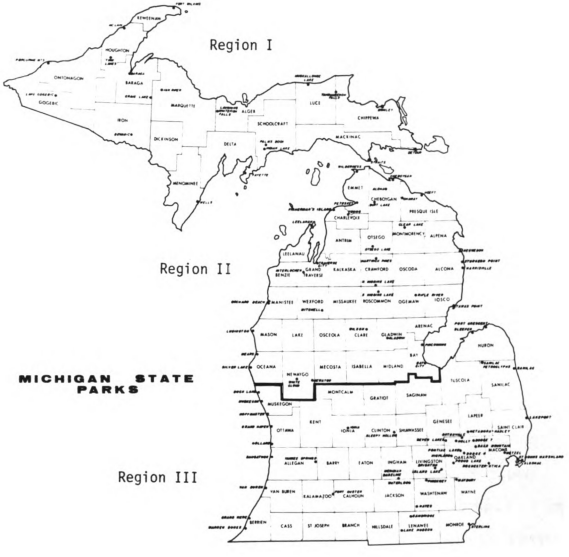

Figure 1. Michigan State Parks

including such labels as 'urban park' and 'historic area'. With the appointment of the present Chief, the system has adopted two broad classifications. The present policy of the Division is to provide natural areas at which to recreate and relax, and to minimize costly park development projects. For example, although in the past the Division has installed and maintained electrical hookups for campsites, the new doctrine is to provide rustic sites when developing new campsites; and to convert highly developed sites back to the rustic state as they necessitate repairs.

The two park classifications used now are more general in nature and reflect this attempt to get back to basics. Nevertheless, they are meaningful to this study because the related shifts in state park policy might be influencing off-season use levels. Dice (1976) found that commercial campgrounds with primitive sites experienced more severe peaking than the more developed campsites.

The two classifications now in use are 'State Park' and 'State Recreation Area'. A state park is defined as an area of 500 to 1000 acres in size and possessing a natural scenic attraction or having historical significance (Hane, 1979). These areas are normally closed to hunting. A State Recreation Area is defined as an area of approximately 1000 to 5000 acres in size, which is typically located geographically near an urban population center. These areas often lack the natural features of state parks, but are open to hiking, fishing, horses and hunting. The Division reserves the right to restrict these activities as dictated by conditions.

It is important to note that the classification system has changed several times during the test period. Although not tested for specifically, this may have caused a change in the average off-season use at some parks. In most cases, however, it was felt that reclassification should have no effect on use unless it results in development or policy changes. The term 'state park' will be used throughout this paper to mean any area (State Park or State Recreation Area) under the control of the Division of Parks.

Statement of Purpose

The Division has published a written statement of purpose to ensure that all employees are properly promoting the Division's philosophy. The statement is used as a guideline by employees when facing policy decisions that may not be stated in writing. The statement reads:

> The purpose of the Division of Parks is to acquire, maintain, and make available for the use of the public, open spaces for recreation or for the preservation of natural beauty or natural features possessing historic information or association. It shall further be the responsibility of the Divison to regulate the use of these lands to conserve the scenery, the natural and historic features, and the wildlife found thereon and to provide for the enjoyment of these features and aspects by the public in such a way as to assure preservation for the enjoyment of future generations (Department of Natural Resources; 1978).

Although not specifically mentioned in the statement of purpose, the Division makes it quite clear through its policy guidelines that the use and availability of the parks shall be on a year-round basis. There are instances where the use of the parks during off-seasons is specifically encouraged by the Division in writing. In the past, the policy

regarding encouragement of off-season use, however, is unknown. The present policies may be different from those at the beginning of the study period.

Attendance History in Michigan State Parks

Michigan's first state park was established on Mackinac Island in 1895. Other parks were added to the system through the years and in 1923, when attendance records were established, visitors to the state parks in Michigan numbered 670,000 a year (see Figure 2). Curiosity was the reason cited by the Division for keeping records. There is a question as to the means by which the attendance information was collected. By 1931 Michigan boasted of the second highest annual state park attendance in the country. In 1937 the annual attendance was already almost one million people. During World War II attendance dropped dramatically; by as much as 25% in 1942. But, when the war ended attendance skyrocketed to record highs. At this point interest in parks began a steadily increase in popularity. Camping gained popularity as evidenced by the fact that in 1950 the number of campers had tripled since 1940. It was also in 1950 that the Department instituted a fee policy for the first time. Campers were charged 50¢ for the use of the facilities. This was in addition to the charge of 20% for electricity hookups that had been in effect for many years. Ten years later, in 1960, the Division began charging a daily fee for use of the day use areas. A steady growth in attendance continued in both camping and day use areas. Over the test period total park attendance has increased from 17 million in 1968 to 23 million in 1978.

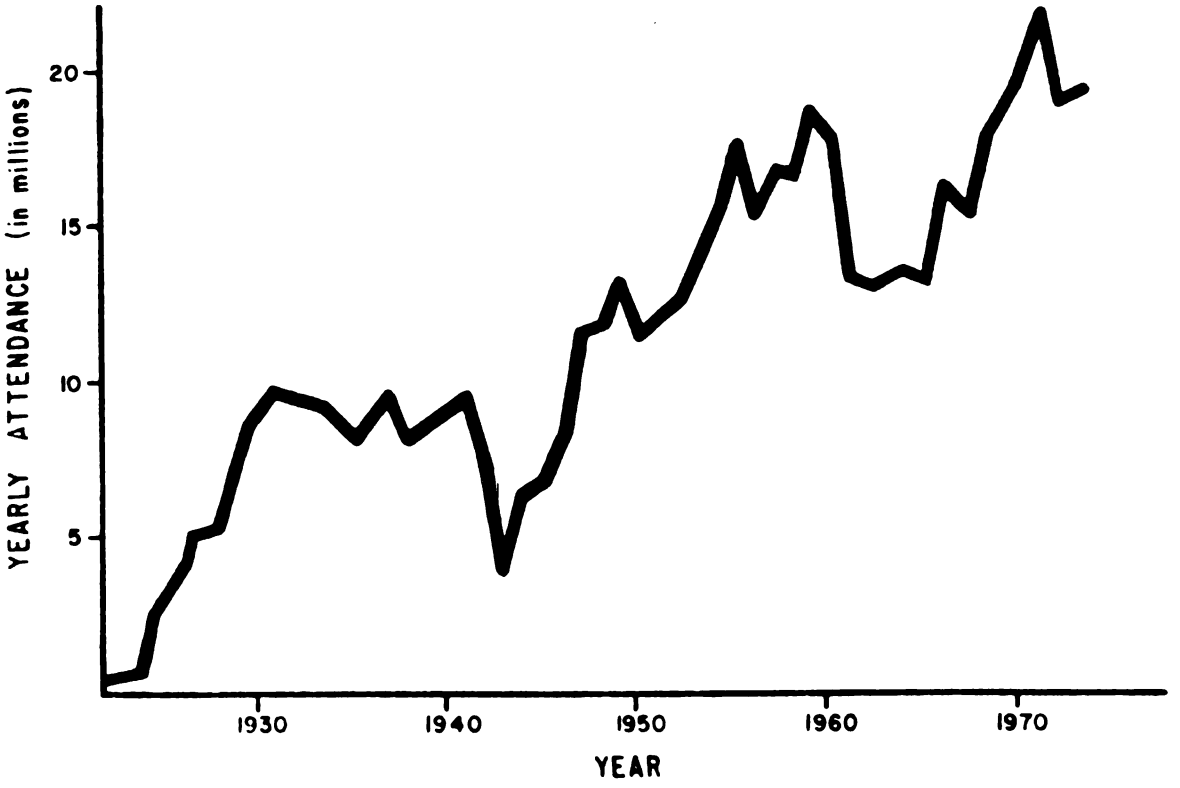

Figure 2. State Park Attendance for Combined Day Use and Camping (1920-1973)

Organization of the System

The size of the State Park System dictates that smaller units be established to aid administrative procedures and control. Ninety-two areas are distributed throughout the state. As mentioned above, many of the parks are located at or near interesting natural features such as waterfalls and lakes. The system is broken down into three, fairly equal sized, administrative regions to facilitate field activities.

Region I is comprised of the Upper Peninsula area. Region II includes the northern half of the Lower Peninsula, and Region III includes the southern half of the Lower Peninsula (see Figure 1, page 23).

The character of the parks differs in each region due to several factors. Region I includes the northernmost regions of this large state, and parks in this region tend to be more rustic and are generally established at natural settings of significance. Because of its remote geographic location Region I has traditionally received a major portion of its use during the warm months when travel is easier, and when many families take a vacation. A five hour drive is necessary to reach this area from the Detroit metropolitan area. Camping in Region I state parks is common because families are far enough away from home to stay several days (as opposed to weekend trips).

Region II is closer to the metropolitan areas of southern Michigan, but far enough away for people to 'get away from it all'. This region is characterized by second homes and resort areas for travelers. These areas are generally more developed than those in the region to the north.

Region III is the most highly developed due to the greater proportion of the population living there and a less extensive natural resource base. Most of the parks and recreation areas in this region are used heavily by the people from the Detroit, Chicago and Grand Rapids areas. The state parks in this region receive large numbers of visitors from the state just south of Michigan.

A list of state park names along with the regional classification is given in Appendix A.

Fee Structure

Charging for the use of park areas and facilities administered by the Division undoubtedly affects the use. The raising of a fee is likely to cause a decrease in the attendance. For this reason, a short discussion of the fee structure and history is included.

