READY, KEITH FRANCIS

A SPATIAL ANALYSIS OF RECREATION PERCEPTIONS, ATTITUDES, AND BEHAVIOR RELATED TO THE GRAND RIVER IN LANSING, MICHIGAN

Michigan State University PH.D. 1981

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark __√__.

1. Glossy photographs or pages _____
2. Colored illustrations, paper or print _____
3. Photographs with dark background ✓
4. Illustrations are poor copy _____
5. Pages with black marks, not original copy _____
6. Print shows through as there is text on both sides of page _____
7. Indistinct, broken or small print on several pages ✓
8. Print exceeds margin requirements _____
9. Tightly bound copy with print lost in spine _____
10. Computer printout pages with indistinct print _____
11. Page(s) _____ lacking when material received, and not available from school or author.
12. Page(s) _____ seem to be missing in numbering only as text follows.
13. Two pages numbered _____. Text follows.
14. Curling and wrinkled pages _____
15. Other _____

University
Microfilms
International

A SPATIAL ANALYSIS OF RECREATION PERCEPTIONS, ATTITUDES, AND BEHAVIOR RELATED TO THE GRAND RIVER IN LANSING, MICHIGAN

By

Keith Francis Ready

A DISSERTATION

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

DOCTOR OF PHILOSOPHY

Department of Geography

1981

ABSTRACT

A SPATIAL ANALYSIS OF RECREATION PERCEPTIONS, ATTITUDES, AND BEHAVIOR RELATED TO THE GRAND RIVER IN LANSING, MICHIGAN

By

Keith Francis Ready

This study was designed to investigate the recreation perceptions, attitudes, and behavior of residents in Lansing, Michigan. These perceptions, attitudes, and behavior are examined as they relate to recreational use of the Grand River.

The procedure used two separate sample populations obtained from stratified systematic sampling procedures. The first survey (N = 371) investigated the general population's perceptions and attitudes concerning river recreational use. The second survey (N = 173) examined the perceptions, attitudes, and behavior of actual river recreation participants. Data were analyzed using frequency and percentages of responses, metric multidimensional scaling, and non-parametric statistical methods, namely, chi-square and Kendall tau correlation coefficients.

The multidimensional scaling algorithm (MDS) used in this study produces a mean distance matrix between selected river recreation concepts (i.e., the average

perceptual distance between concepts for all respondents). One stimulus set containing 15 concepts was employed for both surveys. The stimulus set was determined from a pilot study and results of previous research. Consideration was given to respondents' ability to recognize concepts, and their relevancy to Grand River recreational activities.

Three hypotheses were formulated. The first tested the idea that people's perceptions and attitudes concerning use of the Grand River are related to the location of their residence relative to different sections of the river. The second stated that current participation levels in recreational activities along an urban river are related to the participant's residential location. The third stated that sections of a city in which high percentages of river recreationists reside can be identified from the interpretation of area residents' environmental perceptions, attitudes, and behavioral responses.

Several results of the multidimensional scaling have implications for urban river recreation management and planning. These findings have applied value for Lansing and heuristic value in other urban areas.

The first area of importance involves the identification of river concepts (including activities) that respondents consider to be most similar or dissimilar to the recreational use of the Grand River. Those concepts

identified by both the general population and on-site respondents as most similar to the Grand River are "industrial development," "natural areas," and "relaxing." Both respondent groups agreed "swimming" and "clean water" were the most dissimilar concepts, despite documented evidence that river water quality for a large segment of the river has improved dramatically in recent years and is suitable for contact recreation. Thus, it appears an environmental opinion lag is operating in regard to Grand River water quality.

The second area of importance in the MDS results involves interpretation of the underlying dimensions of variations in the data. The common multidimensional space can best be summarized by four dimensions: 90 percent of the total variations for the 15 concepts in both studies are explained by four factors; namely, "urbanized river" (42 percent of the variance), "enhanced urban river recreation" (20 percent of the variance), "recreation danger" (15 percent of the variance), and "non-urban river oriented recreation" (13 percent of the variance).

Additional conclusions from the studies include: (1) an overall positive attitude toward recreational use of the Grand River. Currently, however, 40 percent of Lansing residents have never used the Grand River for recreation. Moreover, these residents are not equally

distributed, tending to live in neighborhoods juxtaposed with or oriented toward more physically displeasing sections of the river; (2) variations among respondents' perceptions, attitudes, and behavior regarding river recreation are strongly influenced by the location of residence; (3) the development of new parks in the downtown section of Lansing may have problems attracting users; and (4) user-oriented activities, if developed and/or promoted within natural settings, represent the most viable waterfront activities.

ACKNOWLEDGMENTS

The participation of 544 residents of Lansing, Michigan helped make this dissertation possible. It is sincerely hoped that the findings of this study will benefit them, thus expressing the author's appreciation.

I would particularly like to thank Dr. Michael Chubb, whose careful guidance and suggestions contributed greatly to the clearness obtained in the final version. Also, Dr. Chubb provided invaluable advice in the development of the research problems, and gave the author considerable encouragement and purpose throughout the preparation of this dissertation.

Finally, personal thanks is due my father, Bernard J. Ready, who helped with the excellent cartographic work contained herein. Also, a special thanks to my wife, Jackie, who typed several rough draft versions, while showing considerable patience and providing encouragement during the project.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Historically, riverfront areas in cities in the United States have been the site of intense industrial activity. Within the last decade this emphasis has shifted, for a variety of reasons, and city governments and planners have begun to regard the urban river as a potential aesthetic and recreational resource. The so-called "environmental renaissance" of the late sixties and early seventies stimulated renewed concern for the aesthetics of the urban waterfront, resulting in improved sewage and industrial waste treatment facilities, river clean-up programs, flood plain zoning, and a variety of urban renewal projects. Currently, planning and development of urban river recreation facilities are based primarily on the engineering feasibility of providing those facilities at a given site. This process usually fails to address the perceptions, attitudes, and behavior of those for whom facilities are being provided. If planning and development procedures are not based on surveys of public attitudes toward the river and its recreational potentials, then the planning process is incomplete.

Research Problem

This dissertation develops and evaluates an approach based on social and geographic research methods, thereby augmenting prevailing planning procedures. It focuses on urban residents' perceptions, attitudes, and behavioral responses related to river recreation. Particular attention is given to the impact of spatial variation in both river resource quality and residential location. Do urban residents living adjacent to, or otherwise exposed to, the more physically appealing sections of a river constitute the majority of current and future recreationists, and are they the citizens with the most favorable attitudes toward waterfront development? Conversely, do those people living adjacent to, or oriented toward, the more physically displeasing sections of the river exhibit the opposite attitudes, perceptions, and behavior? And, are they the citizens least likely to use the river for recreational purposes?

Study Objectives

The main objective of this investigation is to develop a tentative planning model based on user attitudes and behavior for the recreational use of an urban river. This will be accomplished by:

a. investigating the spatial variations in recreational attitudes, preferences, and behavior of urban residents;

b. assessing the significance of residential location within an urbanized area as it affects perceptions, attitudes, and behavior concerning the recreational use of an urban river;
c. offering suggestions to the planning community on methods of assessing the optimal recreational benefits, both current and future, that can be derived from urban rivers; and
d. offering a planning approach based on geographical and social research methods that will make the current decision-making process, based largely on engineering feasibility and funding, more humanistic.

Review of Literature

Research related to the problem of identifying urban residents' recreational perceptions, attitudes, and behavior is found both in the literature concerning environmental perception and in materials about recreational behavior. The ensuing discussion traces the development of environmental perception studies, particularly in geography, and examines the applicability of previous research findings.

Environmental Perception Research

Geographers have long been interested in the effect of the environment on humans. At the beginning of this century, the theme of "environmental determinism" was

popular in geography. Its proponents, prominently Huntington and Semple, suggested that human cultural variation could be attributed to the different physical environments where different culture groups evolved. Huntington, for example, considered climate to be the most important factor in the development of civilization.[1] Other geographers eventually reacted to scientifically unfounded theories of environmental determinism by suggesting that geographical inquiry should focus instead on human adjustments to the physical environment rather than on the environment as the determining factor. But this approach was also unacceptable to most geographers since it replaced physical determinism with human determinism. In 1925, Sauer established a new geographical approach, termed "cultural ecology," that avoided the extremes of determinism. He advocated that geographers should consider both the physical and cultural environments and investigate the natural landscape from a human perspective. This approach greatly influenced scholarly thinking in geography for many years.[2] It involves consideration of the

---

[1]Elsworth Huntington, Civilization and Climate (New Haven, Conn.: Yale University Press, 1915).

[2]Carl O. Sauer, "The Morphology of Landscape," University of California Publications in Geography 2 (October 1925): 19-54.

adaptations and adjustments that humans make in order to utilize their environments.[1]

Today the meaning of environmental research within geography has moved away from a strict cause and effect interpretation. Increasing recognition is given to man as an important component in the environmental system.

The Behavioral Approach in Geography

Coincidental with the maturation of the environmental perspective in geography has been the development of the behavioral approach. This approach, followed in this study and facilitated by quantitative methods, investigates human spatial behavior.[2] Golledge, Brown, and Williamson in an overview of the behavioral approach in geography state:

> The behavioral point of view involves (a) the researcher viewing the real world from a perspective of those individuals whose decisions affect locational or distributional patterns, and (b) trying to derive sets of empirically and theoretically sound statements about individual, small group, or mass behaviors.[3]

---

[1]Julian H. Steward, "The Concept and Method of Cultural Ecology," in Theory and Cultural Change (Urbana, Ill.: University of Illinois Press, 1955), pp. 5-17.

[2]Roger M. Downs, "Geographic Space Perception: Past Approaches and Future Prospect," in Progress in Geography, Vol. 2, ed. Christopher Board et al. (New York: St. Martin's Press, 1970), pp. 65-108.

[3]Reginald G. Golledge, Lawrence A. Brown, and Frank Williamson, "Behavioral Approaches in Geography: An Overview," The Australian Geographer 12 (1972): 59.

This attempt to understand human behavior stimulated the study of geographic perception. Such investigations assume that attitudes and behavior toward the environment are based on images of the real world that are held by an individual or group. The study of cognitive images of the environment involves both geography and psychology.

Downs has identified three major classes of published work on geographic perception.[1] His first category includes work on the identification and structuring of space perceptions. The approach focuses on how man stores and structures images of the environment, and what relationship exists between these images and the real world. A large number of psychological works have been completed using this approach, some examples of which are cited below. A second category pertains to those studies which evaluate the environment in terms of spatial images related to environmental decision-making and behavior. Many geographers have adopted this approach, particularly in research on perception of environmental hazards (see, for example, Kates, 1962; Saarinen, 1966; and White, 1964). Downs' third and final category of geographic perception research refers to those studies, including the present one, which utilize a preference approach. These studies seek to identify perceptually significant environmental objects and

---

[1]Downs, "Geographic Space Perception," pp. 70-83.

and individual attitudes about these objects as revealed by environmental behavior. The ultimate goal is to ascertain the underlying causes of spatial variations among individual preferences for elements in the environment.

The works by Gould and Peterson provide two early examples of the preference approach.[1] In his paper, entitled "On Mental Maps," Gould illustrates the approach in determining preference rankings for individual states of the United States. He demonstrates the relationship between the respondents' level of familiarity with a state and the perceived desirability of that state. In writing of preferences for the physical attributes of neighborhoods, Peterson concludes that the visual appearance of residential neighborhoods is a multidimensional phenomenon that can be simplified to three dimensions: "general physical quality," which is strongly influenced by the age of the neighborhood; "harmony with nature," a factor that may be a reflection of cultural conditions; and "noise." Although considered to be an important part of preference, the "noise" factor was not interpretable in terms of the variables used. Both Gould and Peterson use factor-analytic techniques to

---

[1]Peter Gould, "On Mental Maps, Michigan Inter-University Community of Mathematical Geographers, Department of Geography, University of Michigan, Ann Arbor, Michigan, Discussion Paper No. 9, 1966; and George L. Peterson, "A Model of Preference: Quantitative Analysis of the Visual Appearance of Residential Neighborhoods," Journal of Regional Sciences 7 (1967): 19-31.

determine the underlying dimensions of spatial variation among individual preferences.

Related Research in Psychology

Two schools of thought within psychology that are pertinent to geographic environmental perception research include: (1) "Stimulus-response theory," which views all human behavior as conditioned responses to environmental stimuli, and (2) "Gestalt psychology," the more widely accepted view which assumes that the individual is conscious and reasoning, with an ordered perceptual organization.[1] This Gestalt school provides the underpinnings for studies of environmental cognition or cognitive mapping. Tolman, among the first to work with cognitive images, concluded from the behavior of rats in a maze that spatial behavior was not learned from stimulus-response, but rather from an accumulation of tactile and olfactory inputs forming sets that function as cognitive maps. He suggested that these mental maps vary from images of a narrow strip of the environment to comprehensive impressions of large areas.[2]

Expanding on the work undertaken by Tolman and others, Kevin Lynch investigated the cognitive images of

---

[1]M. E. Hurst, A Geography of Economic Behavior (North Scituate, Mass.: Duxbury Press, 1972).

[2]Edward C. Tolman, "Cognitive Maps in Rats and Men," Psychological Review 55 (1948): 189-208.

residents in three urban environments: Boston, Jersey City, and Los Angeles. He identified five factors that mold the individual's urban image: edges, paths, nodes, districts, and landmarks. Lynch concluded that urban inhabitants structure their spatial behavior around their knowledge of these factors, constituting the "imageability" of the city.[1] In Boston, he found the Atlantic waterfront to be a negative element in the image of the city due to its commercial and industrial developments. Waterfronts, in general, appear to be important components of the urban image. Lynch writes, "The landscape features of the city, the vegetation or the water, were often noted with care and with pleasure . . . several [people] reported daily detours which lengthened their trip to work, but allowed them to pass by some particular planting, park, or body of water."[2]

Another study of the Boston area investigated the visual impact of elements along roadways. The researchers found that the longer an element remained in view, the better it could be remembered.[3]

---

[1]Kevin Lynch, The Image of the City (Cambridge, Mass.: M.I.T. Press and Harvard University Press, 1960), pp. 15-20.

[2]Ibid., p. 44.

[3]D. Appleyard, K. Lynch, and J. Meyer. The View from the Road (Cambridge, Mass.: M.I.T. Press, 1964), pp. 19-25.

Environmental perception studies within geography are primarily concerned with the spatial characteristics of the physical stimuli which establish the physical environment (i.e., those factors that determine how one learns about structures, visualizes, and interacts with the surrounding environment). Psychology, on the other hand, is more concerned with these stimuli at the micro-level, or interpersonal scale (i.e., the study of the effects that physical environmental transactions have on an individual's personal attitudes), although psychologists are also expanding their interest under the rubric of social psychology.[1]

Recreation and Perception

Most geographic research on recreation and perception has focused on the use of wilderness areas. The majority of these investigations have used the behavioral approach in explaining recreation users' perceptions and attitudes concerning the resource as they affect patterns of behavior and locational decisions. The studies concluded that variations exist between users and managers as well as among users in their perceptions of recreational resources. Lucas, among the first to investigate recreation

---

[1]Robert Beck, "Spatial Meaning and the Properties of the Environment," in Environmental Perception and Behavior, ed. D. Lowenthal (Chicago: Department of Geography, Research Paper No. 109, 1967), p. 18-41.

resource perceptions, used roadside interviews to contrast users' and managers' perceptions of the Boundary Waters Canoe Area.[1] He found significant differences exist among users and between users and managers regarding the importance, extent, and qualities of wilderness.