Motor Vehicle Permits became a requirement for any motorized vehicle entering park lands in 1960.* It was enacted to provide a source of revenue to repay the bonds which were sold for land acquisition and capital improvement.

A Camper Permit is issued to each camping party as they enter into the campground area. The Division's camping policy dictates that each camp must be registered on an official camp permit for record and control purposes. The permit is also a tool used by the campground staff members for campground rules enforcement and control.

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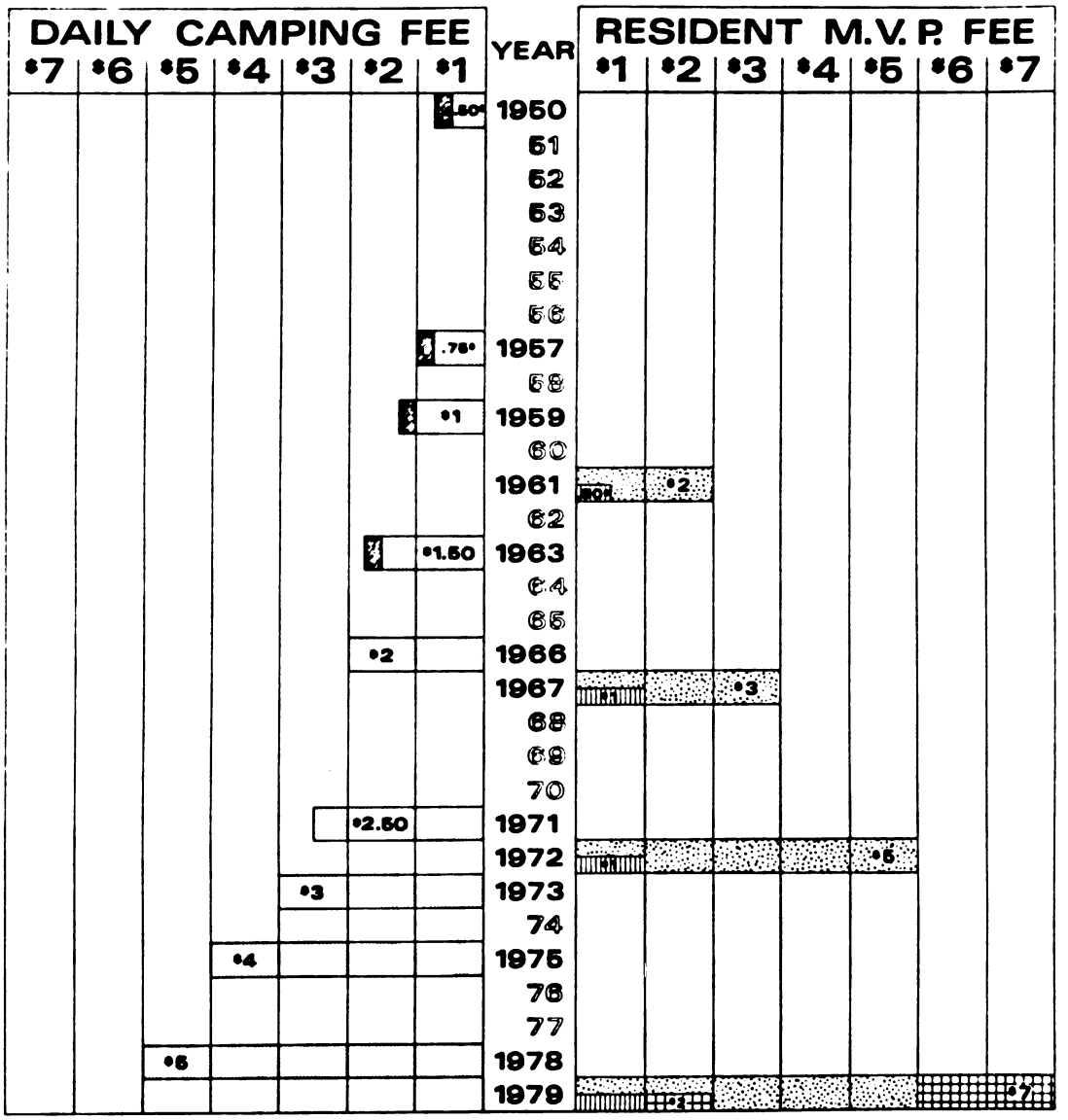
*Motor Vehicle Permit Act, Act 149, Public Acts of 1960, Act 286, Public Acts of 1967, and Act 145, Public Acts of 1971.

Over the years the amount charged for these permits has varied. Figure 3 gives a visual history of the fees charged in state parks for both day use and camping. Notice that several fee changes were instituted during the test period from 1968 through 1978. As fees were raised, the Division began to adopt new policies concerning differential rates. Realizing that some parks are used on mostly a day use basis, and with high frequencies of repeat visitors, the Division instituted an Annual Permit system where a family can pay once for the use of the park system for an unlimited number of times during the year. Daily Permits were still available for those wishing to 'buy' one trip to the park at a time. Also, due to the variations in use patterns, the Division instituted differential fees for out-of-state users at Warren Dunes State Park which serves mostly residents from other states (75%). Camping fees are differentiated too, depending on the degree of development at the campsites. In 1972 the Division instituted a special annual day use permit rate for resident senior citizens in an attempt to address the needs of this group.

It should be mentioned here that the fee rate for the use of park areas and facilities is undergoing rigorous debate. Some feel that charging higher rates will exclude some portions of the population, while others counter with the theory that people must realize that provision of parks is costly and the users must help bear the burden. At the present time there is no fee charged to anyone entering the park unless they drive in with some kind of motorized vehicle. All campers pay the same rate regardless of the type of transport in which they arrive.

MICHIGAN STATE PARKS FEE HISTORY



M.V.P.: Motor Vehicle Permit

ELECTRICITY .25¢

ANNUAL PERMIT

DAILY PERMIT

LEGISLATIVE PROPOSAL

Figure 3. Michigan State Parks Fee History

The fees charged within the state park system do not vary according to the season of the year. Except for camping permits, which are reduced when water facilities are shut off, all fees are collected uniformly throughout the calendar year. The Division's philosophy is that the users are provided with equal facilities, etc., on a year-round basis, so the fees reflect this. Although the Division is actively promoting year-round use of the state parks there is no fee incentive used to further this end.

Promotion of State Parks as a Year-round Operation

Because of the nature of the project, a glance at how the system is represented to the public is important. Is there emphasis on the fact that parks are open year-round, and offer activities and facilities for the off-season user?

For the typical tourist stopping at a travel information booth along a highway the Department of Natural Resources offers a brochure called Michigan State Parks which is a broad introduction to the system. Strong emphasis, both in wording and visually, is given to the use of the state parks during all four seasons of the year. General information regarding fees is offered as well as addresses and telephone numbers where further information may be obtained. Each park in the system is listed along with its location (on a map and as a postal address), size, number of campsites, camping information, day use facilities, activities, and special features. The parks are divided into the three regions (as mentioned earlier) for ease in understanding and identification.

This brochure is by far the most widely distributed and most often referred to when questions are asked.

Complementing this brochure is a booklet entitled Michigan Outdoor Guide published by the Automobile Club of Michigan (AAA) for its members. Similar information in this source gives greater detail on each park, and also includes information about other sources of outdoor recreation in the state (i.e., state forests, private campgrounds, etc.).

Several brochures have recently been published by the Department of Natural Resources to promote specific off-season activities. A brochure entitled Winter Quiet Places details places where people can go (both state parks and state forests) to enjoy winter activities such as snowshoeing, hiking, and cross country skiing. The brochure was a response to a need raised by residents for non-motorized areas when snowmobiles began to increase in popularity. The Department also publishes the Michigan Snowmobile Guide to Rules, State Parks, State Forests, State Game Areas which explains where to find areas to enjoy that sport. More recently the Division has compiled a list of specific cross country ski trails in state parks in an attempt to limit the accidents which occur by using trails not suited for this activity.

There are no brochures specifically designed to guide residents to state parks for fall and spring activities, although several tourist associations around the state provide general information on outstanding fall foliage areas and good fishing holes, which may be located on or near state park lands.

The Division of Parks is actively promoting the system as a year-round operation. Whether the emphasis has shifted over the last eleven years is difficult to ascertain. Reconstructing information used for promoting the parks over an eleven year period has been less than successful. There is reason to believe that the emphasis on off-season has increased gradually over the test period as the general increase in off-season outdoor activities has expanded in popularity. Today nearly half of the state park employees (330 people) are considered year-round employees. (The other half are employed only for the summer season.)

Collection of Use Data

Regardless of how carefully data is collected and compiled flaws and inaccuracies are inevitable. Since it is no longer practical to count heads as they come through the entrance, the Parks Division has adopted a sampling method to measure park use. This system is tested and revised every five years to assure accuracy. Each park manager is expected to keep records of daily attendance broken down into camping and day use. The use of the Park Weekly Report form (see Appendix B) enables the Division to maintain uniformity among parks. The Field Manual describes this report as,

> an account of all activities taking place in the park. Primarily for attendance purposes, the period covered is from Monday through Sunday. To arrive at a more accurate estimated day use attendance figures, count the number of vehicles in the parking lots sometime between 2-3 p.m., multiply this figure by 3 as a turnover factor, then multiply this answer by the factor assigned to each region as the persons per car count. Outdoor centers, frontier cabins, and trailside cabin users shall be counted as day users. Group camp counts over the normal factor used in figuring camper

> attendance should be added to the day use figure. To figure camping, count the number of camps that day at the end of the day, add the number of camps that are due out that day, then multiply this figure by the factor assigned to each region (Department of Natural Resources, 1978; Chapter 2; 1-2).