Stankey studied users' perceptions of wilderness in relation to the carrying capacity of four wilderness areas--Bob Marshall, Bridger, High Uinta, and Boundary Waters Canoe Area.[2] Stankey used Likert attitudinal scales on wilderness concepts with data collected from 500 respondents. The objectives of his study were: (1) to define the parameters that visitors utilized to define capacity, (2) to determine what spatial variations existed in the perception of capacity, (3) to determine the measures necessary to increase existing capacity, and (4) to measure the geographic extent of crowding in each area. Results showed considerable spatial variations concerning users' perceptions of wilderness capacity (between study areas). Variations were related to: (1) differences in resource characteristics, (2) situational aspects, (3) level and types of present use, and (4) cultural backgrounds of respondents.

---

[1]Robert Lucas, "Wilderness Perception and Use: The Example of the Boundary Waters Canoe Area," Natural Resource Journal 3 (1964): 394-411.

[2]George Stankey, "The Perception of Wilderness Recreation Carrying Capacity: A Geographic Study in Natural Resource Management" (Ph.D. dissertation, Department of Geography, Michigan State University, 1970).

Peterson investigated differences in user attitudes, perceptions, and preferences in the Boundary Waters Canoe Area between canoeists and managers.[1] The objective of the study was to suggest management strategies to minimize perceptual differences between the two groups. Peterson used personal interviews and completed the research with 127 users and 17 managers. Major perceptual differences arose: (1) managers are less negative about environmental conditions than canoeists, (2) canoeists are more particular in their preferences for outdoor recreation areas, and (3) canoeists have more "purist" attitudes toward the presence of convenience facilities than managers.[2]

Urban Recreation Behavior

Research in urban recreation behavior has been limited. Writing in 1972, Chubb commented on possible reasons for this:

> First, city park and recreation administrators have generally not been oriented towards research as a means of obtaining facts on which to base policies and programs; in contrast, natural resource agency administrators are accustomed to research programs providing information for many aspects of their work. Second, unlike natural resource agencies, urban recreation departments do not have research divisions. . . .

---

[1]George L. Peterson, "A Comparison of the Sentiments and Perceptions of Wilderness Managers and Canoeists in the BWCA," Journal of Leisure Research 3 (1974): 194-206.

[2]Selected studies similar to those cited above are: Hendee (1968), Lucas (1970), Lime (1970), Peterson (1971), Vaux (1977), and Rossman (1977).

> Third, society in general and elected city officials in particular, are not yet accustomed to routinely funding data-gathering in advance of social development programs in the same way that engineering data-gathering surveys are funded in advance of physical development. . . . Fourth, recreation behavior and attitudes survey research is considerably more difficult to carry out in an urban setting than in most resource-based recreation situations so researchers have tended to neglect this important area. Finally, most university staff and students capable of this type of investigation tend to be oriented toward natural areas.[1]

Possibly for these reasons, research to date on environmental perceptions, attitudes, and behavior related to recreation has focused primarily on resource-oriented areas, particularly the wilderness areas previously discussed.

Although a paucity of geographic research exists concerning the perception of urban recreation resources, the issue has not been entirely neglected in the literature. Individuals' perceptions, attitudes, and behavior have generally been investigated using other activities such as market decisions, residential preferences, and intraurban migration (Golledge, 1967; Downs, 1969; Rushton, 1969; Clark, 1973; McCracken, 1975; Smith, 1979). Much of this research has focused on the action or activity space of individuals. Action space represents the total area within which individuals interact and have knowledge

---

[1]Michael Chubb, Recreation in the Lansing Model Cities Area, Recreation Resource Consultants, East Lansing, Michigan, July 1972, pp. 3-4.

(Wolpert, 1965). Activity space, a subset of action space, represents smaller areas and connecting routes within which individuals conduct their daily activity routines.

Horton and Reynolds studied the relationship between urban spatial structure and action spaces for a middle and a low income area in Cedar Rapids, Iowa.[1] Action space was operationally defined as the area with which respondents are generally familiar. Results show that levels of familiarity related to urban spatial structure differed between the two groups. Specifically, residents of the middle-income neighborhood indicated a more pronounced overall familiarity with the city than the respondents from the low-income neighborhood. In addition, the objective spatial structure of the city, that is, the location of a household relative to the location of all potential activities and their level of attractiveness, was seen as an important variable in the environmental learning process and hence the level of environmental familiarity.

Johnston investigated the form of activity spaces with reference to the residential location process in six Australian cities.[2] First, he found that there are

---

[1]Frank E. Horton and David R. Reynolds, "Effects of Urban Spatial Structure on Individual Behavior," Economic Geography 47 (January 1971): 36-48.

[2]R. J. Johnston,"Activity Spaces and Residential Preferences: Some Tests of the Hypothesis of Sectorial Mental Maps," Economic Geography 48 (April 1972): 199-211.

considerable similarities between individuals in the definition of their activity spaces. Second, he concluded that respondents' preferences for residential neighborhoods take the form of sectoral activity spaces particular to certain groups. The formation of these spaces is constrained by distance and directional influences to form sectoral activity spaces around the respondents' homes.

Some work has been completed at the urban level on general recreation attitudes, preferences, and behavior using questionnaire survey techniques. Goodale's research findings are particularly germane to this study.[1] He obtained interviews from 925 residents of twelve Minneapolis census tracts in order to ascertain behavior and attitudes concerning recreational activities. He hypothesized that: (1) the leisure behavior and attitudes of people living in a particular census tract differ from those living in another type of tract, (2) that the differences observed between the leisure behavior and attitudes of tract populations is attributed to the criteria used in selecting tracts.

Goodale found that the leisure behavior and attitudes of people living in one type of census tract do differ from those persons living in another type of tract. He

---

[1]T. L. Goodale, "An Analysis of Leisure Behavior and Attitudes in Selected Minneapolis Census Tracts" (Ph.D. dissertation, University of Illinois, 1965).

attributed some of these variations to differences in age, educational level, occupational status, and income level between selected tracts. He also observed that differences between tracts continue in leisure behavior and attitudes after influences of age and socioeconomic variables have been controlled. Goodale concluded that by analyzing the leisure behavior and attitudes of census tract populations, researchers can obtain useful estimates of the type and amounts of participation in selected leisure activities.

In another study, Chubb investigated recreation participation of model cities' residents in Lansing, Michigan.[1] (Three model city neighborhoods, a total of 433 households were selected for study out of an estimated 5,400 potential respondent households). The data used in analysis came from personal interviews that were completed in 159 households. Some of the conclusions from that study which are particularly germane to this research include:

1. Use of nearby parks by family groups appears to vary considerably in the model cities area. . . . A high proportion of those who did not use their nearest parks apparently have no desire to do so . . . ;

2. Picnicking is clearly a most significant activity in the use of nearby parks by family groups . . . ;

3. The responses showed that familiarity with a park is not always closely related to proximity of residence to that park even when it is a park of city-wide significance . . . ; and

---

[1]Chubb, Recreation in the Lansing Model Cities Area, pp. 48-65.

4. Less than one-fifth of model city area households were aware of Lansing Parks and Recreation Department programs.

The underlying factors which influence an individual's knowledge of outdoor recreation opportunities and that help explain outdoor recreation behavior were investigated by Cappelle in two Pittsburgh census tracts.[1] The study was completed with 334 randomly chosen households using personal interviews. Investigation into the respondent's recreation awareness space suggest that:

1. For urban households without ready access to outdoor recreation, there is a strong tendency toward directionality, influenced by the composition of their acquaintance circles;

2. Interpersonal contact is the most important source of knowledge concerning opportunities. Accidental bypass is the second most important information source; and

3. Nonparticipating households indicated a greater awareness of opportunity which requires physical exertion, higher costs, and greater travel.

Variations in traditional socioeconomic determinants (e.g., income, education, age, and occupation) have been shown to be important variables in the explanation of recreation behavior (Clark, 1957; Ferris, 1962; Burdge, 1969; Thompson, 1978). However, it is becoming apparent that these factors alone do not account for all variations in recreation behavior patterns.

---

[1]Russell B. Cappelle, "Space Searching Behavior: Recreation Space from the Urban Resident's Point of View" (Ph.D. dissertation, Department of Geography, University of Pittsburgh, 1973).

Lindsay and Ogle studied socioeconomic patterns of outdoor recreation use among the urban population of Weber County, Utah (near Salt Lake City).[1] The study consisted of 600 interviews. Conclusions reached were (1) no significant differences exist in income levels between recreation participants at public parks and non-participants and (2) socioeconomic factors combine to cause nearly equal preference for public outdoor recreation for all income and educational groups but that external factors such as availability of opportunities deprive low income and less educated groups from participating in recreation.

Recreation Accessibility and Participation

Questions concerning the optimal locations of urban recreation facilities and the ability of these facilities to satisfy demand also have received attention from recreation researchers. These investigations focused on the use and non-use of urban parks (Jacobs, 1961; Bangs, 1970; and Gold, 1972, 1977).

Dee and Liebman studied the use of urban playgrounds in Baltimore using personal interviews.[2] A multiple

---

[1]John A. Lindsay and Richard A. Ogle, "Socioeconomic Patterns of Outdoor Recreation Use Near Urban Areas," Journal of Leisure Research 4 (1972): 19-24.

[2]Norbert Dee and Jon C. Liebman, "A Statistical Study of Attendance at Urban Playgrounds," Journal of Leisure Research 2 (1970): 145-159.

regression analysis was used with "rate of attendance" at supervised playgrounds as the dependent variable. The independent variables included distance, socioeconomic variables, types of equipment present, and proximity to other recreation facilities. The conclusions reached included: (1) Distance to the playground is the most important variable--as distance increases, attendance decreases; (2) The greater the distance between playgrounds the greater the attendance at both; (3) Income was not related to playground attendance; and (4) Significant relationships were identified between age groups, race, types of playground equipment and "rate of attendance."

The use and non-use of urban parks in selected Ottawa neighborhoods was investigated by Rugg.[1] Four neighborhoods were selected for study which had the same kinds of recreational resources so that observed differences in behavior were believed to have resulted from neighborhood differences. Two personal interview surveys were conducted, one of park users and one of households within the parks service area. Survey results indicated:

1. Visits declined with distance away from the park in three out of four neighborhoods in the user survey but distance was not a factor in the household study;

---

[1]Robert D. Rugg, "The Use and Non-Use of Urban Parks: Accessibility and Social Characteristics in Relation to Public Outdoor Recreation in Selected Neighborhoods of Ottawa-Hull" (Ph.D. dissertation, Department of Geography, University of Ottawa, 1974).

2. Variables which were significantly related to park attendance for the household study include the number of children in the household, equipment ownership, and certain recreation habits (e.g., TV watching times);

3. Significant variations in attendance were observed between neighborhoods; these appear to be related to cultural differences and land-use characteristics of each neighborhood; and

4. Fifty percent of respondents made no use of local parks, and only 2% to 4% of the neighborhoods made use of local parks on the heaviest day of use.

Access to recreation facilities is considered a key to providing recreation opportunities within the urban area. Accessibility is a particularly acute problem for ghetto residents and inner city populations because of fixed residential locations. Moreover, access to water-based recreation is limited because of the fixed location of the resource base. David, using Milwaukee as a case study, determined that flood plains are not necessarily a valuable source of recreation land in metropolitan areas. He states,

> The kinds of water-based recreation which the rivers provide are limited and flood plain parks are readily available only to a select group of people Inequities occur both because they are less readily available to lower income residents and because flood plains are not uniformly scattered.[1]

---

[1]E. J. L. David, "Floodplain Lands for Parks and Recreation, A Case Study of Milwaukee," Land Economics 49 (1973): 221-226.

Whitman studied public access to water resources in Cleveland.[1] He concluded that: (1) inner city residents are denied access to water-based recreation because of distance and/or physical land-use barriers (e.g., highways); (2) residents with the greatest needs do not interact with and thus do not use water-based recreation areas; and (3) even when access is provided, inner-city residents will not participate in water-based recreation because of actual and/or perceived water quality problems.

Water-Oriented Recreation Resources

The individual's perceptions and attitudes concerning water-based recreation resources has not been extensively investigated. Barker studied the attitudes affecting behavior in relation to urban water-oriented recreation facilities.[2] In that study, four groups of variables were identified that showed wide variation in user perceptions and behavior related to outdoor recreation in the metropolitan Toronto area. The four groups were:

1. the type of recreational activity and its relationship to water quality;
2. the type and degree of pollution;

---

[1]Ira L. Whitman, Evaluating Urban Core Usage of Waterways and Shorelines (Columbus, Ohio: Battelle Memorial Institute, 1971).

[2]Mary L. Barker, "The Perceptions of Water-Quality as a Factor in Consumer Attitudes and Space Preferences in Outdoor Recreation" (Master's thesis, Department of Geography, University of Toronto, 1968).

3. the variations in the degree and kind of personal experiences; and

4. the attitudes of the users toward the environment.

Hecock investigated the differences in recreation use patterns of Cape Cod beaches.[1] The objectives of the study were to determine: (1) What is the extent of beach to beach variations in the characteristics of beach users? and (2) What are these variations attributed to? The study was completed with 900 interviews on beaches which were classified according to physical attributes (e.g., water temperature, surf, topography, degree of development, and accessibility). Results indicated a great difference in the attendance levels at different beaches. Large crowds were attributed to ease of access. Hecock concluded that the occupancy of beaches by socioeconomic groups is related to the physical characteristics of the beaches (e.g., higher socioeconomic groups used beaches having the best physical quality). Within socioeconomic groups, however, attendance is related to the beach's proximity to developed areas and the availability of beach facilities. He also showed that teenagers are attracted to overcrowded beaches that have eating establishments.

---

[1]Richard D. Hecock, "Recreation Behavior Patterns as Related to Site Characteristics of Beaches," Journal of Leisure Research 2 (1970): 237-250.

David studied the affect of water pollution on water-based recreational activities in Wisconsin.[1] She interviewed 574 persons statewide over a three-year period. Results indicated that 40 percent of the respondents perceived "water pollution" as the presence of algae and green scum; 35 percent indicated unnatural color, smell, and floating debris; while 10 percent indicated suds or foam. The affect of water pollution on swimming was given special consideration. In that study, 80 percent of the respondents felt the presence of algae and scum were most detrimental to swimming, while 70 percent indicated that the presence of cans and glass were detrimental factors.

Ditton and Goodale investigated variations in recreation users' perceptions of water quality of Green Bay in relationship to recreation activities.[2] The study was completed with 2,174 interviews, obtained by cluster sampling techniques in five riparian counties. Results indicate that recreation behavior patterns correspond to water quality. Boaters were least deterred by poor quality, while swimmers were most deterred. Fishermen, however, were more concerned with the fishing potentials of the area than with

---

[1]Elizabeth L. David, "Public Perceptions of Water Quality," Water Resources Research 3 (1971): 453-457.

[2]Robert Ditton and Thomas Goodale, Marine Recreational Uses of Green Bay: A Study of Human Behavior and Attitude Patterns (Madison, Wis.: University of Wisconsin, Sea Grant Program, Report No. 17, December 1972).

the water quality. Data from the study also revealed significant differences between people's verbalized attitudes toward water quality and their actual use of water of varying quality.

The Department of Parks and Recreation at Michigan State University, under the direction of Dr. Lewis Moncrief, investigated attitudes concerning the Red Cedar River.[1] This study demonstrated that some of the negative public images of a river resource may linger even after environmental improvements have been made. It indicated that 50 percent of the "users" felt the river was too grossly polluted for recreational use; actually, the Red Cedar's quality has been vastly improved during the previous five years and "uncontrolled sewage and dumping" is not occurring, contrary to public opinion.

This writer investigated the attitudes and preferences of urban and suburban residents in Northern Middlesex County, Massachusetts, concerning the potential use of a polluted river, the Merrimack.[2] Two hypotheses

---

[1]Lewis Moncrief, "User Related Study of Three Michigan Rivers," in An Ecological Evaluation of Stream Eutrophication (East Lansing: Michigan State University, Institute of Water Resources, Tech. Report No. 36, 1973), pp. 12.1-12.5.

[2]Keith Ready, "Perception by Area Residents of the Merrimack River: A Spatial Analysis" (Master's thesis, Department of Geography, Miami University, Oxford, Ohio, 1973).

were tested. The first investigated the idea that recreational preferences within Northern Middlesex County had significant spatial variations. The second explored attitudes about the recreational use of the Merrimack to determine whether significant variations existed. Conclusions from that study indicated: (1) an overall positive attitude toward the recreational use of the Merrimack River existed in the study area; the regional variations showed that the highest percentages of positive responses came from suburban residents; (2) income levels of respondents were found to be significantly related to recreational attitudes toward the Merrimack--as respondents' income levels increased, so did the percentage of positive river responses; (3) perceived distances to preferred recreational sites were found to be significantly related to recreational attitudes toward the Merrimack; and (4) the results suggested that attitudes toward the recreational use of an urban river are related to the respondents' knowledge of the river and the location of their residences. Those respondents who perceived that areas of the river may be aesthetically pleasant and useful as recreational sites had positive attitudes. Conversely, those who did not perceive this to be the case did not have postive attitudes.

Summary

Previous research indicates that the underlying factors which influence people's knowledge of outdoor recreation opportunities and which help to explain outdoor recreation behavior include the traditional socioeconomic variables such as income, age, education, and occupation. However, socioeconomic factors, although important, are not the only controlling influences. Studies have concluded that factors such as distance, differences in resource characteristics, cultural background, acquaintance circles, accessibility, and situational aspects are all important considerations in the explanation of recreation resource use and non-use. Ultimately, recreation decisions should not be viewed as dependent solely on any one variable. Rather, these variables should be considered collectively in the context of residential location and in relationship to people's preferences for recreation activities and areas. Residential location, then, reflects levels of familiarity with and use of recreation opportunities. And, one's place of residence has a profound impact on the development of action space and consequently, one's image of the surrounding area. Examining individual's attitudes and perceptions of recreation opportunities in relation to their residential locations should be particularly valuable for urban river recreation research, since characteristics of the resource

usually differ between sections of the city. Since different areas within cities are inhabited by groups of people with different socioeconomic characteristics and action spaces, could it be that people's attitudes, knowledge, and use of river recreation facilities vary between different residential areas of the city?

No investigation detected by the review of previous research considered the use of a single urban resource by residents of different sections of the city. But, it seems reasonable to assume that individuals from different residential areas will select different sections of a resource for recreation use, or may not participate at all. Some residents in close proximity to a river, for example, may be unaware of its recreational potential. And, if the condition of that resource is repulsive to them, say in terms of land and water quality, these segments of the population may retain unfavorable attitudes toward river recreation for some years to come. Thus, people's attitudes toward the recreation use of an urban river should depend greatly on their residential location in relation to differences in resource characteristics and their knowledge of them. While attention has been given in the literature to recreation participation, resource accessibility, and water quality perception, few researchers have investigated levels of use and non-use according to the quality of the

recreation resource and its relationship to individual's understanding and preferences.

Hypotheses

The following hypotheses are proposed (based on the findings of previous studies):

1. People's perceptions and attitudes concerning use of an urban river for recreation activities are related to the location of their residence relative to different sections of the river.

   Specifically, it is hypothesized that those residents living in sections of a city adjacent to or oriented toward more aesthetically appealing sections of a river will have the most favorable perceptions and attitudes toward the recreational use of an urban river. Conversely, those residents adjacent to or oriented toward more aesthetically displeasing sections of an urban river will have more unfavorable perceptions and attitudes toward that river.

2. Current participation levels in recreational activities along an urban river are related to the participants' residential location within a city.

   Specifically, it is hypothesized that those residential areas located adjacent to or oriented toward more physically appealing sections of a river will have the highest percentages of residents that actually use the river for recreation. Conversely, the lowest percentages of residents using a river will be from those residential areas located adjancent to or oriented toward more physically displeasing sections of the river.

3. Sections of a city in which high percentages of river recreationists reside can be identified from the interpretation of area residents' environmental perceptions, attitudes, and behavioral responses.

   Specifically, it is hypothesized that sections of a city in which residents are shown to have

more favorable perceptions, attitudes, and behavioral resources will be the same sections in which high percentages of river recreationists reside.

Significance of the Study

This type of study, focusing on perceptions of and attitudes toward recreation resources is only the preliminary phase of a river recreation land use planning process. Assessing the adequacy of an area's resources as a source of the future supply of recreation opportunities should be the basis for all public land-use planning. Investment decisions by private enterprise, whether involving the initial capital investment necessary to establish a recreation-related entity or the capital required to develop an existing facility should also be founded on such assessments.[1]

This type of study also contributes to the development of theory in the field of environmental perception. It considers the nature, causes, and consequences of human perceptions, attitudes, and behavior toward recreational use of urban rivers, thereby extending perception studies in a new direction. It also addresses a problem common to much of the research in this area--the relationship between perceptions or attitudes and behavior.

---

[1]U.S., Congress, Outdoor Recreation Resources Review Commission, National Recreation Survey, by Abbott L. Ferriss, Commission Report No. 19 (Washington, D.C.: Government Printing Office, 1962), p. 6.

Urban river recreational planning models have great applied value. Extensive urban waterfront planning is being carried out by federal, state, and local agencies. For example, the National Park Service and the Ohio Department of Natural Resources have completed a multimillion dollar planning effort for the Cuyahoga National Recreation Area between Akron and Cleveland. Many of the questions that need to be answered in order to properly plan and operate a project of this type (such as the perceptions, attitudes, and behavioral responses of local residents) remain unanswered.

In 1978, the Interior Department (Heritage Conservation and Recreation Services and the National Park Service), as mandated by Congress in 1976, completed the National Urban Recreation Study.[1] The study concentrated on thirteen "highly populated regions." Its goals were to investigate the needs, problems, and opportunities associated with urban recreation and to identify appropriate federal, state, and local roles in public urban recreation development and programs. Possible courses of action, for each level of government, are identified in regard to planning, operating, and maintaining urban recreation delivery systems. Some of the national study findings relevant to this dissertation include:

---

[1]U.S., Department of Interior, National Urban Recreation Study, Executive Report (Washington, D.C.: Government Printing Office, 1978).

1. A key element in responsive recreation planning is identification of the desires and needs of users.

2. The use of special studies, which focus on user needs in urban areas, is extremely limited. . . . Lack of periodic efforts by park and recreation agencies to systematically and scientifically survey their clientele may result in unresponsive programs.

3. Although an understanding of urban recreation needs and problems is essential to provide a rational basis for planning and decision-making, little research has been conducted specifically on urban recreation.[1]

As documented in the Outdoor Recreation Resources Review Commission Report, 80 percent of all outdoor recreation takes place in or around water.[2] Thus, research concerning urban river recreation behavior and opportunities should be a critical aspect of determining needs and desires.

The Environmental Protection Agency (EPA) is also interested in the acquisition of empirical knowledge concerning river resources and the people who utilize them. The Director of the EPA Office of Land Coordination in Washington, D.C. wrote,

> Indeed we share your concern for properly assessing the attitudes and perceptions of river constituencies (both area residents of rivers as well as users in general), this is a necessary step in the planning for (urban river) recreational activities. Two of your major conclusions

---

[1]Ibid., pp. 76-84.

[2]U.S., Congress, Outdoor Recreation Resources Review Commission, Outdoor Recreation for America, a report to the President and to Congress (Washington, D.C.: Government Printing Office, 1962).

> contained in your thesis regarding the Merrimack River can be perhaps generalized for all rivers and to reflect the attitudes and perceptions of all river constituencies. These being--that water pollution is a major concern of individuals and that most people feel that development of river recreational facilities would benefit their town or city. . . .[1]

In November 1975, EPA sponsored the Conference on Water Cleanup and the Land, in Boston, Massachusetts, and concluded that since billions of public dollars at the local, state, and federal levels of government are being spent in wastewater cleanup efforts, proper planning for recreational use of these now clean rivers is imperative. Russel Train (then director of EPA) said in his keynote address:

> What we have not always appreciated in the past is that the public has a right to share more fully in those enhanced values, particularly in the case of cleaner rivers. Since it has been the tax dollars--public dollars--that made possible the transformation of a body of water from an environmental liability to a source of recreation and aesthetic beauty.[2]

At the state level, the Massachusetts Department of Natural Resources, in conjunction with the National Park Service, is currently developing a $42 million cultural park in Lowell centering on the Merrimack River and its canal system. Problems have developed with this project

---

[1]From personal correspondence with Shelley Mark, Director, Environmental Protection Agency, Office of Land Use Coordination, 2 January 1976.

[2]"Careful Planning for Recreation Areas Along Restored Waterways," Environmental News, 5 November 1976, pp. 1-2.

involving some unfavorable response among residents concerning its desirability.[1]

In summary, the planning process concerned with the promotion and development of urban recreation facilities and activities has failed to address the perceptions, attitudes, and behavior of those for whom these facilities and activities are being provided. The main contribution of this dissertation will be to demonstrate the application of geographical research to a contemporary planning problem. The importance of this type of study is discussed by Morrill.

> A shift toward professionalism [in geography] confronts us with the legal entrenchment of professional degrees in planning, business administration, etc. We should avoid training planners under another label, but rather offer something different, namely geographic expertise in its forms of locational analysis, regional knowledge, and environmental relations . . . the most obvious way to raise our own visibility is for faculty and students to participate aggressively and competently in all manner of research and service activities, even if not asked or paid, if the issues are within our ability to contribute.[2]

---

[1]This possibility was noted in the writer's 1973 study which has been incorporated into the planning process for the Lowell Cultural Park--from correspondence with Albert E. Pratt, Chief of Planning, Massachusetts Department of Natural Resources, 1 May 1975.

[2]Richard L. Morrill, "View and Opinions: The Future of Geography," The Professional Geographer 27 (February 1975): 1.

CHAPTER II

THE SETTING

This study examines the perceptions, attitudes, and behavior of Lansing, Michigan residents as they relate to current and potential recreational use of the Grand River. Perceptions, in this dissertation, are operationally defined as the cognitive understanding that Lansing residents have of that portion of the Grand River within Lansing. Attitudes are defined as respondents' predispositions toward specific recreational propositions. Behavior will be considered the recreational activities in which respondents participate along the Grand River in Lansing.

Currently, there is limited information available concerning recreational use of urban rivers in general and the effects of consumer perceptions and attitudes toward waterfront development. Expanding interest in urban river recreation development nationwide makes this a pressing research need. The Grand River study area was selected because (1) the City of Lansing is undertaking an extensive waterfront redevelopment program, (2) the river offers a diverse environment, and (3) the river redevelopment programs have been subject to public debate.

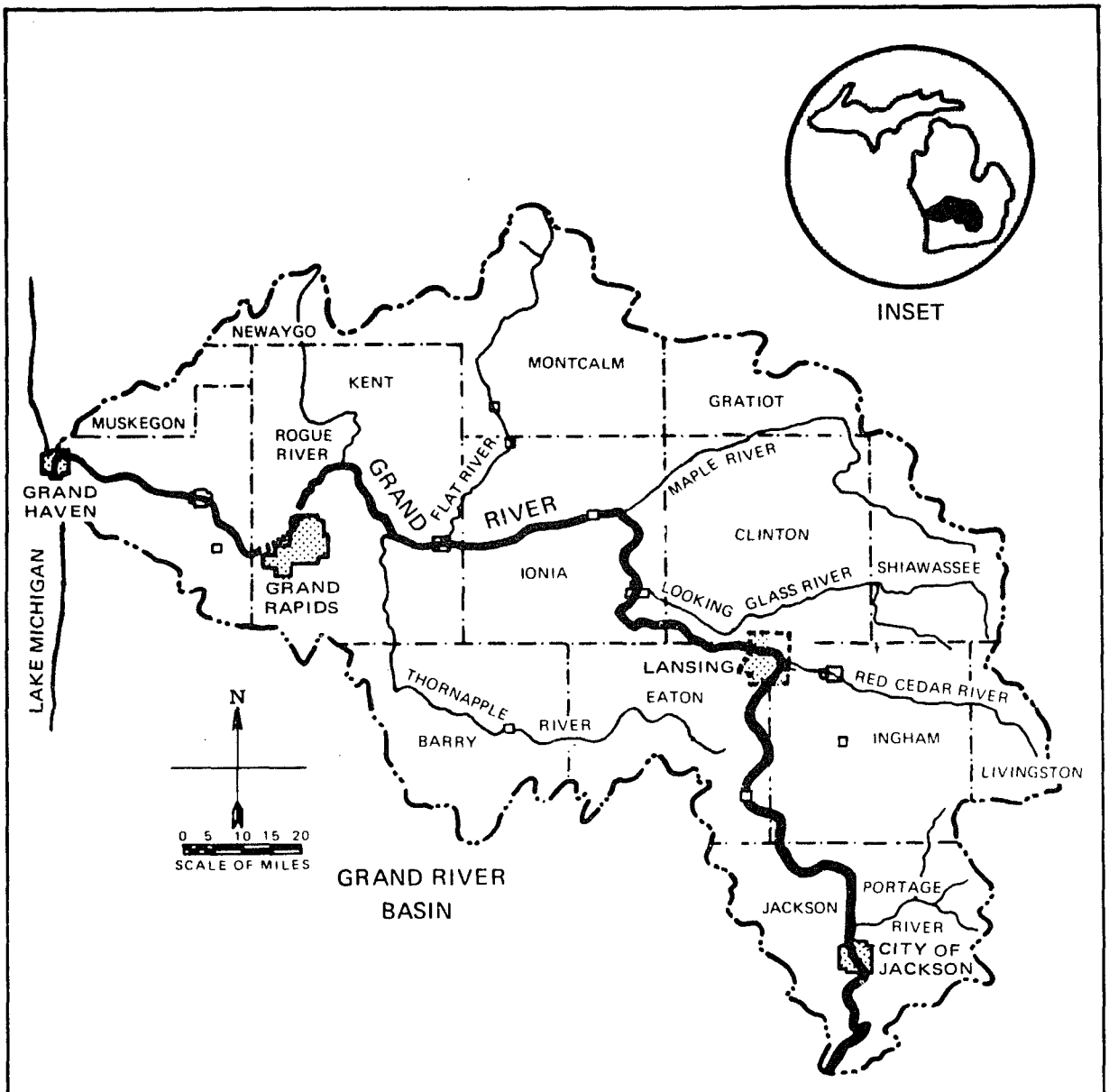
Physical Characteristics

The Grand River Basin, located in south central Michigan, drains an area of approximately 5,500 square miles (Figure 1). The river, approximately 260 miles in length, rises in Hillsdale County south of Jackson, flows north and then west through Jackson, Ingham, Eaton, Clinton, Ionia, Kent, and Ottawa Counties, finally emptying into Lake Michigan at Grand Haven. The watershed is Michigan's largest, its seven major tributaries include the Rogue, Flat, Maple, Looking Glass, Thornapple, Portage, and Red Cedar Rivers.