Although the method outlined is used for most parks, a few parks use traffic counters, gate counts or other means of collecting the information due to the character of the particular area. Such alternate methods are used only on an extremely limited basis.

Data Limitations

During the test period the Division changed the turnover rate multipliers in an attempt to improve accuracy of the estimated attendance per day at the parks. These changes are made infrequently and may result in abrupt shifts in use curves. Regression techniques help to smooth out these effects (see Figure 4).

Different styles in collecting the information on the part of the individual managers, may cause some degree of variation in the attendance figures gathered for individual parks. The existence of this variation should be kept in mind, as it may affect the reliability of the information. Aggregation of use data to systemwide totals was employed in an attempt to average out any variations encountered.

There is also a need to bear in mind that the method of obtaining estimated attendance does not seem to change as park use declines from summer to fall. If the system for determining attendance does not change during the off-season, there is greater reason to believe that the figures obtained do not accurately reflect the true count. It must

Turn Over Rate

	68	69	70	71	72	73	74	75	76	77	78
Region I	count the number of camps that day (including extensions) add number of										
Region II	camps due out that day, then multiply this figure by the multiplier.										
Region III											

Multiplier (average persons per car)

	68	69	70	71	72	73	74	75	76	77	78
Region I	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.01	4.01	4.01	4.01
Region II	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.04	4.04	4.04	4.04
Region III	4.45	4.45	4.45	4.45	4.45	4.45	4.45	4.11	4.11	4.11	4.11

Turn Over Rate

	68	69	70	71	72	73	74	75	76	77	78
Region I	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Region II	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Region III	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Multiplier (average persons per car)

	68	69	70	71	72	73	74	75	76	77	78
Region I	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.21	4.21	4.21	4.21
Region II	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.97	3.97	3.97	3.97
Region III	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.75	3.75	3.75	3.75

Figure 4. Formula for Calculating Attendance (Daily) (from 1968-1978)

be remembered as analysis information is presented that although the researcher is aware of these reliability flaws, it is assumed such flaws, over time, average out through the use of aggregation to system-wide figures and allow conclusions to be drawn from the calculations made.

CHAPTER IV

ANALYSIS

The results of the data manipulations are discussed in this chapter. They are presented in three sections corresponding to the three objectives as restated below:

1. Document day use and camping levels at Michigan State Parks by season from 1968 through 1978.
2. Establish trends in seasonal use (winter, spring, summer, fall).
3. Test hypotheses as to why some state parks attract more off-season use than others based upon locational factors and site characteristics.

The first section shows the levels of use in actual numbers of visitors and as percentages which indicate how many visitors can be attributed to each season as part of the total annual use over the eleven year test period. In the second section the trends and patterns of use for each of the seasons are shown and are compared with one another. A statistical straight-line trend is also calculated for each season. In the final section site the locational characteristics are examined to assess their influence on off-season attendance.

Camping and Day Use Levels by Season

Camping in the state parks occurs during all four seasons. The summer season is by far the most popular of the four, averaging five

million campers a year. Spring, fall and winter camping each average less than 500,000 people a year. These three seasons, considered the off-seasons, contribute only 15% of all state park camping. Summer use appears to be slightly more volatile but maintains an average 85% of total state park camping use. The proportion of summer to off-season use may be better visualized by looking at Figure 5. The area between total camping use and summer camping use is attributable to the off-seasons. The area beneath the summer camping use line represents summer camping. This clearly indicates that, during the study period, off-season camping is substantially less than summer (see Appendices C and D for camping and day use by season (1968-1978)).

Day use levels of Michigan State Parks during the study period differ from camping. Although summer day use still exceeds off-season day use, its share of total day use is smaller. Off-season day use is almost double that of off-season camping averaging 29% over the eleven year period. Again, the three off-seasons share similar proportions of total use. Note that day use figures are substantially higher than camping during all four seasons. It is interesting to note that the ranking of the three off-seasons differs from camping to day use (see Figure 5). Spring is the most popular off-season for day use, whereas, fall is the most popular off-season for camping during the study period.

Trends in Seasonal Use

Although the proportion of total annual use attributed to each season is important, this is not the major thrust of this study.

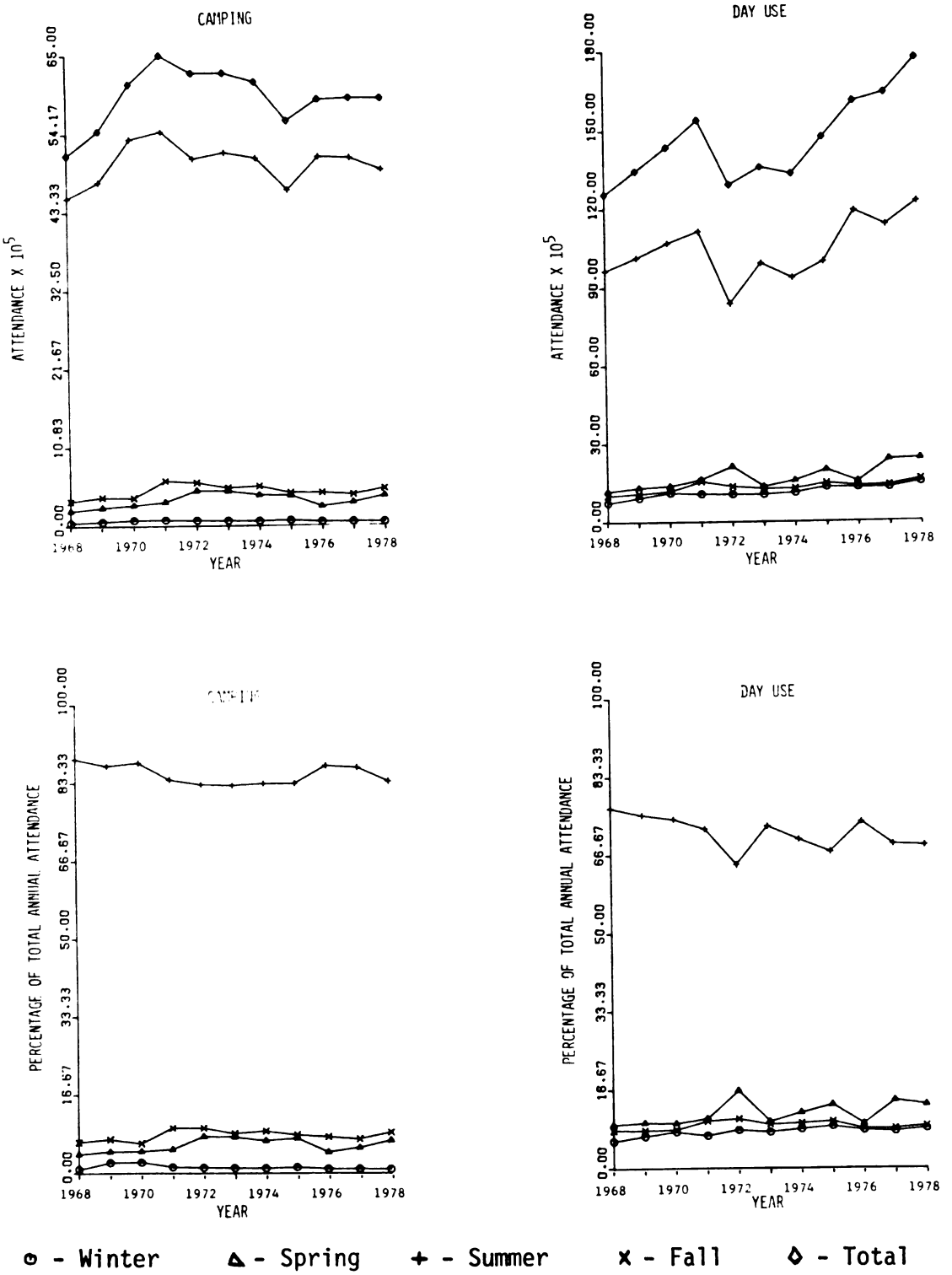


Figure 5. Michigan State Park Camping and Day Use by Season (1968-1978).

Of more interest are the changes in off-season use over the test period, and any trends that might be established from these patterns. In order to identify trends and to extrapolate these changes into the future, a least squares regression line is fitted to the individually plotted seasonal attendance figures. The reason for doing this is to statistically determine the eleven year trend and smooth out short-term fluctuations that may be due to weather conditions, changes in state park policies, or methods of counting users. The slopes of these regression lines are tabulated in Table 4. Two values for each season are shown. One is the change in actual number of users per year. For example, the winter camping level is decreasing at the rate of 920 campers per year, or 9,200 campers over a ten year period. The other listing is of the relative change per year. This is defined as how the share of total winter use changes in relation to total annual use. We can see from Table 4 that the share of summer camping is declining at the rate of 0.28% per year (see Appendix E for Regression Line End Points).

Total Camping and Day Use

Both camping and day use totals show large year to year fluctuations during the study period. But, in spite of the yearly fluctuations there is an overall trend toward increased use. Camping use increased 15% (relative to 1968 attendance over the test period) which may be an indication that campgrounds are used to capacity at traditionally high-use time periods such as weekends and summer months. On the other hand, day use totals during the test period increased rather sharply. The statistical line of regression indicates that between 1968 and 1978

Table 4. Slope of Regression Lines for Seasonal Camping and Day Use

Season	Average Change Per Year In Attendance	Average Change Per Year In Percentage of Total Annual Use
	Camping	
Winter	-920	-.02
Spring	12,000	.19
Summer	9,000	-.28
Fall	7,000	.10
Total	27,000	----
	Day Use	
Winter	59,000	.24
Spring	100,000	.44
Summer	184,000	-.29
Fall	41,000	.09
Total	311,000	----

three million additional people visited Michigan State Parks for a day outing (see Figure 6). This equals a 41% increase in total day use relative to 1968 day use levels. The importance of the increase lies in the distribution of the change across the four seasons.