Municipal effluent and agricultural land run-off seriously affect water quality in the Grand River Basin. Municipal effluent is the product of approximately 1.3 million residents (1970 census) concentrated predominantly in three Standard Metropolitan Statistical Areas (Grand Rapids, Lansing, and Jackson). Agricultural run-off is generated by 3.5 million acres of agricultural land used for dairy, corn, hay, fruit, and vegetable production. The most serious water pollution problems are found just downstream from Jackson, Lansing, and Grand Rapids, and at the river's mouth near Grand Haven.

Historical Background

The history of development along the Grand River in Lansing reflects the changing importance of America's



SOURCE: GRAND RIVER WATERSHED COUNCIL

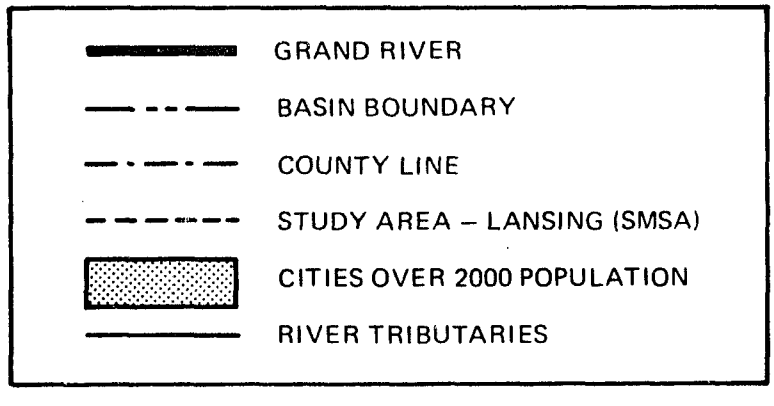


Figure: 1 THE GRAND RIVER BASIN

rivers. Once central to urban cultural and economic life, particularly in terms of transportation, rivers have declined in direct importance due to changing socioeconomic and technological conditions.

Before European settlement, the Chippeway Indians living in the Lansing area used the Grand River, which they called the Ojibiway (Big River) for hunting, fishing, and canoe transportation. Settlers from the east established themselves in the Grand River Valley in the 1840s. In 1847, Lansing became the capital of Michigan and, for a brief period, river steamers provided a vital communications link between the new capital and other population centers along the river. During the 1850s, the exploitation of the area's vast forest reserves began and the river was used both for log-floating and the production of power for sawmills and other mechanized industries. Dams built to provide water power limited water-borne transportation and the river became known as the "Old Mill Stream."

However, expanding population,[1] economic diversification, and the development of rail transportation combined to cause a decline in the river's importance. As in other American cities, the railroads took advantage of lower construction costs and existing industrial and commercial outlets by locating their lines along the river front.

---

[1]For example, between 1850 and 1861 the population of Lansing grew from 8,700 to 17,000.

This, in turn, attracted new industrial development to the riverfront area, particularly the automobile industry in the 1920s. River water was also a convenient and free industrial coolant and waste dispersal system. New industries stimulated further population growth and local governments utilized the river for the disposal of the increasing volume of sewage.[1] Householders and businessmen, likewise, dumped wastes in the river and littered its banks with trash.[2]

Although some riverfront areas were retained in public ownership, mainly through gifts and dedications (e.g., Moores River Drive, 1910; Frances Park, 1918; and Grand River Park, 1927), these were generally sections of the river away from the central city. In the urban core, the river became an "edge," a "no man's land," dividing the city into segments rather than functioning as a unifying force. Moreover, inner city residents, usually deprived of adequate park lands and open space due to previous land-use and/or acquisition costs, were cut off from the river. Thus, urban rivers have become, both in Lansing and other American cities, a part of the declining central city. In essence, the "imageability" of the central city riverfront

---

[1]The Lansing population grew from 51,000 in 1920 to 80,000 in 1930 and 155,000 in 1958.

[2]Jon Bauer, Plan for Development of Lansing's Waterfront (Lansing, Mich.: Waterfront Development Board, February 1974).

has been conditioned by industrial and commercial development rather than recreational or cultural amenities.[1]

Socioeconomic Characteristics

Lansing's population of 131,546 (1970 census) represents 38 percent of the entire SMSA population.[2] The city is divided into forty-five census tracts (Figure 2). Tracts 34, 35, and 31.01, outside the city boundaries in Lansing Township, have been included as part of the urban area in this study. The City of Lansing, for planning purpose, has divided the city into five sections: the north, east, west, south, and Lansing Township.[3]

Income

Figure 3 presents the spatial variations in the population's income level. The median annual income within the study area in 1970 was $13,357. The area's principal employers are state government agencies, Michigan State

---

[1]Lynch, The Image of the City, pp. 15-20.

[2]It is acknowledged that considerable demographic change has occurred in Lansing since 1970. Many of these changes will be evident in subsequent discussions of survey results. Reference to the 1970 census is intended to give the reader some general background information regarding the socioeconomic characteristics of Lansing.

[3]These divisions do not necessarily reflect terms used by Lansing residents. They are used here for convenience.

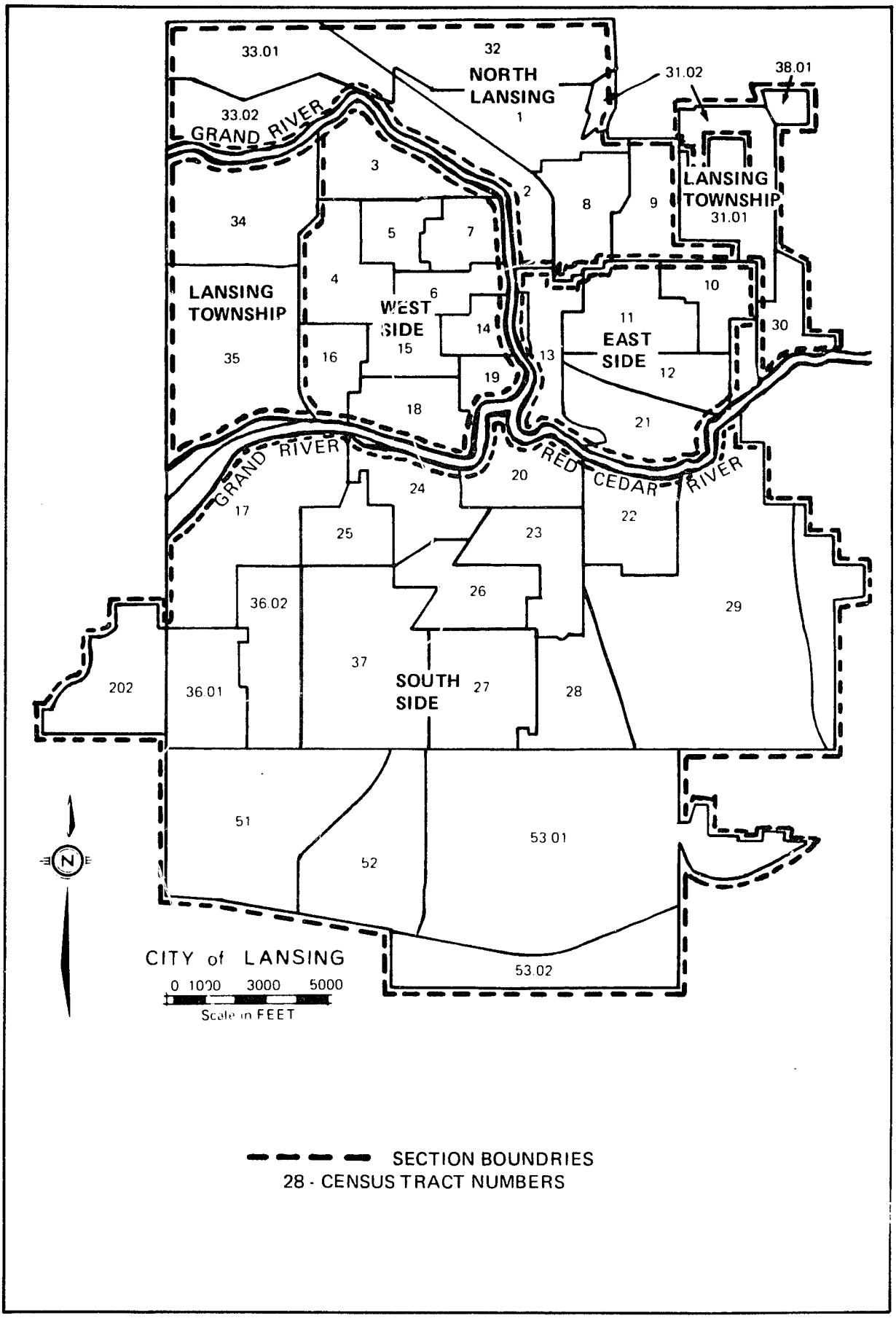


Figure: 2 TRADITIONAL CITY SECTIONS AND CENSUS TRACTS IN LANSING URBAN AREA

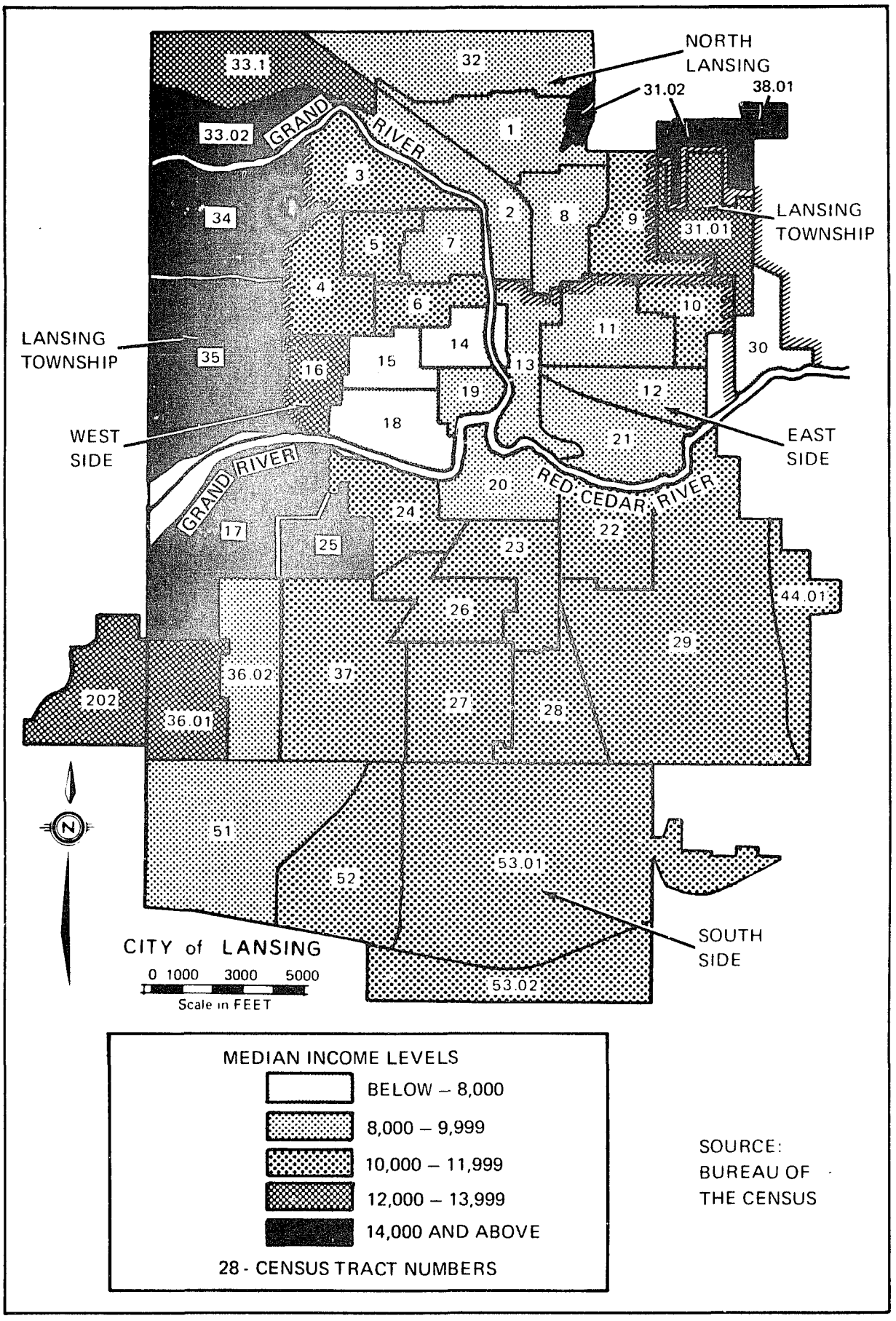


Figure: 3 MEDIAN INCOME LEVELS IN LANSING MICHIGAN

University, and the automobile industry and its ancillary industries.

In this study, the "south side" of Lansing is defined as those census tracts south of the Grand and Red Cedar Rivers. In 1970 this area had 65,594 people or 47 percent of the study area population. Some of the more affluent areas are found here. Tract 17 ($18,172 median annual income) includes the high income area along Moores River Drive as well as the exclusive Lansing Country Club. Tract 25 ($13,235 median annual income) contains a number of high income subdivisions.

The south side, characterized by both old and new neighborhoods, has experienced rapid growth in recent years. Tracts 17, 36.01, and 36.02 are indicative of the growth. The latter two show rising proportions of black residents (10.4 percent and 12 percent black, respectively). These percentages have increased rapidly since 1970. Another example of new growth in this area is tract 202, where 59 percent of the residents have resided two years or less. By contrast, tracts 25, 24, 23, and 22 generally represent older neighborhoods with high percentages of older people.

The east side area includes tracts 13, 10, 11, 12, and 21 and has the lowest annual medium income ($9,017) and 12 percent of the study area population (16,550 people). It is bounded by the Grand River on the west, the Red Cedar on the south, Saginaw/Oakland Avenues on the north, and the

City of East Lansing on the east. This section is highly commercialized and includes the major east-west arteries to and from East Lansing (Michigan Avenue, Kalamazoo Street, and Oakland/Saginaw Avenues). These arteries have been subject to extensive commercial strip development. The area is characterized by high percentages of blue collar workers and people of lower socioeconomic status.