All seasons showed signs of "zigzagging" in use from one year to the next. Increases in one year were compensated for in the next year by similar decreases. These patterns may be the result of many causal factors. Weather is perhaps the most influential. Without doing exhaustive research into specific factors which may be causing use fluctuations the conclusions which may be drawn from the study are limited. Thus the statistical emphasis has been adopted to allow broad base conclusions regarding use trends.

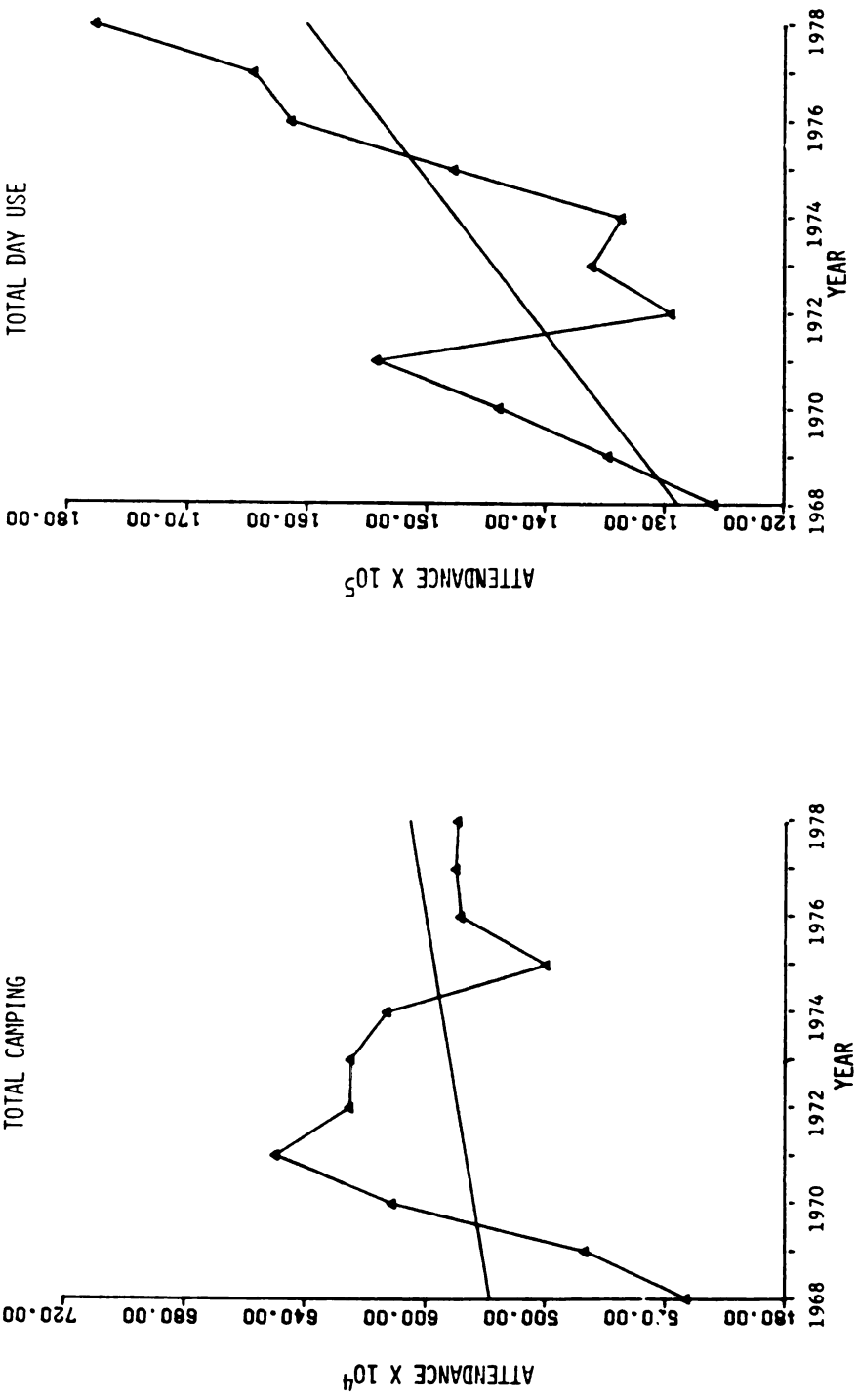


Figure 6. Comparison of Total Camping and Day Use Levels

Seasonal Camping and Day Use

In actual numbers of state park visitors the figures show that spring, summer and fall camping seasons all showed overall increases in camping use. Winter camping actually declined (see Figure 8). In relative terms, however, both winter and summer declined in share of total annual use. This is an important indication. It means that even though summer visitors increased in number during the test period, proportionately fewer people camped during the summer as the test period progressed. In terms of relative use (seasonal use relative to total use) fall and spring camping are increasing 50% and 97% respectively* during the test period.

It is important to note the distinction between actual numbers of visitors and proportionate use by season. For example, actual summer camping use attendance showed a general increasing trend (from 4.9 million people in 1968 to 5.0 million people in 1978). That is an increase of 100,000 people. But, summer camping use in relation to total camping use actually declined, overall, from 86% in 1968 to 83% in 1978. (see Figure 8). That shows a decrease of 3%. The study is more concerned with the relative proportion of use which can be attributed to each season (and the change over the eleven year test period) than in actual numbers of people using state parks. Nonetheless, it is important to report both figures to acknowledge the fact that summer use (both camping and the day use) still constitutes an important portion of state park use.

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*Relative to 1968 use levels Percent Change = $\frac{\text{1978 percent attendance - 1968 percent attendance}}{\text{1968 percent attendance}}$

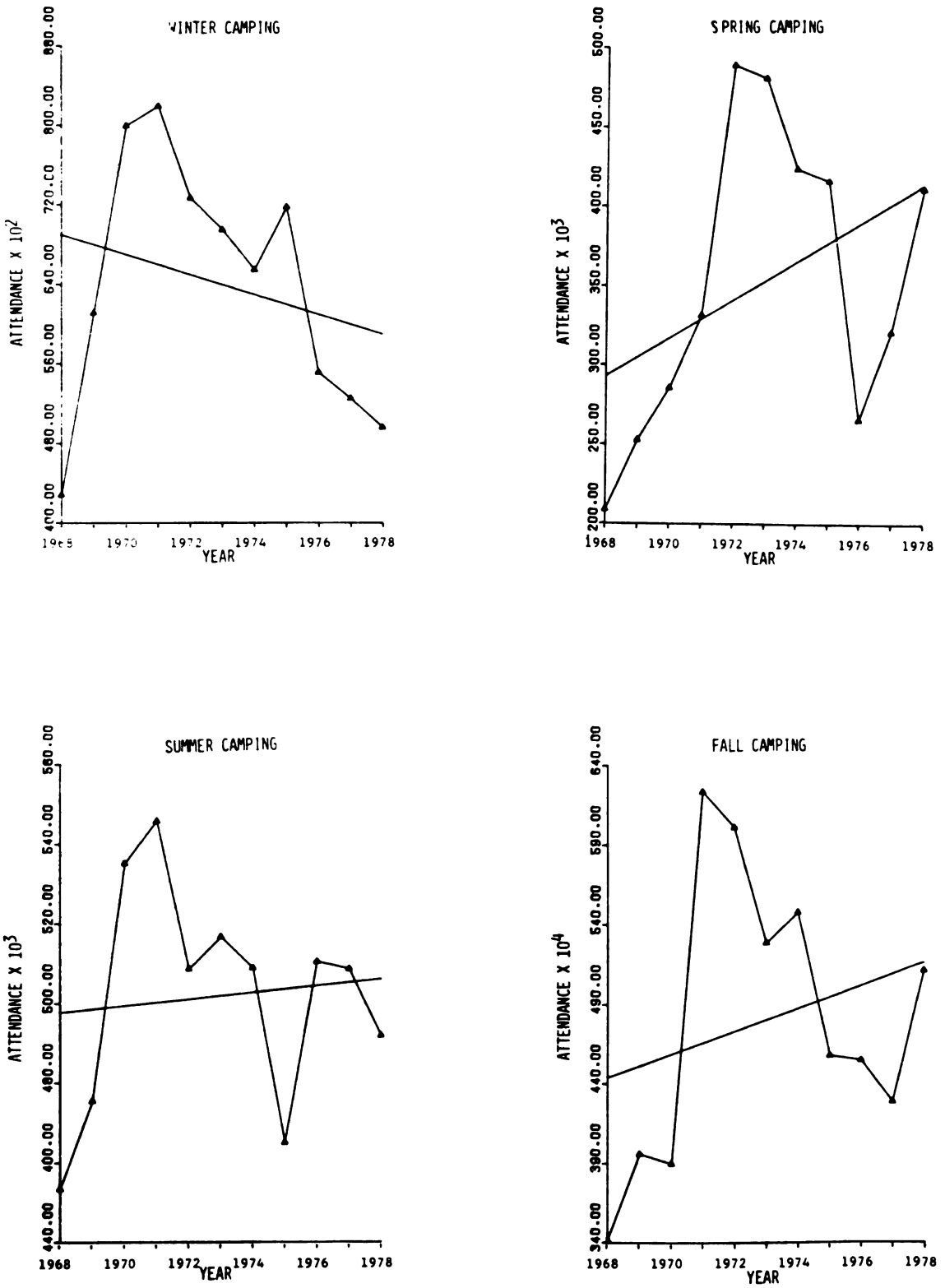

Figure 7. Annual Michigan State Park Camping by Season (1968-1978)