Tracts 3, 4, 5, 6, 7, 14, 15, 16, 18, and 19 comprise the area called the west side. This area is enclosed by the Grand River on the south, east, and north, and by Lansing Township to the west. An estimated 24,696 people (18 percent of the study area population) live here, including 61 percent of Lansing's black population (tracts 15, 16, 18). Tract 16 may be categorized as a gilded ghetto with a median income of $12,144. Tract 18 on the Grand River just north of the vast Oldsmobile complex is representative of a slum ghetto with 93 percent black and a median income of $4,929. The C.B.D. (tract 14) is located in this section. This area is also characterized by large percentages of newly arrived foreign born people, particularly Hispanics.

The north section includes all tracts to the north of Oakland/Saginaw Avenues and the Grand River. This area has 26,417 people (19 percent of the study area population) and is the oldest section of the City. Tracts 2, 8, and 9 contain old, established neighborhoods, including the

original C.B.D. in tract 2. It contains areas of both high and low income. The lowest annual median incomes are in tracts 2 ($8,766), 32 ($9,658), and 1 ($9,710). More affluent areas are tracts 21.02 ($15,888) and the Tucumseh Park area of tract 32.02 ($14,877).

The Lansing Township area (tracts 30 and 31.01 on the east side of the City and tracts 34 and 35 on the west side) is a fairly affluent area; tracts 31.01 and 34 have median incomes of $15,929 and $14,544, respectively. Like the south side, this area has been subject to recent growth and is characterized by new neighborhoods.

River Recreation Land Use and Planning

The Lansing stretch of the Grand River has a diverse riparian landscape. Figure 4 is a general land-use classification for the Grand River within Lansing. The south side riverfront is largely park land, while on the west side industrial areas predominate. Other sections are characterized by mixed land uses.

Figure 5 classifies that portion of the Grand River flowing through Lansing according to visual appearance and recreational land use compatibility areas. Classification criteria includes (1) the nature of the river, (2) riparian land use, (3) scenery, (4) vegetation, (5) topography, and (6) other factors contributing to the river's visual

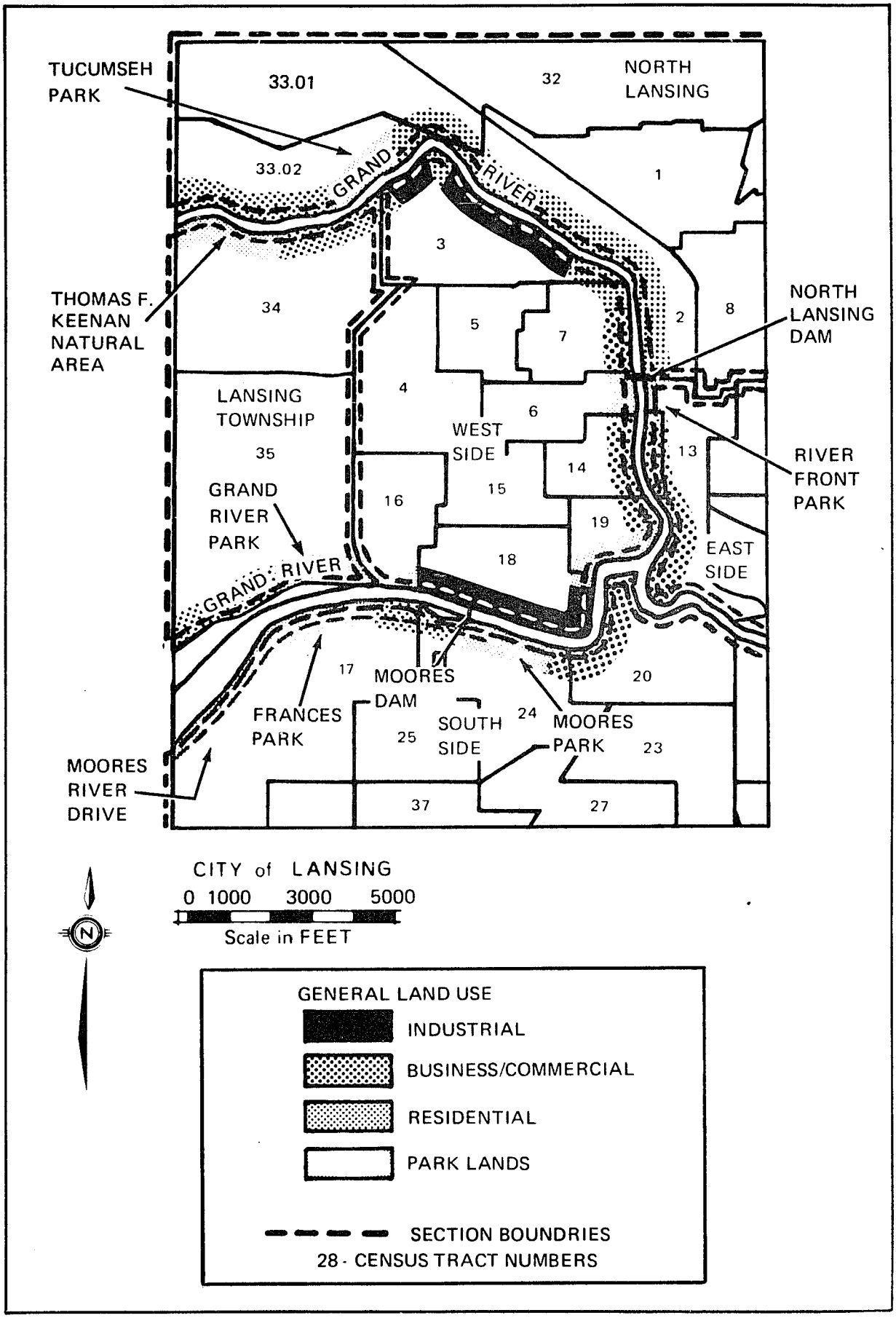


Figure: 4 GENERAL LAND USE CLASSIFICATIONS FOR GRAND RIVER

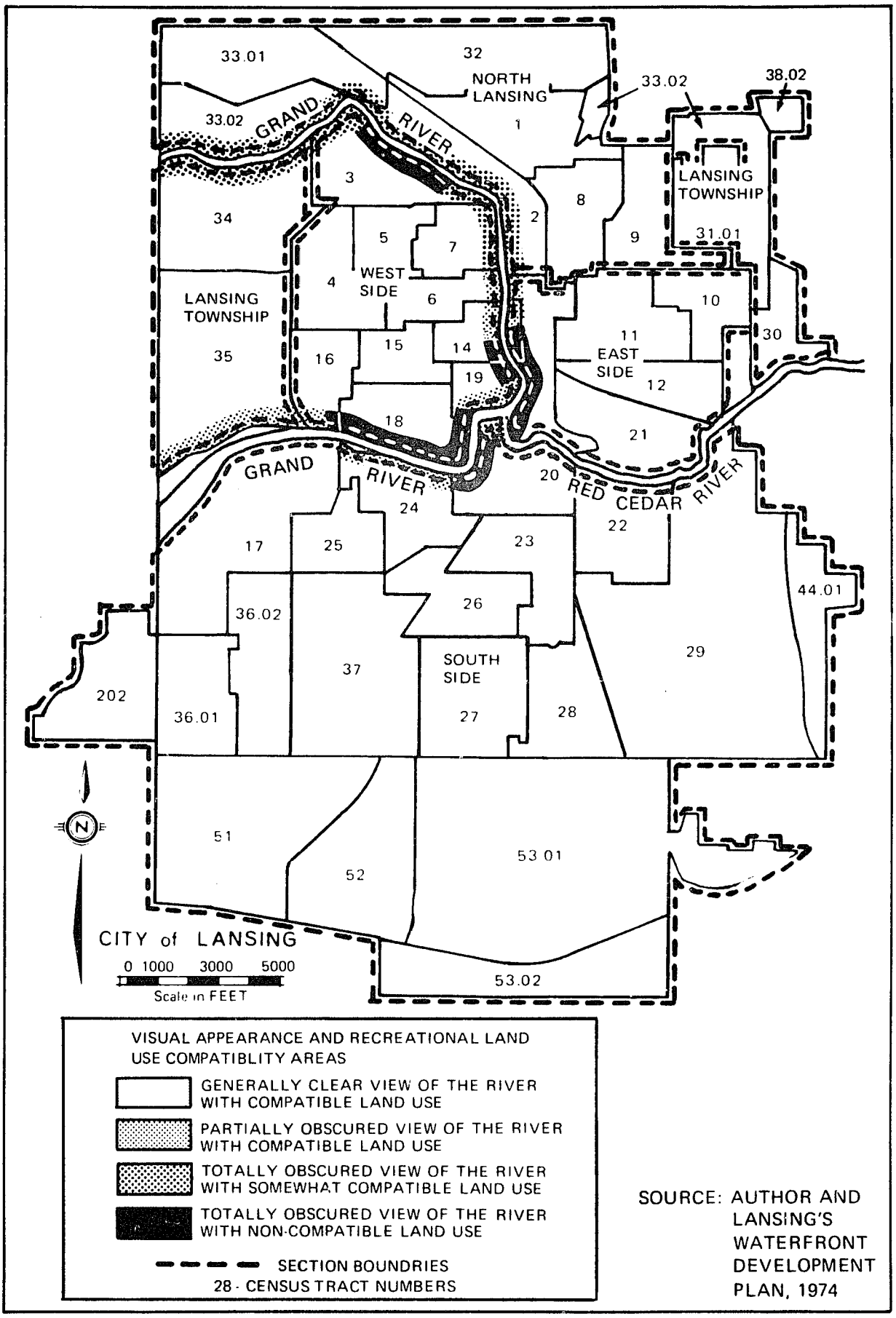


Figure: 5 VISUAL APPEARANCE AND RECREATION LAND USE COMPATABILITY AREAS ALONG THE GRAND RIVER

appearance and recreational land use compatibility (Figure 4).[1]

The first areas identified are sections of the Grand River which are wide, with slow-moving currents, and riparian lands highly visible to vehicular and other transportation modes. The only section of the river that fits the criteria is Moores River Drive. Riparian lands in this area are generally developed for recreation use.

The second areas identified are sections of the river where the view from the nearest road is partially obscured but where riparian lands are generally developed for recreation use. Major parks in this area include Grand River Park, River Street Park, and Riverfront Park. Only Grand River Park is located along a section where the river is wide and currents are slow.

The third area identified includes sections of the river totally obscured from view with riparian land use that is at least somewhat compatible with recreational uses. Sections in this area with completely compatible land uses are the Thomas F. Keenen Natura Area, the "Point" (i.e., the confluence of the Grand and Red Cedar Rivers),

---

[1]The information needed to establish visual appearance and recreational land use compatibility areas was obtained from Grand River planning reports, interviews with city personnel, and empirical observations of the study area. This information is only intended to help the reader understand the nature of the Grand River; visual appearance and recreation land use compatibility areas do not necessarily reflect the views of Lansing area residents.

and Tucumseh Park. The largest sections of this area from the boundary between the north side and the west side of the City. Most of these riparian lands are undeveloped, but are interspersed with commercial/industrial development and restricted to the lands immediately adjacent to the river. In this area, slopes are steep, the river is narrow, subject to heavy pollution loads, and has very low water levels during summer months. During July and August, low water levels may make participation in certain types of recreational activities less appealing, if not impossible. Canoeing, for example, is usually difficult in August.

The final area identified includes sections of the river totally obscured from view, except at bridges, by industrial and commercial development and where land use is incompatible with recreational use. In this area the river is narrow and has relatively high pollution levels. The most important riparian lands in this area include the vast Oldsmobile Complex, forming the boundary of the black ghetto (i.e., tract 18) and the C.B.D. (tract 14).

Lansing's waterfront development planning is similar to that in other American cities. Designs have been drawn up and expensive construction planned or completed without a foundation of adequate social research. The waterfront planning process has taken the engineering approach, as characterized by White: "authorizing agencies have reached planning decisions by considering (1) attitudes of the

people sharing in the decisions (i.e., other planners); (2) opinions as to what others prefer (i.e., personal opinions); (3) opinions as to what others should prefer (i.e., personal bias)."[1]

Current river recreation plans in Lansing, many of which have been implemented, can be divided into three broad groups: (1) canoeing improvements, (2) downtown waterfront development, and (3) general river improvements. John Kennaugh, former executive secretary of the Grand River Watershed Council, vigorously promoted canoeing. The Watershed Council disbanded in 1977, due to lack of local government financial support. Before its demise, however, the council published extensive canoeing maps for the entire Grand River and its tributaries. Major council programs included "Alpha 74," a council-sponsored canoe trip in 1974, and "CC-76," a major bicentennial canoe trip.

Lansing's Waterfront Development Board was created in July 1973, and its plans for a sweeping rehabilitation of the Grand River were approved as general guidelines by the city council. The major goals of the Waterfront Board were as follows:

1. Make the city a better place in which to live;

---

[1]Gilbert F. White, "Formation and Role of Public Attitudes," in Environmental Quality in a Growing Economy (Baltimore: Resources for the Future, Inc., and Johns Hopkins University Press, 1966), p. 106.

2. Link the image of a well-developed waterfront with the City of Lansing.

3. Promote people-oriented land use adjacent to the waterfront; and

4. Encourage the adjacent units of government to develop the waterfront within their jurisdiction and to coordinate that development with the City of Lansing as well as other jurisdictions.[1]

The Development Board, with city council support, has constructed canoe landings at Riverfront Park and Moores Park (making a total of five city canoe landings in operation) and approved the establishment of canoe rental services in these parks.

The second major emphasis, downtown riverfront rejuvenation, concentrates on Riverfront Park (Figure 4). This park, dedicated July 4, 1976, cost $680,000 to construct. It includes a canoe landing, amphitheater, play area, walkway, bicycle trails, and extensive landscaping. A U.S. Economic Development Administration grant, in August 1977, included $1.7 million for construction of rest rooms, tennis courts, additional landscaping, and lighting along the riverfront.

Finally, a number of general river improvement projects have been undertaken in recent years. For ple, in 1977 a $29,000 state grant was matched with City of Lansing funds to promote a general river clean-up

---

[1]Bauer, Plan for Development of Lansing's Waterfront, p. 94.

and added to it was a $966,306 U.S. Economic Development Administration grant for development of fishing and viewing areas near the North Lansing Dam. In addition, efforts are under way by the Fisheries Division (Michigan Department of Natural Resources) to bring salmon fishing to Lansing with the release of hatchery raised fish and installation of fish ladders along the Grand River. Estimated costs of the fish ladder project in the Lansing area were $650,000. The City of Lansing has also planned a bicycle path from East Lansing to Riverfront Park and has completed restoration of the Dodge Mansion area. In addition, the Tri-County Regional Planning Commission (under Section 208 of the Federal Water Pollution Control Act, 1972) is striving to make the Grand River swimmable and fishable by 1983.

In summary, the planning and development procedure in Lansing, as in most cities in United States, does not include a survey of public attitudes toward the river and its recreational potentials. Questions which are critical to successful planning remain unanswered: for instance, the city knows little about the people who are presently using the river and the relationship such usage has with future patterns of use. It may be that many Lansing residents do not view the Grand River as a recreational resource. There may be widespread agreement with this letter to the editor in the Lansing State Journal:

> Looking on tonight's front page the whole of the Journal's subscribers again get to see how senseless the Lansing city government can be. For one to even hope, imagine, or pray that anything such as their smelly waterfront (Riverfront Park) could bring people, action, or anybody, except riff-raff to downtown Lansing I will never know.
>
> That thing's doomed. . . . The day of city downtown activity has passed. . . . No one in their right mind walks the streets of Lansing at night.
>
> One has to remember Lansing is above all else an industrial city and industrial people, not a town that goes for Vienna Waltzes, Shakespeare, and long-haired music.
>
> Why can't the city face reality? It needs money but spends it this way. I doubt if you would show "Deep Throat" free of charge if you could get 1,580 people down there.[1]

---

[1]Milton Posey, "City Not Facing Reality," The Lansing State Journal, 5 November 1975, p. 5.

CHAPTER III

METHODOLOGY

The behavioral revolution in geography has focused on attempts to better understand human spatial behavior. The emphasis in behavioral research is on mental processes (e.g., learning and attitude formation). This process-oriented approach sees man as a rational decision maker acting as an intervening variable between the physical environment and spatial behavior. Researchers have found it difficult to conceptualize, define, and establish theories concerning this relationship. Lowenthal has divided geographic research on behavior into three realms: human perceptions and attitudes about the environment; human environmental behavior; and human effect on that environment.[1] Most research efforts have concentrated on the first of these realms, perceptions, and attitudes, yet all three facets are interrelated and essential to understanding human nature as it relates to environmental stimulus and response patterns. As Pierce in 1974 observed:

---

[1]David Lowenthal, "Environmental Perception and Behavior," in Environmental Perception and Behavior, ed. D. Lowenthal (Chicago: Department of Geography, Research Paper No. 109, 1967), p. 7.

> One of the most important results stemming from research (in perception and behavior) could be the development and application of a model that adds to the understanding of human behavior. Too little work has been conducted by behavioral geographers in the past which goes beyond the model building stage. As a result we have a series of frameworks which purport to explain human behavior but with little empirical evidence to support these theories.[1]

Assuming that appropriate variables are defined, a conceptual schema identified, and explicit hypotheses that lead to theory development are stated, there still remains the critical problem of measurement. This problem is compounded by the complexity of human nature. In essence, the validity of an entire research design depends on how well the researchers measure the myriad psychological attributes which comprise the variables, concepts, and hypotheses of their study.

Data Gathering Instruments

A major problem with geographic inquiry into perceptions and attitudes has been an inability to relate these factors to actual behavior. This study employs two separate surveys in order to address this problem. The first survey, the "household study," investigates the sample population's perceptions and attitudes concerning river recreation use.

---

[1]Robert Pierce, "Behavioral Correlates of Perceived Stress in the Urban Environment: Spatial Restriction in Metropolitan Detroit" (Ph.D. dissertation, Department of Geography, Michigan State University, 1974), p. 11.

The second survey, the "on-site study," examines the behavior, perceptions, and attitudes of actual river recreation participants.

It was decided that personal interviews were the most suitable approach both for the household and on-site studies. The disadvantages of personal interviews include high costs in both time and money and the possibility of bias from differing interviewer performances and/or inadequate sampling techniques. Measures to reduce or minimize these problems were instituted. For example, questions were carefully designed to avoid misunderstanding, and interviewing was done at various times and on various days of the week in order to avoid underrepresentation of certain segments of the population. Most interviews were conducted by the author in 1975 and 1976. The advantages of the personal interview compared to a mailed questionnaire are: higher response rates, the ability to modify the language of the survey to suit the vernacular of the person being interviewed, and the ability to lengthen the survey if additional probing is needed.

Both the household and on-site surveys employ census tracts and traditional city sections as spatial units of analysis for selection of the sample (see Figure 2). This approach allows the comparisons of survey findings to census statistics.

Scaling Model

Attitude and social variables for both the on-site and household surveys are measured using metric multidimensional scaling (MDS) as well as more traditional methods. Attitude measurement has usually been based on Likert-type scaling which attempts to identify a "unidimensional" construct using a "positive" value at one end of the scale and a "negative" value at the other. The major limitation of this technique is that the information obtained is at an ordinal scale, limiting the range of applicable statistical analysis techniques.

Multidimensional scaling measures stimuli according to several dimensions or attributes. The respondent is asked to judge the similarity or dissimilarity between stimulus objects on the basis of several attributes rather than a simple ranking on one particular attribute. The MDS models were developed from research on psychometric theory in the 1950s. One of the leading proponents of MDS, W. G. Torgerson, contrasts unidimensional and multidimensional scaling techniques as follows:

> The notion of a single unidimensional, underlying continuum is replaced by the notion of an underlying multidimensional space. Instead of considering the stimuli to be represented by points along a single dimension, the stimuli are represented by points in a space of several dimensions. Instead of assigning a single number (scale value) to represent the position of the point along the dimension, as many numbers are assigned to each stimulus as there are independent

> dimensions in the relevant multidimensional space. Each number corresponds to the projections (scale value) of the points on one of the axes (dimensions) of the space.[1]

The MDS model establishes an arbitrary distance between two theoretically derived concepts (e.g., the Grand River and clean water are 100 units apart), and respondents are asked to estimate distances between other concepts (e.g., Grand River and fishing are 75 units apart) on the basis of this scale. Respondents may select as much distance as desired between concepts. Thus, a "psychological space" is established. The MDS model reduces these points to an identifiable space of least dimensionality using a process conceptually analogous to factor analysis. The scale values thus obtained are interval levels and can be employed in parametric analytical algorithms.

A number of studies have demonstrated the validity of the MDS model.[2] MDS is not an hypothesis testing model. MDS is used in this study to reveal basic environmental

---

[1]Warren Torgerson, Theory and Methods of Scaling (New York: John Wiley & Sons, 1958), p. 248.

[2]See G. A. Barnett, "A Method for Political Communication Research," paper presented at the Annual Convention of the Association for Education in Journalism, San Diego, California, 1974; R. G. Golledge, Configuration of Distance in Intra-Urban Space, Proceedings of the Association of American Geographers, Vol. 1 (Washington, D.C.: Association of American Geographers, 1969), pp. 60-65; and James O. Wheeler, "Location of Mobile Home Manufacturing: A Multidimensional Scaling Analysis," The Professional Geographer 28 (August 1976): 261-266.

preferences. The model is particularly applicable to the task as Golledge and Rushton observe:

> The development of non-metric MDS has therefore provided the geographer with concepts and techniques by which he can expect to solve some of the puzzling measurement problems that have impeded the development of behavioral geography. For example, geography has only just begun to research and to measure form of preference structures. We can surely expect that man's adjustment will more commonly be interpreted and researched as his reaction to a perceived set of stimuli. His evaluation of these stimuli will become a primary research problem. Decisions made in this environment will increasingly be viewed as a process by which basic preferences are linked to perceived sets of stimuli.[1]

Previous MDS applications in recreation research have been limited to identifying perceptual dimensions used in judging the similarity of recreational activities without considerations concerning perceptions of the resource base (Ritchie, 1975; Becker, 1976). This study considers both the similarity of recreational activities and their relationship to the resource base.

The On-Site Survey

On-site user study data were collected by personal interviews. The sampling design for the on-site study was based on interviews with city personnel, empirical observations of the study area, and from a pilot study of forty

---

[1]R. G. Golledge and Gerard Rushton, "Multidimensional Scaling: Review and Geographical Applications," Commission on College Geography Technical Paper No. 10 (Washington, D.C.: Association of American Geographers, 1972), p. 74.

randomly selected river recreation participants conducted in June 1975. Preliminary investigations indicated that Grand River recreationists are comprised of different socioeconomic groups that participate in many different types of activities at different times and various locations. This made it necessary to stratify the sample both spatially and temporally to increase the homogeneity of the user population and decrease the sample variance. Four two hour time frames were selected and the Grand River within the City of Lansing was divided into ten geographic sampling units based on use patterns identified in the pilot study. The size of the sampling units was selected to establish areas containing comparable numbers of recreation participants. Sampling units include individual riparian parks as well as non-park lands, thus individual sampling units' length varied. Non-park units were also selected on the basis of land use. For example, the Oldsmobile industrial area constituted one sampling unit as did the "Point" (the undeveloped lands where the Grand and Red Cedar Rivers meet).

During the actual survey, time frames and sampling units were assigned numbers and selected at random using a random numbers table for each day's interviewing. Each site selected was matched to a time frame. The researcher then traveled to the sample site at the correct time, divided the site mentally into quadrants, assigned each

quadrant a number, and using a random numbers table, selected the order in which each quadrant would be surveyed. As many users as possible were interviewed within each quadrant. (A more complete description of the on-site sampling procedure is presented in Appendix A.)

Questionnaire

The original questionnaire was divided into three sections. Part one contained eleven questions (many of which had several parts) concerning recreation preferences and attitudes of river users. Part two consisted of seventeen multidimensional and fourteen unidimensional measures of river recreation concepts derived from previous research and empirical observation; this resulted in a total of 150 paired comparisons. Part three contained four socioeconomic identification questions; many had several parts (see Appendix B).

The original questionnaire took approximately forty-five minutes to complete; a total of fifteen respondents terminated the interview before it was completed. In order to reduce the time required for each interview (which was shown to be a crucial factor in keeping respondents' interest), several of the paired comparisons were eliminated. Comparisons such as old age, flood danger, and cultural events caused confusion, took much time, and were therefore not included in the multidimensional analysis. In addition,

these comparisons were eliminated because it is imperative that respondents understand the concept in order to obtain valid results.

After the pilot study, parts one and three of the original questionnaire remained unchanged. However, the order was changed so that questions in part three were asked before part two components. This was because (1) respondents tended to complete the entire survey if the multidimensional questions were the final segment, and (2) it permitted some analysis to include respondents who terminated the survey during the final part. Sections one and two of the final questionnaire contained fifteen questions, some of which had several parts; section three contained thirteen multidimensional concepts (i.e., 105 paired comparisons) and nineteen unidimensional concepts. In selecting the final concepts, consideration was given to respondents' ability to recognize concepts and their relevancy to Grand River recreation activities.

Each respondent was given a list of 124 comparisons. Verbal instructions call for a ratio distance between concepts (i.e., how far apart are a and b) based on a provided standard distance. (For a more complete description of the multidimensional scaling procedure, see Appendix B.)

The first question in section one involved attitudes toward Lansing: this was an attention-getting "warm-up" question and responses were not analyzed. The second

question measured recreation satisfaction on an ordinal scale from zero (total dissatisfaction) to 100 (total satisfaction). Question three determined the sections of the river with which respondents interacted on a continuing basis. Locations of present and former residence throughout the city were determined by question four. Question five addressed respondents' knowledge and environmental perceptions of the Grand River. Questions six through ten elicited responses on preferences and attitudes for recreational activities, particularly those concerned with the Grand River.

The second segment of the questionnaire measured socioeconomic variables. Respondent names were not collected. The information sought included age, sex, occupation, income, education, marital status, number of children, and number of vehicles. In this section, general remarks or comments concerning the ir erview were written out by the interviewer. Each interview took approximately thirty-five minutes. Only those respondents residing in Lansing and at least eighteen years of age were included.

Sample Size

After considering the aggregate unit of analysis, the exploratory nature of this research, the extent of river recreation use, and the precision of the sampling model, it was determined that 150 respondents would

constitute an adequate sample size.[1] The sampling design described above insured that an adequate cross section of socioeconomic groups and types of activities were selected. Strenuous efforts were made to contact as many users as time and fiscal resources would allow. (A more complete description of the considerations given to sample size is presented in Appendix A.)

Response Rates

Pilot study results indicated an overall response rate of approximately 80 percent could be expected. Response rates for individual questions varied. Shortening the questionnaire and securing local government support for the project helped secure higher response rates for both surveys (see Appendix C). A total of 185 interviews were conducted; 25 people refused to participate and 13 did not reside in Lansing, giving a response rate of 83 percent. Of these 185 interviews, 12 were eliminated because of incomplete responses, health factors, language barriers, hostility, or the advanced age of the respondent. The on-site survey analysis is therefore based on 173 interviews. All interviews were conducted by the author between July 1, 1975 and August 10, 1975.

---

[1]After interviews with city planners, it was concluded that a very liberal estimate of the total user population is 10 percent of the total Lansing population. Thus, approximately 13,500 people comprise the total user population. The sample size of N = 150 is a greater than 1 percent sample of this estimate.

The Household Study

The high costs and extensive time necessary to conduct household interviews over a large geographic area resulted in a longer survey schedule (September 15, 1975 to April 30, 1976) for the household study. The questionnaire employed is almost identical to that in the on-site study (see Appendix D). Question number nine was changed from actual use of the Grand River to past and potential use or non-use.

A stratified, proportional, random geographic survey sampling technique was used (see Appendix E). Figure 6 shows the residential location of household respondents.

Sample Size

Consideration was given to previous research findings, the aggregate unit of analysis, the exploratory nature of this study, and the precision of the sampling model in establishing an appropriate sample size. The reliability of the MDS technique increases with the size of the sample; the curve of the coefficient flattening out greatly once more than 75 individual responses are included.[1] It was determined that 300 respondents were an adequate sample size for Lansing, Michigan. Strenuous efforts were made to contact as many users as time and fiscal resources would

---

[1]G. A. Barnett, "Reliability and Metric Multidimensional Scaling," unpublished research report, Michigan State University, East Lansing, Michigan, 1972.