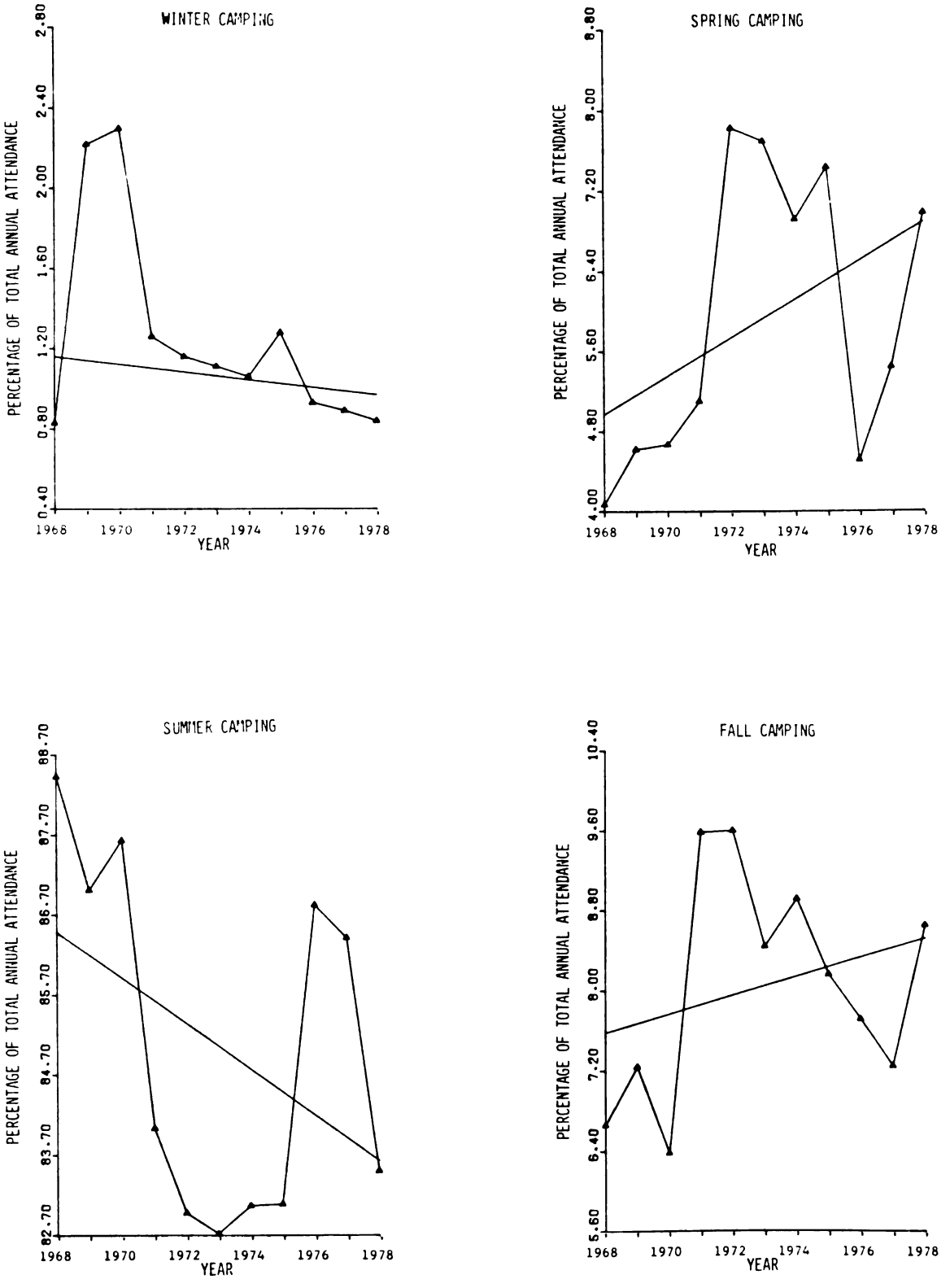

Figure 8. Seasonal Contributions to Annual Michigan State Park Camping (1968-1978)

Day use of state parks increased, generally speaking, in actual numbers of visitors during all four seasons of the test period (see Figure 9). Summer showed the smallest increase (27%) in the number of visitors using state park day use facilities. Fall day use rose 57%. Winter and spring showed equally large increases of 106% and 105% respectively. This means that day use during winter and spring more than doubled during the test period. The winter increase may be related to the spreading popularity of snowmobiling and other winter sports which developed during the test period. The increase in spring day use is not as easily explained. It may be due, in part, to the overall increasing awareness of state parks as year-round recreation facilities.

According to the statistical trends, summer day use is becoming proportionately smaller in relation to total state park day use (see Figure 10). All three off-seasons showed an increasing trend, whereas summer showed a decline. This is important for the conclusions drawn from the study. It supports the hypothesis that there is increasing off-season use of Michigan State Parks, and may indicate that day use is gradually becoming more evenly distributed throughout the year. It would be interesting to learn whether the decline of summer day use and increase in off-season day use during the test period are directly related. Further testing into the underlying causes of the change in use patterns and possible shifting of use from summer to off-season is needed to make conclusive statements.

Spring day use is increasing at a faster rate than the other off-seasons (from 9% in 1968 to 14% in 1978). During the test period it increased 4.3%. Winter day use is increasing at 2.3% and fall is third

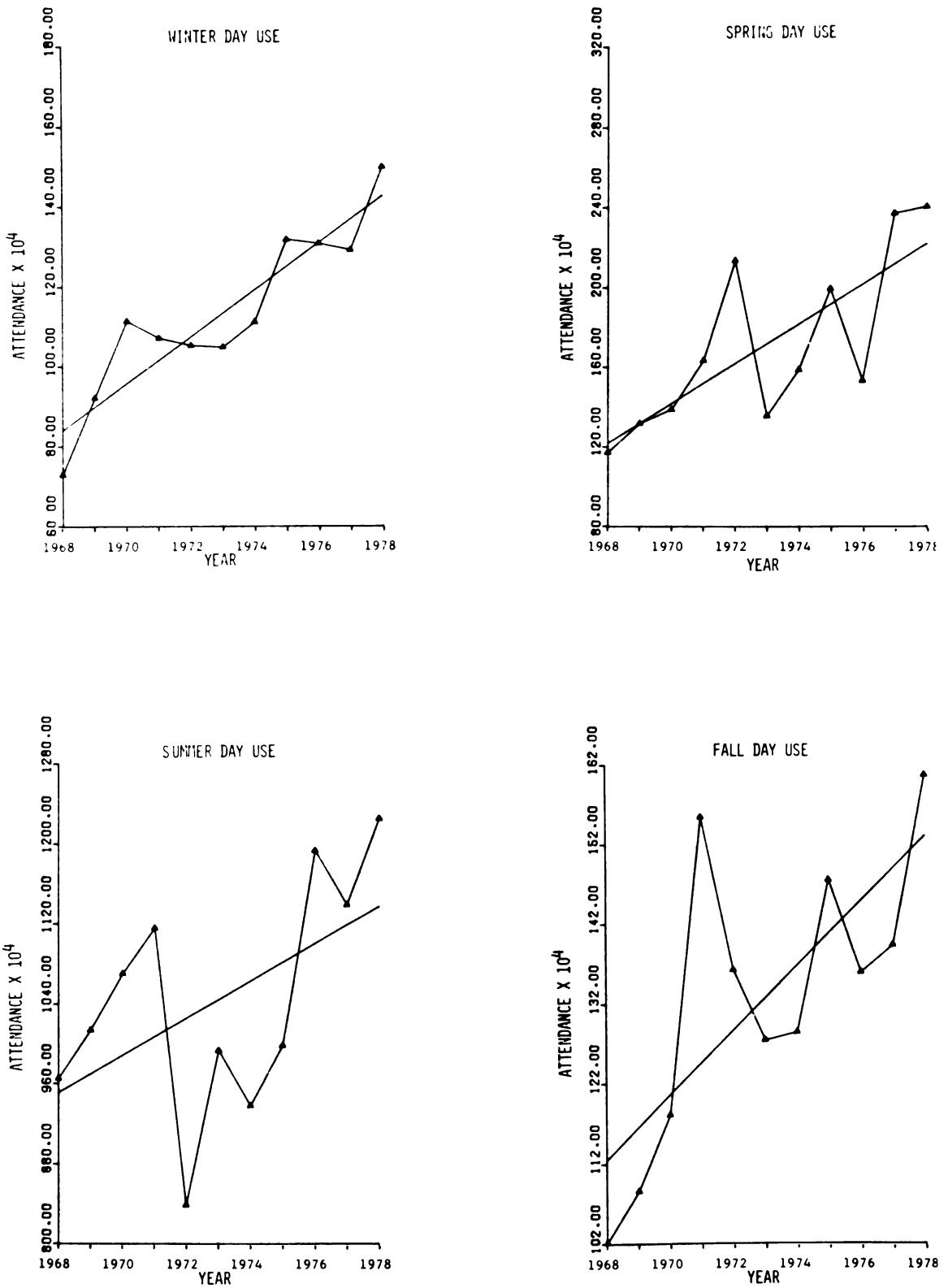

Figure 9. Annual Michigan State Park Day Use by Season (1968-1978)