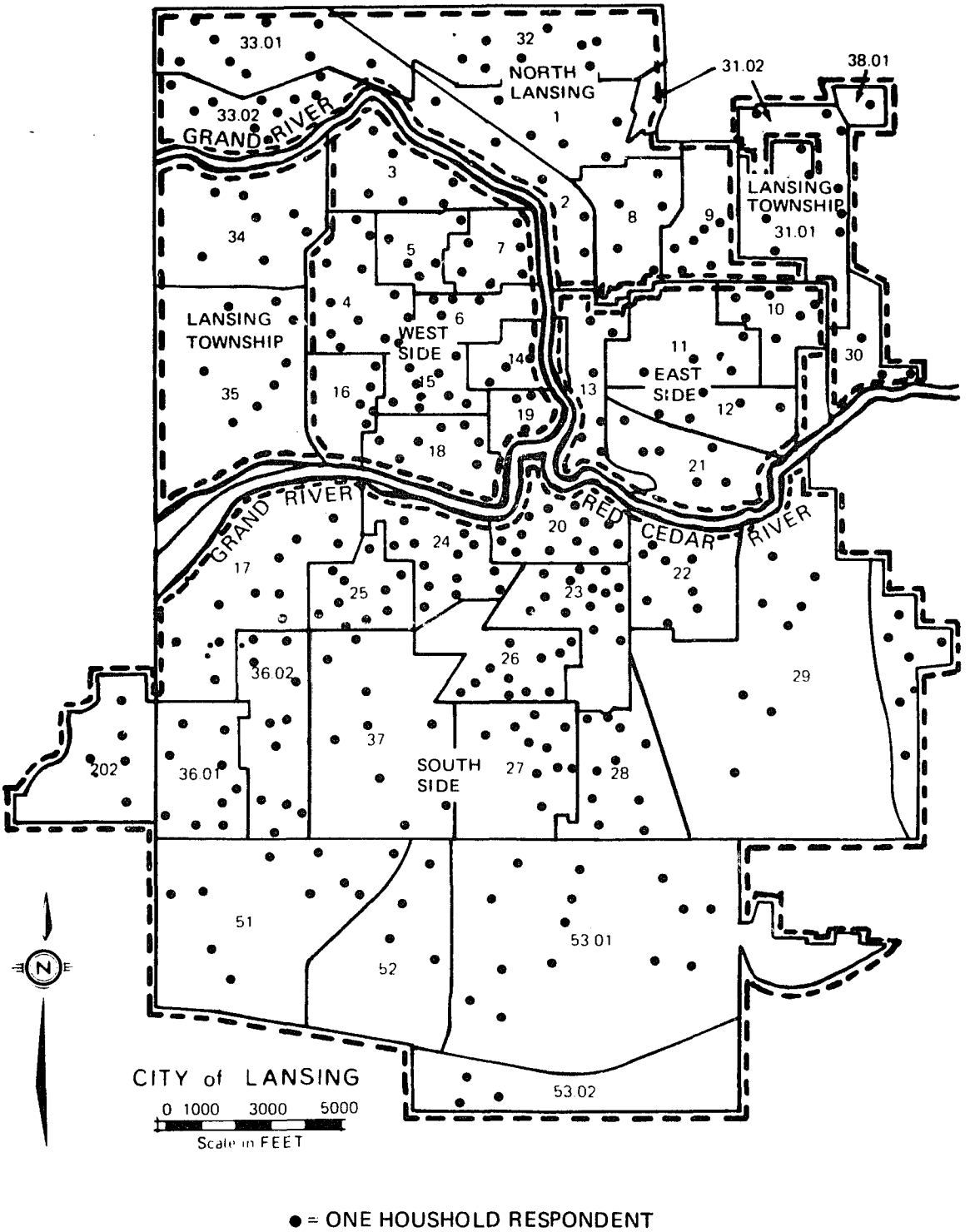


Figure: 6 THE RESIDENTIAL LOCATION OF HOUSEHOLD RESPONDENTS

allow. (A more complete description of the considerations given to sample size is presented in Appendix E.)

Response Rate

It was anticipated that response rates would be somewhat lower for the household survey than for the on-site study. Of an initial sample size of 536 households, 129 people refused to participate, thus giving a total of 407 interviews and a response rate of 76 percent. Of the 407 interviews conducted, 36 were eliminated because of incomplete response, respondent health factors, language barriers, hostility, or the advanced age of respondent. The survey was completed with 371 interviews. Of this sample of 371 households, 42 people refused to complete the MDS analysis (i.e., section three) and 15 were eliminated because of incomplete response. Therefore, the MDS analysis is based on 314 interviews.

Method of Analysis

Upon survey completion, each answer sheet was scanned for recording errors. Each questionnaire was coded for keypunch operators, who transferred the information data to data processing cards.

In Chapter IV, multidimensional and unidimensional variable mean distance matrices are examined and analyzed by city section. The Galileo Metric-Multidimensional

Scaling Program, developed by Woelfel,[1] is employed to identify underlying relationships. Frequency and percentage distributions are calculated for all the other questions for both the household and on-site responses. Some descriptive statistics are then mapped by census tracts in order to illustrate geographic distributions.

In Chapter V, non-parametric statistical methods, namely chi-square (χ^2) and Kendal tau tests are employed to investigate possible relationships between some variables for both sample populations.

---

[1]Joseph Woelfel and John Saltiel, "Cognitive Processes as Motion in a Multidimensional Space: A General Linear Model," monograph, Michigan State University, East Lansing, Michigan, 1975.

CHAPTER IV

THE RESULTS OF THE SURVEYS

Introduction

Both the household and on-site studies revealed differences in perceptions, attitudes, preferences, and use of the Grand River within the sampled population. Differences exist between city sections and among census tracts, between users and non-users, and between groups of recreation participants involved in different types of river activities. In the following section these differences and similarities are described and analyzed.

Considerable socioeconomic data were collected for the 371 individuals who completed section one and two of the household survey within the City of Lansing. A more complete tabular presentation of this socioeconomic data is presented in Appendix F.

General Attitudes Revealed in the Household Survey

Respondents' levels of satisfaction with their current recreation activities were measured on a scale from 0 (total dissatisfaction) to 100 (total satisfaction). The mean value was 62.3, indicating that respondents were

considerably less than totally satisfied with their current participation in recreation activities.

Table 1 tabulates respondent preferences for water-oriented activities. The most preferred activities were swimming and power boating. Fishing also had relatively strong preference.

Use of Rivers Other than the Grand River

Several questions concerning the recreational use of rivers other than the Grand River in Lansing indicate that the majority of respondents have participated in river recreation activities. However, a large minority (37 percent) have never used a river for recreation (see Table 2). The Red Cedar River is used by the largest proportion of respondents. This is likely due to the proximity of the river to Lansing and the popularity of Potter Park and the Michigan State University campus through which the Red Cedar River runs. Fishing and canoeing were the most popular activities, while swimming and power boating, although most important for water activities in general, were a less significant aspect of river recreation (Table 2).

Recreation Use and Perceptions of the Grand River

Questions examining respondents' knowledge and familiarity with different parts of the river and perceptions of the desirability for recreation of these sections

Table 1

Preferred Water Oriented Activities--Household Survey Respondents

Activity	Number of Respondents	Percent of Respondents
Swimming	186	23
Boating	178	22
Fishing	95	12
Walking for pleasure	71	9
Water skiing	69	9
Relaxing	49	6
Canoeing	48	6
Picnicking	43	5
Playing sports	17	2
None	45	6
Total	801	100

Table 2

Past River Recreation Use by Household Survey Respondents

Variable	Number of Respondents	Percent of Respondents
1. Use of River Previously:		
Yes	232	63
No	139	37
Total	371	100
2. River Used:		
Grand (ther than in Lansing	0	0
Red Cedar	112	31
Maple	10	3
Thornapple	12	3
Looking Glass	13	4
Pine	26	7
Au Sable	44	12
Manistee	23	6
Other	122	36
Total	362	100
3. Activities on Rivers (other than the Grand--in Lansing):		
Fishing	92	23
Relaxing/playing	69	18
Canoeing	90	23
Walking for pleasure	3	1
Picnicking	50	13
Boating	40	10
Water skiing	6	2
Playing sports	14	4
Swimming	30	8
Total	394	100

indicate that the areas of greatest knowledge, familiarity, and desirability are on the south side (Table 3). Figure 7 shows the spatial distribution of varying degrees of knowledge concerning Grand River lands. South side residents were most knowledgeable, while east side and north side residents indicated greatest ignorance. A sizable proportion of residents did not consider themselves familiar with any particular stretch of the river (23 percent). Figure 8 shows respondents from the east side and north side indicated least familiarity with Grand River lands. Only 30 percent of east side respondents and 28 percent of north side respondents indicated familiarity with Grand River lands. On the other hand, 74 percent of south side respondents indicated familiarity. Respondents for the total sample ranked south side Grand River locations as the most familiar and desirable areas (Table 3). Figure 9 shows south side residents tended to be more familiar with south side river locations than other residents, particularly east side and north side residents. Approximately 73 percent of south side respondents indicated a familiarity with south side lands compared to only 3 percent of east side respondents and 9 percent of north side respondents. A similar geographic difference is shown concerning the desirability of south side locations. Sixty-six percent of south side respondents indicated south side lands as most desirable compared to 4 percent of east side respondents and 6 percent

Table 3

Knowledge and Preferences for Sections of the Grand River--Household Survey Respondents

Variable	Number of Respondents	Percent of Respondents
1. Most Familiar Area:		
South Waverly to Moores Park	111	30
South Waverly to Oldsmobile plant	16	4
Oldsmobile plant area	15	4
Moores Park area	15	4
River Street--Point	17	5
Downtown	43	12
North Lansing dam	11	3
North Lansing	20	5
Tucumseh	25	7
No idea	85	23
Total	371	100
2. Most Desirable Area:		
South Waverly to Moores Park	154	42
South Waverly to Oldsmobile plant	22	6
Oldsmobile plant area	1	0
Moores Park area	25	7
River Street--Point	4	1
Downtown	9	2
North Lansing dam	6	2
North Lansing	5	1
Tucumseh	16	4
No idea	129	35
Total	371	100
3. Least Desirable Area:		
South Waverly to Moores Park	0	0
South Waverly to Oldsmobile plant	0	0
Oldsmobile plant area	37	10
Moores Park area	7	4
River Street--Point	32	9
Downtown	78	21
North Lansing dam	15	4
North Lansing	30	8
Tucumseh	13	4
No idea	159	43
Total	371	100