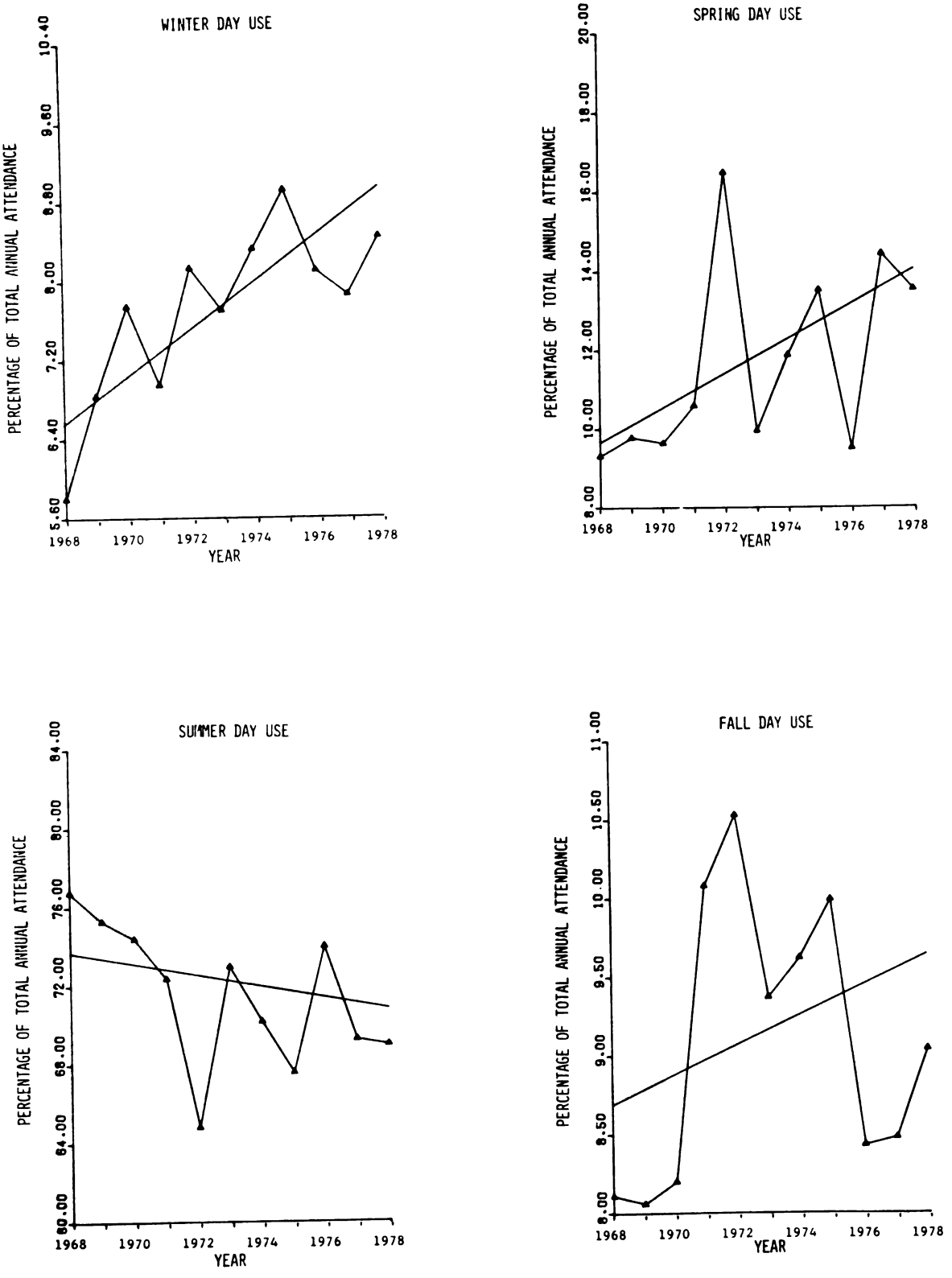

Figure 10. Seasonal Contributions to Annual Michigan State Park Day Use (1968-1978)

with an increase of less than 1%. Summer on the other hand, decreased almost 3% between 1968 and 1978.

Investigation of Locational Factors and Site Characteristics

So far the analysis has been helpful in identifying system-wide trends in camping and day use. This section describes the results of a procedure used to separate parks into groups to aid in identifying which park characteristics appear to promote greater off-season camping and day use at Michigan State Parks. The three off-seasons are aggregated together and treated as a single unit. Therefore, unique seasonal characteristics, such as snowmobile trails, are not included. The characteristics chosen for inclusion in this section are based on categories devised by Bilodeau (1977) for his study of peaking tendencies at Michigan State Park campgrounds.

Tests for the effect of site and locational characteristics of off-season use employ the following approach. First, the sixty-six parks that had eleven full years of attendance records were identified. These parks were divided into categories defined by the presence or absence of the characteristic under study. For example, the first test is for the effect of location by region, so the sixty-six parks are divided into three regional subgroups. Several seasonal use measures are then calculated for each subgroup. These are: average percent of off-season use for the period 1968-1978; average percent of off-season use for the period 1972-1974; average percent of off-season use for the period 1975-1978; and the 1968-1971 average subtracted from the

1975-1978 average. The latter number gives a smoothed rate of change in off-season use over the test period. Comparing the changes in off-season use between the categories gives an indication of the relative importance of the particular site or locational characteristic being tested.

Locational Factors

Five locational factors were tested. The results are shown in Table 5. The first test was undertaken to determine the influence of regional placement on off-season use. Region II (upper lower peninsula) shows the highest average off-season camping use of the three regions. The trend toward greater off-season use is also more pronounced in Region II than in other regions. Day use during the off-season is highest in Region III. This is as might be expected since the largest concentration of population is in southern Michigan and people are not as apt to travel as far for a day outing during the off-seasons because of job and school schedule restraints, as well as weather conditions. Also, the trend toward greater off-season day use is more pronounced in Region III.

The next test was placement of state parks on the great lakes. It was found that off-season day use and camping at parks which do not lie on Great Lakes water is higher than those which do. However, the trend shows that off-season camping and day use of parks situated on the Great Lakes is increasing faster than inland parks. If the present trend continues, the categories will have approximately equal attendance

Table 5. Locational Factors Tested for Influence on Off-season Use

Test	Camping				Day Use			
	Average Percent of Off-season Use			Average Increase in Percent of Off-season Use	Average Percent of Off-season Use			Average Increase in Percent of Off-season Use
Locational Factors	(1968-71)	(1972-74)	(1975-78)	(1975-78)-(1968-71)	(1968-71)	(1972-74)	(1975-78)	(1975-78)-(1968-71)
Regional Placement								
Region I	1.00	1.52	1.37	.41	2.22	3.09	3.03	.80
Region II	3.74	5.28	4.51	.81	6.08	7.41	6.89	.76
Region III	3.58	4.54	3.99	.44	6.71	7.67	7.60	.87
Placement on Great Lakes								
Great Lakes	2.93	4.41	4.00	1.14	6.00	7.92	7.71	1.64
Inland	5.39	6.91	5.87	.52	9.01	10.25	9.81	.79
Proximity to Detroit								
Within 100 miles	2.78	3.42	3.06	.30	5.03	5.48	5.41	.37
Greater than 100 miles	5.40	7.70	6.60	1.29	9.71	12.34	11.79	2.01
Proximity to Other Urban Centers								
Within 50 miles	1.39	1.74	1.50	.13	2.53	2.83	2.84	.30
Greater than 50 miles	2.90	4.43	3.81	.95	5.46	7.02	6.64	1.17
Proximity to Interstate 75								
Within 25 miles	2.15	3.27	2.79	.66	4.95	5.71	5.56	.58
Greater than 25 miles	6.17	8.05	7.08	1.00	10.06	12.46	11.96	1.85

in twenty years. According to the Bilodeau study, peaking tendencies at inland parks is more severe. The fact that inland parks experience both high peaking tendencies and greater off-season use is interesting and merits further investigation, especially since both camping and day use are affected.

This test exhibits a common trait to many of the tests. Highest attendance counts were often during the middle three years of the test period, and it is typical to note the highest percentage of off-season use for this period in these tests. But, the decline in the last four years is not severe enough to lower percentages to their original level in the first period of testing.

The third category tested the influence of proximity to Detroit as an influence on off-season use of state parks. The Detroit metropolitan area is thought to exert tremendous influences on most phases of life in Michigan. Table 5 indicates that Detroit may act as a deterrent to off-season use growth. Clearly for both day use and camping the figures show a preference for parks away from the city area. Also, the rate of growth in off-season use is much higher for both day use and camping in parks not situated near the metropolitan area. The implication here seems to be that people prefer to get away from the urban environment even during seasons when travel may be difficult.

Bilodeau found that parks away from the Detroit area tended to show higher peaking tendencies. The fact that overcrowding (peaking of demand) is more prevalent at the same parks which show higher off-season use may be an indication that even though people prefer to be away from urban environments they tend to flock together at park areas located

substantial distance away from the urban center.

After determining the influence of Detroit on off-season use other urban areas were tested. Proximity to urban centers was defined as those parks within fifty miles of the cities with a population of forty thousand people or more (World Almanac and Book of Facts, 1975). The centers included in the test were Battle Creek, Flint, Saginaw/Bay City, Midland, Grand Rapids, Lansing, Jackson, Ann Arbor, Kalamazoo, Muskegon and Detroit (a radius of one hundred miles was maintained for Detroit). This test further corroborates the conclusions made from the last test. In camping and day use categories figures show that a greater percentage of off-season use can be attributed to parks lying at least fifty miles from any of the metropolitan areas named. The trend shows that parks near urban centers are increasing in off-season use at a slower pace.

As with the patterns of off-season use relative to urban centers, the test for proximity to Interstate 75 as an influence on off-season use indicates that there is greater off-season use occurring in parks at distances greater than twenty-five miles from the major north/south interstate highway in Michigan. Parks more distant from the highway also seem to be gaining in off-season use attendance faster than those close by. There is reason to believe that this factor alone is not responsible for off-season use patterns. It may stem from the fact that people generally seek to get away from noise and civilization when recreating. The pattern shows that both day use and camping are affected. The highest use figures appear once again during the middle three years of the test period.

Site Characteristics

The results of two tests for site characteristics are presented in Table 6. Although other characteristics were tested, the results were not significant relative to off-season use so they are not presented. The type of campground at state parks was tested to find the influence "type" has on off-season day use and camping. Also tested was the presence of hiking trails at state parks.

Three kinds of campground offerings were defined for the first test: modern only, modern and rustic, rustic only. Some parks offer modern campground facilities only. These include features like flush toilets, electrical hookups, sanitation stations, camp store, etc. Other parks offer rustic campgrounds only. These include features such as hand pumped water, vault toilets and other bare essentials (some do not even have all of these). The third type of park has both kinds of areas, which means they are usually able to accommodate more campers at one time and can operate even when weather dictates that water be turned off, etc. (rates vary according to type of campground).

Modern campground facility parks showed the highest off-season use, as well as highest rates of growth on off-season use (see Table 6). Even day use during the off-season is shown to be heavily influenced by the type of campground offered. The positive relationship between off-season use and degree of park campground development was expected.

It was hypothesized that hiking trails might draw greater numbers of people to parks during off-season months of the year (see seasonal

Table 6. Site Characteristics Tested for Influence on Off-season Use

Test / Site Characteristics	Camping: Average Percent of Off-season Use (1968-71)	Camping: Average Percent of Off-season Use (1972-74)	Camping: Average Percent of Off-season Use (1975-78)	Camping: Average Increase in Percent of Off-season Use (1975-78)-(1968-71)	Day Use: Average Percent of Off-season Use (1968-71)	Day Use: Average Percent of Off-season Use (1972-74)	Day Use: Average Percent of Off-season Use (1975-78)	Day Use: Average Increase in Percent of Off-season Use (1975-78)-(1968-71)
Type of Campground								
Modern Campground only	5.26	7.34	6.40	1.18	8.25	10.76	10.22	1.91
Modern and Rustic Camp	1.94	2.30	1.88	0	3.44	3.90	3.73	.27
Rustic Campground only	1.14	1.68	1.40	.35	2.56	2.70	2.68	.13
Hiking Trails								
Parks with Trails	6.79	9.16	7.99	1.34	12.74	15.02	14.55	1.76
Parks without Trails	1.53	2.16	1.88	.32	2.27	3.15	2.97	.67

distribution of hiking participation in the Michigan 1976 Recreation Survey). Overall, those parks that offer hiking trails received an average of 7% more off-season use than those that do not. The rate of increase in off-season use (both camping and day use) is greater for parks with hiking trails. This may be due in part to the fact that hiking trails can be used for a range of activities including foliage tours in the fall, cross-country skiing in the winter, and berry picking in the spring.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The study shows that Michigan State Parks are receiving more off-season use, and that the summer share of use is showing signs of declining. Attendance at Michigan State Parks increased by almost six million people between 1968 and 1978. Both camping and day use increased, as did the off-season totals. Table 7 is a summary of percent changes in system-wide off-season attendance during the test period. Note that day use is consistently higher than camping, and is gaining in popularity with greater speed. If this trend continues it will become increasingly important for the Parks Division to provide more planning, money, and manpower to maintain and operate parks during the traditionally slow months.

Most seasons are experiencing increases in attendance each year. Only winter camping is declining in actual numbers of visitors. For day use, all four seasons show increases. When the three off-seasons are aggregated together they indicate that their popularity as seasons for outdoor recreation activities is gaining rapidly. Virtually all the non-summer months are gaining at a faster rate than summer. Not only are the off-seasons gaining in actual number of visitors, but they are also gaining in their share of annual use compared to summer. Over the eleven years the summer day use share has dropped from 77% to less

Table 7. Percent Change in Use From 1968-1978 by Season (Relative to 1968 Use Levels)

	Camping	Day Use
Winter	16%	106%
Spring	97%	105%
Summer	9%	27%
Fall	50%	57%
Total	15%	41%

*Percent $\Delta = \frac{\text{1978 attendance - 1968 attendance}}{\text{1968 attendance}}$

than 71%. Some of the reasons for this loss of share might be attributed to the maximum carrying capacity being reached. While the weekdays and off-seasons still have plenty of capacity for use, the summer weekend capacity may be near full. Both camping and day use are limited in this way. The number of campsites or the size of the parking lot in any given area effectively limits the number of people using an area or facility at any given time.

The study found that the seasonal use of parks may be affected by such site characteristics as type of campground and the existence of hiking trails. Locational factors that seem to affect use patterns during the off-season include proximity to urban center, location on the Great Lakes, and the distance from Interstate 75. The tests showed that parks with greater off-season use were those which were located away from the Great Lakes, greater than twenty-five miles from Interstate 75, and with only modern campground facilities. The same parks

offered hiking trails and an atmosphere away from urban centers. Other characteristics that were tested, but did not conclusively show an effect one way or the other were: number of acres in a park, number of campsites in a campground, and a breakdown of urban centers individually.

The fact that many other influential factors exist is not to be ignored. Some characteristic other than those site and locational factors tested may be the dominant influence in whether certain parks get more or less off-season use. The information presented can be used by managers and administrators when planning for off-season use. It is also a nucleus to give direction to further practical study.

Comments

The project was not without its problems and disappointments. The reliability of the raw data used for the tests was cause for doubt in the research process. In addition, obtaining historical information from the Parks Division was difficult and sketchy. The present Parks Division method of keeping records is organized in such a manner as to make an investigation of the information-collecting methods frustrating, difficult and often unsuccessful. The use of computerized record keeping has just recently been instituted and was not helpful to this study in most respects. As is often the case, the personnel of the State Office have most of the historical perspective in their heads. Written documentation of many important documents is lacking or difficult to recover.

With the results obtained the Parks Division can now move forward and make some policy decisions based upon more factual information and less intuition. The information presented will also be of use to other researchers investigating seasonality trends.

Recommendations

As with many studies of this type, one of the first observations to be made is that much more study is needed to fully understand the problem. Several observations and recommendations can be made however.

The most obvious need brought out by this study is that of a more precise and accurate method of obtaining off-season use attendance information. Application of the same techniques for estimating use for summer and the off-seasons may not be valid. For example, people may simply drive through or around in the park, or may park in areas of the park other than the main lot, and may not come in contact with park personnel during the fall, winter and spring months. Although counting vehicles parked in the lot at a given time on a summer afternoon may accurately estimate summer attendance levels, using this method for off-seasons may not be a good indicator of use. At the present time no other official method of estimating attendance exists. The turnover rate and party size used for estimating attendance may also differ during off-seasons.

The types of use a park receives differ according to the season of the year. Although park activities during summer months are well documented through various surveys there is little indication that

off-season activities, especially spring and fall, have been documented. Conducting a survey to learn more about off-season use (types, patterns, etc.) of state parks would be helpful to the Divison in more effectively implementing their off-season use policies.

If the goal is to redistribute use to alleviate crowding, then it is time to institute the policies that will enhance that goal. Making use of differential fees during different seasons is one way. To make the park areas more attractive during the off-seasons, a reduction in the price of use permits might be considered. At the same time, raising the level of fees charged during busy times may deter summer crowds and encourage greater use at other times of the year.

By far the most influential factor on use is the knowledge that the areas exist, are open and offer plenty of activity during the off-season. Improved consciousness by the public of what is available is likely to increase the attendance. Promotion of state parks should emphasize the off-season attractions if encouragement of off-season use is desired. Publishing of brochures, advertising in the media and talking to summer patrons will all serve to increase awareness of parks as a year-round operation.

Further Study

The undertaking of a study invariably creates a far greater list of questions to be answered than answers to be reported. The more a researcher learns, the more needs to be learned. This study has generated many questions and areas for further study.

After reading through the literature related to seasonality it became quite obvious that a far greater knowledge of climatology and specific weather patterns in the study area was needed. A greater understanding of specific park use patterns is dependent upon understanding exactly what makes one park different from all the others. With this realization this study changed slightly in direction. System-wide trends were emphasized to lessen the local effect of climate on an individual park or group of nearby parks.

Park use also seems to be affected by specific local activities. The study attempted to veer away from investigating specific events such as festivals, which affect park attendance. In order to thoroughly understand use patterns in any specific park this phase of seasonal activity should be further explored. On a larger scale, the effects of activities which affect all parks, but some more than others, should be investigated. Exactly how does a gas shortage affect seasonal use? Does it affect all parks alike? Raising of fees, including park fees, license fees and taxes, surely affect park use patterns. This is an area which needs more study.

While working with the results of the seasonal graphs I realized that each season should be studied individually to see how it differs from the others. This study originally tended to group the three off-seasons together, under the assumption that they are alike. In a sense they are similar when compared to summer, but each began to show unique qualities which should be further explored. The three off-seasons each show different levels of use as well as different rates of growth. In particular, the winter season seems to exhibit unique characteristics.

The new popularity of outdoor sports in this decade is surely an influential factor, but there are others to be explored. The advertisement of winter activities at state parks, for example, may be increasing the winter use. The Division does not publish brochures specifically dealing with spring and fall. The Division's concentration of promotional effort on winter is reflected in the rate of increase in winter day use. Promotion and advertisement of the various seasons could prove to be an interesting topic of study. Exploring reasons for a decline in winter camping might also be addressed.

The analysis of site characteristics also raised possibilities for further study. It would be informative to know exactly what park offerings each park has (i.e., camping, hiking, skiing, fishing, etc.) during each season and compare and contrast parks as separate entities. The inventory could include outside influences on the park which directly affect attendance levels. This would compliment the work already completed. Included in the inventory should be an indication of when the offering was instituted. If the addition of a hiking trail occurred in 1975 and attendance during off-season months increased sharply that year, then perhaps the existence of a hiking trail has important implications for off-season use levels. This method of establishing impact on parks by specific features could prove useful to the Division in its planning efforts.

An area which this study did not explore but is important to learn more about, is the economic impact of state parks on local communities. How much does the increase in year-round use create a similar increase in retail sales at the local market? Does the presence of more people

in the area all year round influence the town in other ways? The questions to be answered go on.

In any area of research there are usually economic implications. This is especially true in recreation. People want to know how to get the most return on their dollar. In an era of spiraling inflation and benefit cost analysis these kinds of studies are of particular interest. Personal interest in the way in which government spends the tax dollar is becoming increasingly common. Because the government controls, to a large extent, the direction of the economy most people are more interested than ever to learn more about what government plans to do.

Whether or not the Division of Parks will be influenced in their decision-making regarding seasonal use of parks is not of paramount importance to this study. The Michigan State Park system was used as an example to show that seasonal use of parks is changing. The goal was to increase general awareness and knowledge of the changes occurring in use patterns of natural areas. The information presented supplements and corroborates some of the information in other park use studies. Hopefully, others will follow to make use of and add to this information.

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APPENDICES

APPENDIX A

MICHIGAN STATE PARK SYSTEM: PARK NAMES AND REGIONS

Region I

Baraga State Park
Brimley State Park
Fayette State Park
Fort Wilkens State Park
Lake Gogebic State Park
Indian Lake State Park
F. J. McLain State Park
Muskallonge Lake State Park
Porcupine Mountains Wilderness State Park
Straits State Park
Tahquamenon Falls State Park
Van Riper State Park
J. W. Wells State Park
Palms Book State Park
Twin Lakes State Park
Bewabic State Park

Region II

Aloha State Park
Bay City State Park
Burt Lake State Park
Harrisville State Park
Hartwick Pines State Park
Higgins Lake State Park-South
P. H. Hoeft State Park
Interlochen State Park
Ludington State Park
Charles Mears State Park
William Mitchell State Park
Onaway State Park
Orchard Beach State Park
Otsego Lake State Park
Silver Lake State Park
Traverse City State Park
Wilderness State Park
Wilson State Park
Young State Park
Cheboygan State Park
Gladwin State Park
White Cloud State Park
Rifle River Recreation Area
Tawas Point State Park
Clear Lake State Park
Newaygo State Park
Higgins Lake State Park-North

Region II

Muskegon State Park
Algonac State Park
Bald Mountain Recreation Area
Brighton Recreation Area
Dodge Brothers State Park No. 4
Grand Haven State Park
W. J. Hayes State Park
Highland State Park
Holland State Park
Holly Recreation Area
Island Lake Recreation Area
Lakeport State Park
Metamora Hadley Recreation Area
Ortonville Recreation Area
Pinckney Recreation Area
Pontiac Lake Recreation Area
Proud Lake Recreation Area
Rochester-Utica Recreation Area
Albert E. Sleeper State Park
Sterling State Park
Warren Dunes State Park
Waterloo Recreation Area
Yankee Springs Recreation Area
P. J. Hoffmaster State Park
Ionia Recreation Area
Sanilac State Park
Sleepy Hollow State Park
Van Buren State Park
Cambridge State Historic Park
Duck Lake State Park
Maybury State Park
Seven Lakes State Park

APPENDIX B

PARK WEEKLY REPORT FORM

Department of Natural Resources
Parks Division

PARK WEEKLY REPORT

PARK OR AREA

WEEK ENDING Month Day Year

DAY	CAMP PERMITS	RESERVATIONS CONFIRMED	CAMPS	ATTENDANCE			NO. OF VEHICLES TURNED AWAY		CAMPSITE RESERVATION APPLICATION DISTRIBUTION			
				CAMPERS	DAY USE	TOTAL	CAMPER	DAY USE				
MON									THIS WEEK			
TUES									PREVIOUS			
WED									TO DATE			
THUR												
FRI												
SAT									MOTOR VEHICLE PERMITS SOLD			
SUN									ANNUAL	DAILY	SENIOR RESIDENT ANNUAL	NON RESIDENT DAILY
TOTALS WEEK												
TOTALS PREVIOUS												
TOTALS TO DATE												

DESCRIPTION OF WORK AND ACTIVITIES

ADMINISTRATION:

MAINTENANCE

CONSTRUCTION

DAY USE

CAMPING

SPECIAL REMARKS:

Distribution
White: Division
Pink: Region
Canary: District
Blue: Park

PARK MANAGER'S SIGNATURE

(Tumble the set and use reverse side IF NECESSARY)

R3006
10-74

APPENDIX C

STATE PARK SYSTEM SEASONAL ATTENDANCE: 1968-1978 (CAMPING)

	Winter	Spring	Summer	Fall	Total
1968	42,761	208,775	4,533,648	341,478	5,126,662
Percent	0.83	4.07	88.43	6.66	100.00
1969	61,069	252,828	4,754,766	395,889	5,464,552
Percent	1.11	4.62	87.01	7.24	100.00
1970	79,872	285,583	5,352,824	389,735	6,108,014
Percent	1.30	4.67	87.63	6.38	100.00
1971	82,032	331,729	5,459,257	623,420	6,496,438
Percent	1.26	5.10	84.03	9.59	100.00
1972	72,731	489,722	5,087,411	600,929	6,250,793
Percent	1.16	7.83	82.98	9.61	100.00
1973	69,479	481,696	5,168,555	528,309	6,248,039
Percent	1.11	7.70	82.72	8.45	100.00
1974	65,528	424,306	5,090,690	547,460	6,127,984
Percent	1.06	6.92	83.07	8.93	100.00
1975	71,877	416,781	4,651,638	457,584	5,597,880
Percent	1.28	7.44	83.09	8.17	100.00
1976	55.135	265,885	5,107,532	454,543	5,883,095
Percent	0.93	4.51	86.81	7.72	100.00
1977	52,513	321,446	5,089,155	428,146	5,900,260
Percent	0.89	5.44	86.40	7.25	100.00
1978	49,654	411,680	4,921,585	510,923	5,893,842
Percent	0.84	6.98	83.50	8.66	100.00
11 year	63,877	353,676	5,020,551	479,856	5,917,960
average	1.07	5.93	85.06	8.06	100.00

APPENDIX D

STATE PARK SYSTEM SEASONAL ATTENDANCE: 1968-1978 (DAY USE)

	Winter	Spring	Summer	Fall	Total
1968	729,631	1,173,093	9,652,826	1,020,981	12,576,531
Percent	5.80	9.32	76.75	8.11	100.00
1969	921,637	1,317,683	10,136,949	1,086,070	13,462,339
Percent	6.84	9.78	75.29	8.06	100.00
1970	1,114,970	1,387,699	10,700,636	1,180,850	14,384,155
Percent	7.75	9.64	74.39	8.20	100.00
1971	1,072,276	1,633,482	11,154,875	1,554,772	15,415,405
Percent	6.95	10.59	72.36	10.08	100.00
1972	1,053,822	2,137,019	8,385,660	1,363,253	12,939,753
Percent	8.14	16.51	64.80	10.53	100.00
1973	1,049,462	1,354,881	9,926,482	1,275,227	13,606,052
Percent	7.71	9.95	72.95	9.37	100.00
1974	1,112,917	1,586,827	9,373,145	1,285,051	13,357,940
Percent	8.33	11.87	70.16	9.62	100.00
1975	1,319,589	1,997,631	9,974,673	1,476,135	14,768,028
Percent	8.93	13.53	67.54	9.99	100.00
1976	1,309,734	1,533,034	11,928,517	1,360,349	16,131,634
Percent	8.11	9.50	73.94	8.43	100.00
1977	1,293,153	2,373,017	11,382,953	1,394,424	16,443,547
Percent	7.86	14.43	69.22	8.48	100.00
1978	1,501,468	2,405,001	12,248,689	1,607,190	17,762,348
Percent	8.45	13.53	68.95	9.04	100.00
11 year	1,134,424	1,718,124	10,351,376	1,327,664	14,440,703
average	7.71	11.69	71.48	9.08	100.00

APPENDIX E

END POINTS OF REGRESSION LINES

	Attendance in 1000's	Percent of Total Attendance
	Camping	
Winter	69. to 59.	1.16 to .97
Spring	293. to 414.	4.97 to 6.89
Summer	4,977. to 5,064.	86.48 to 83.63
Fall	444. to 516.	7.58 to 8.53
Total	5,782. to 6,054.	
	Day Use	
Winter	840. to 1,429.	6.56 to 8.95
Spring	1,218. to 2,218.	9.66 to 14.04
Summer	9,512. to 11,364.	73.68 to 70.79
Fall	1,125. to 1,531.	8.69 to 9.64
Total	12,885. to 15,996.	