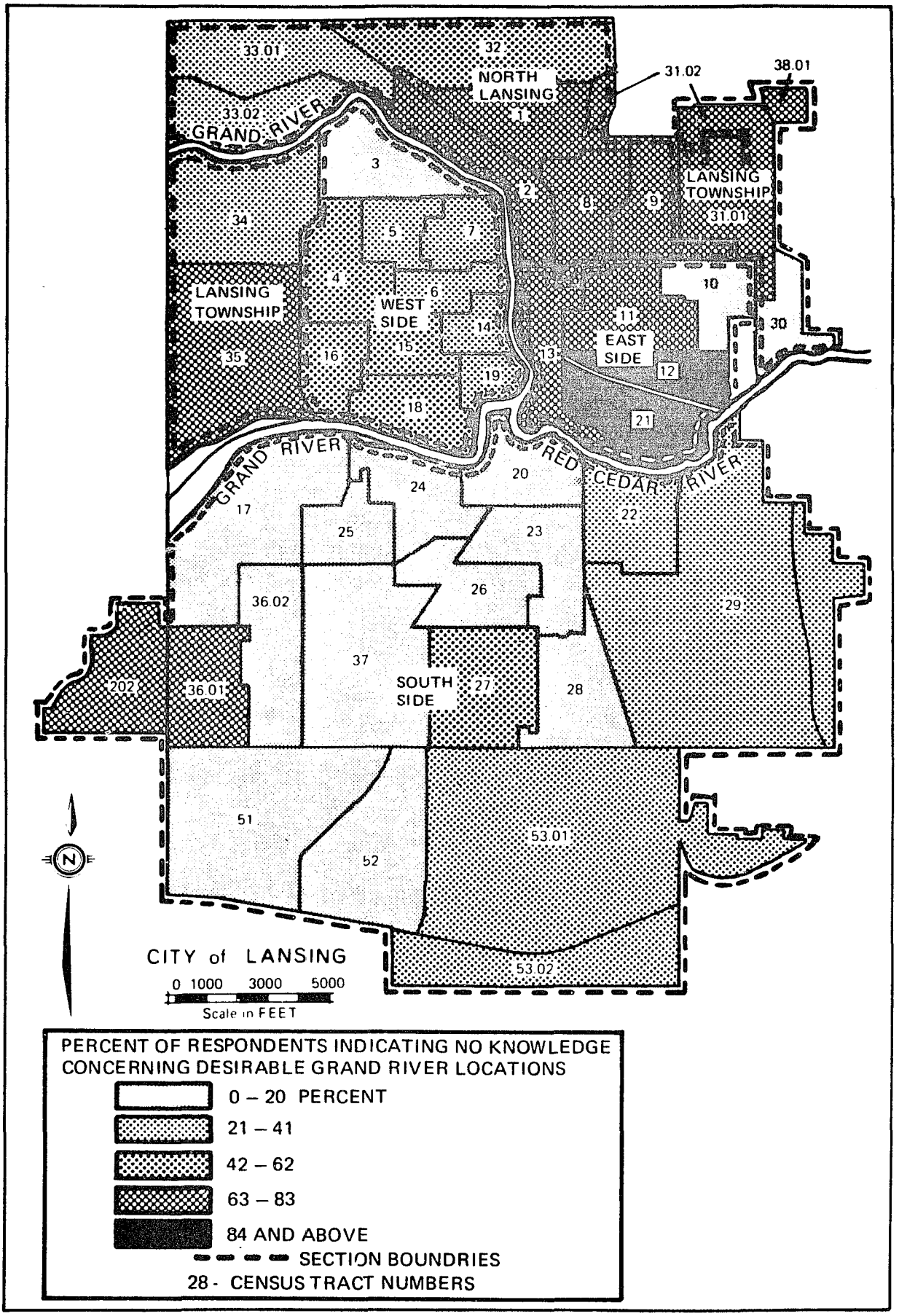


Figure: 7 NO KNOWLEDGE CONCERNING DESIRABLE GRAND RIVER LOCATIONS BY HOUSEHOLD RESPONDENTS

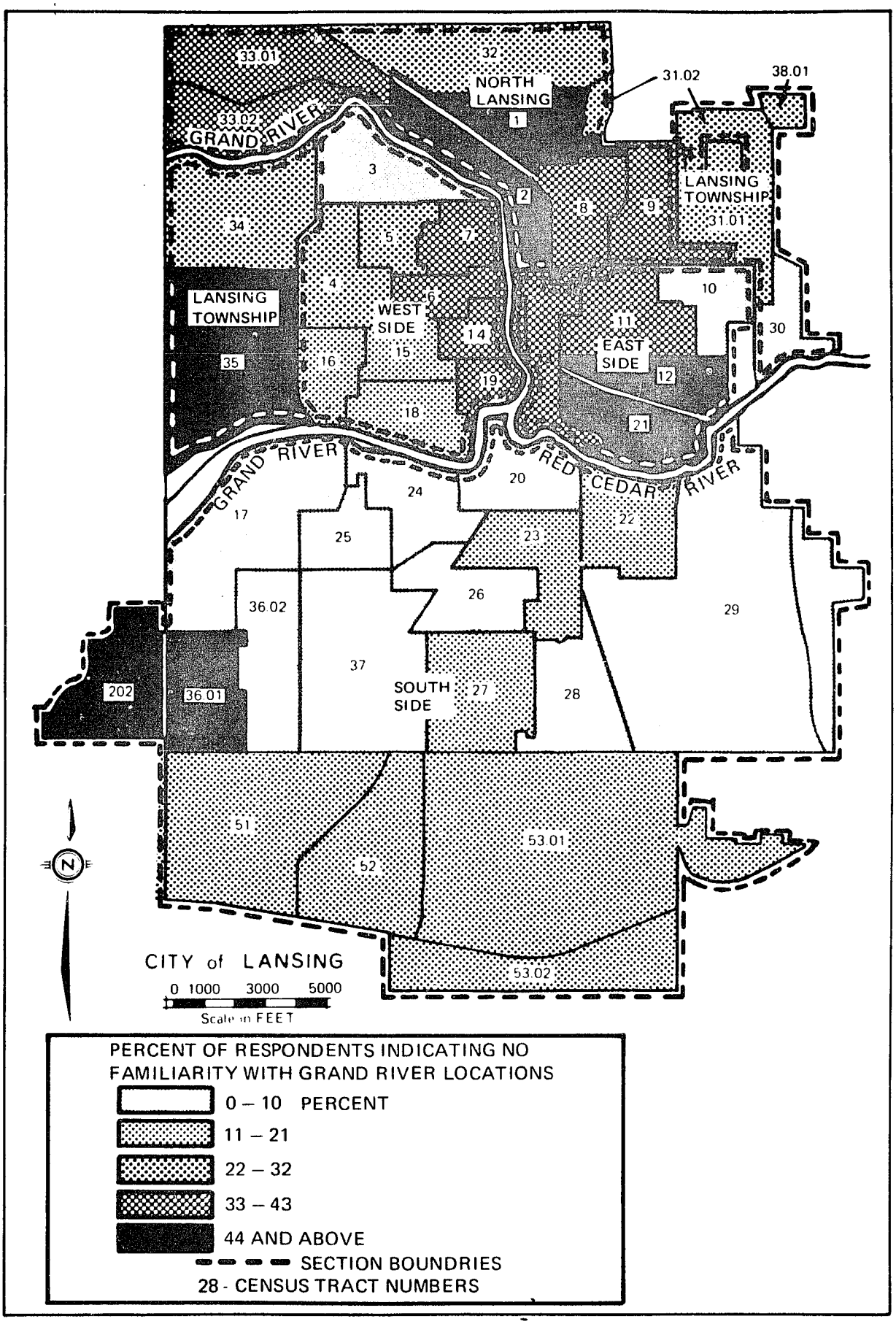


Figure:8 NO FAMILIARITY WITH GRAND RIVER LANDS BY HOUSEHOLD RESPONDENTS

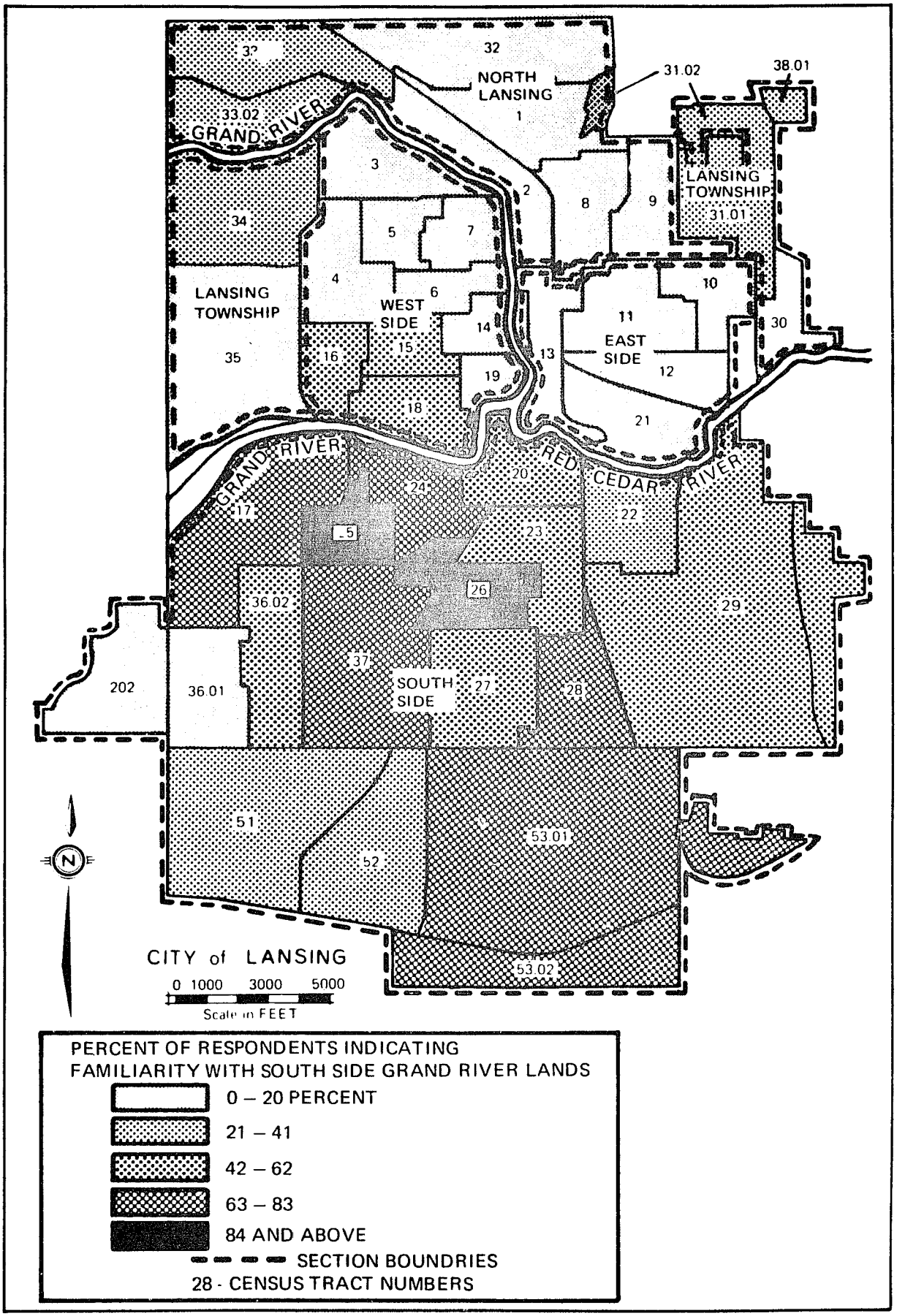


Figure: 9 FAMILIARITY WITH SOUTH SIDE GRAND RIVER LOCATIONS BY HOUSEHOLD RESPONDENTS

of north side respondents (Figure 10). More than one-third of the respondents for the total sample (35 percent) did not rate any stretch as most desirable. An even larger percentage (43 percent) were unable to identify a least desirable stretch; however, a sizeable percentage (21 percent) indicated the downtown area is least desirable.

The majority of respondents have used the river or its lands at least once; however, a substantial proportion (40 percent) have never used the river (Figure 11 shows the spatial distribution of varying degrees of past recreational use). South side areas, particularly those residents living in a sectoral pattern south of Moores River Drive, show the highest percentages of respondents indicating past use of the river (70 percent of south side residents indicated past use). The lowest percentage of previous use occurs in Lansing Township (40 percent), east (45 percent), and north sections (48 percent). The types and locations of activities in which respondents participated along the river are listed in Table 4. The most popular activities were picnicking (35 percent) for adults and fishing (34 percent) for children. Of the 230 respondents who had children, only 85 (37 percent) indicated their children had used the river for recreation in the past.

The use of the Grand River by Lansing area households is concentrated on the south side. The relatively low proportion of use occurring in the South Waverly Street

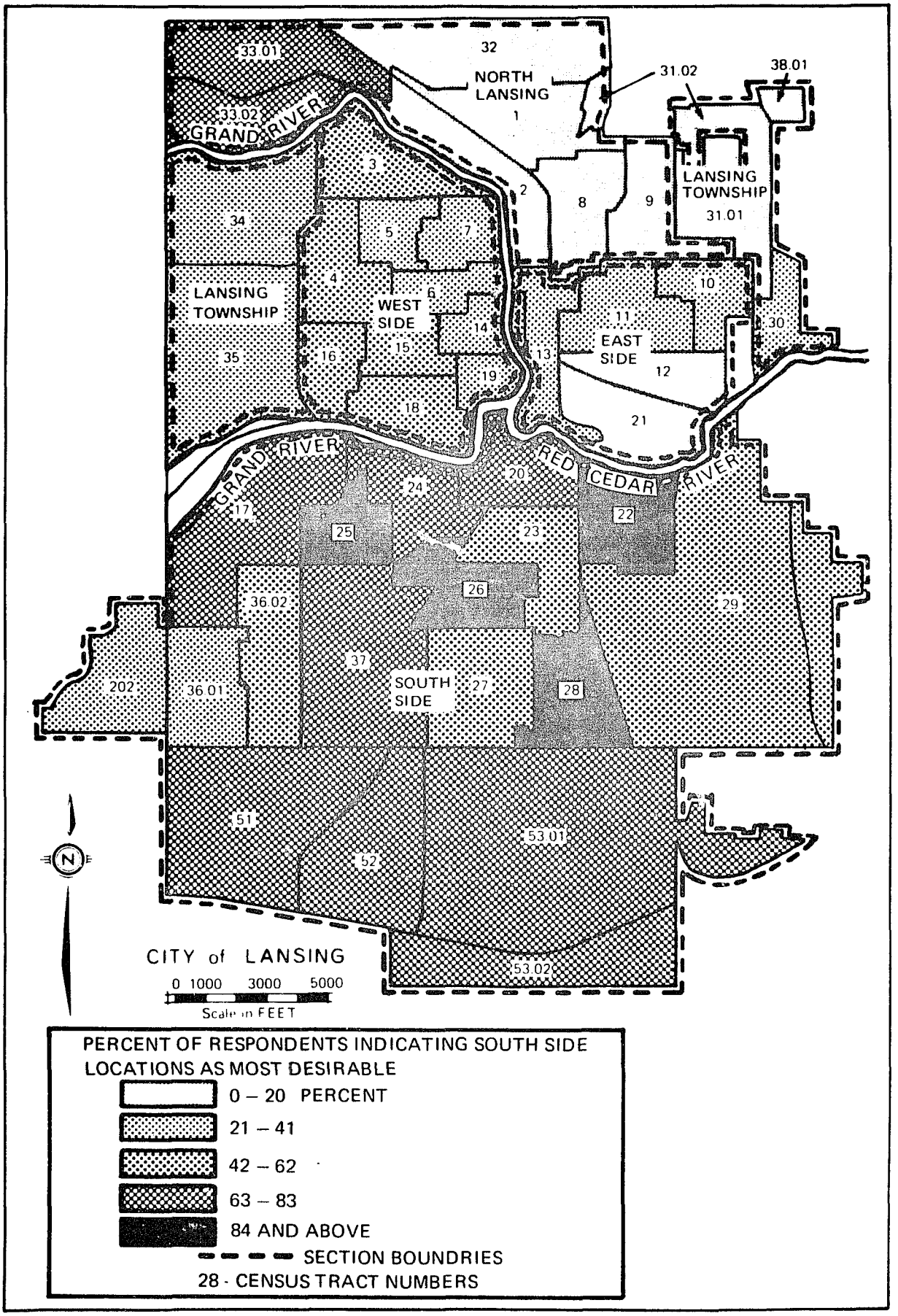


Figure: 10 DESIRABILITY OF SOUTH SIDE LOCATIONS BY HOUSEHOLD RESPONDENTS

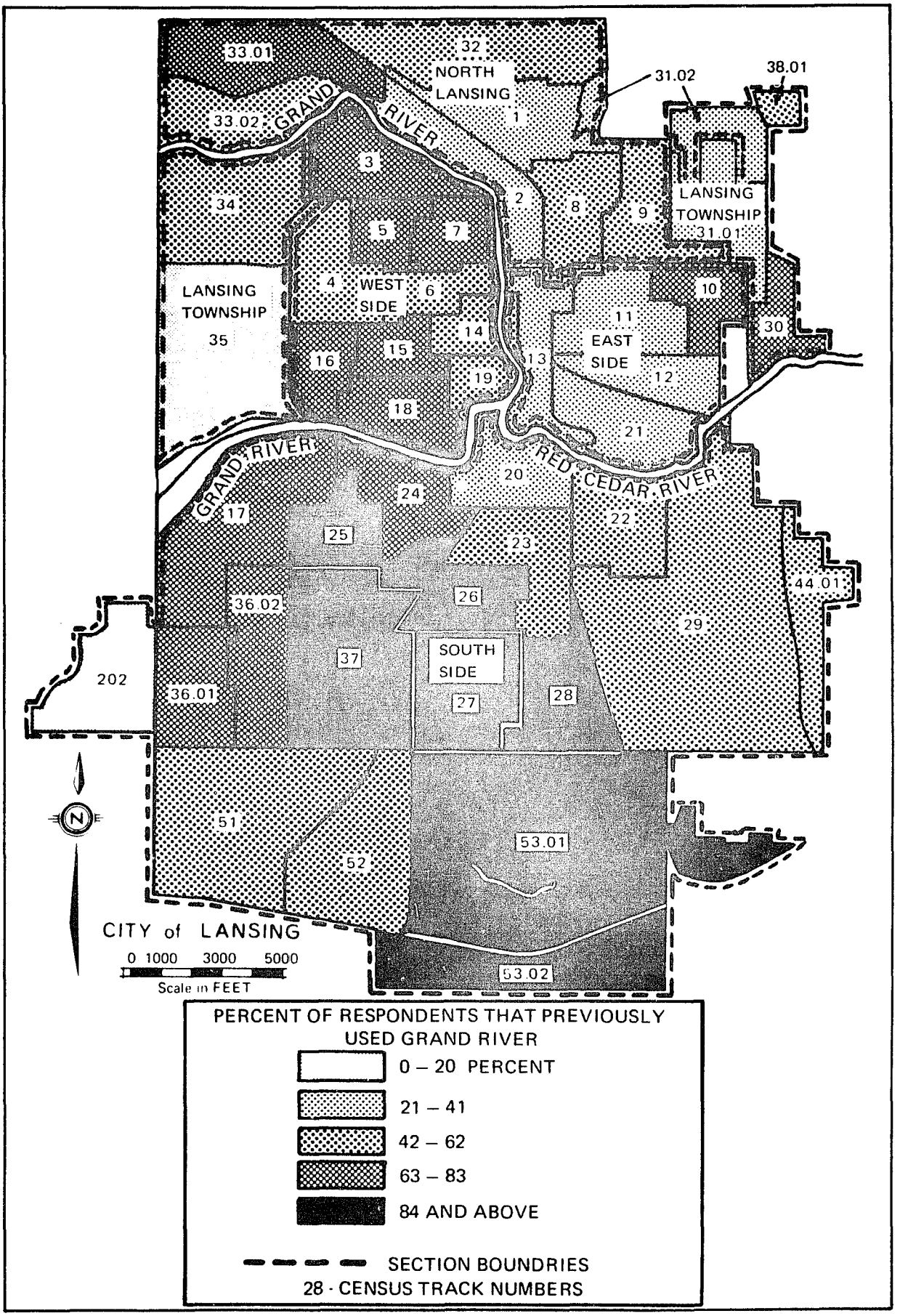


Figure: 11 PAST RECREATIONAL USE OF THE GRAND RIVER BY HOUSEHOLD RESPONDENTS

Table 4

Grand River Recreational Activities and Locations of Household Survey Respondents

Variable	Number of Respondents	Percent of Respondents
1. Adult Activities:		
Picnicking	120	35
Fishing	61	17
Relaxing	62	17
Boating	42	12
Water skiing	20	6
Walking for pleasure	19	5
Canoeing	15	4
Playing sports	13	4
Swimming	7	2
Total	359	100
2. Children's Recreational Use of River:		
Yes	85	37
No	145	63
Total	230	100
3. Children's Activities:		
Fishing	29	34
Picnicking	22	27
Relaxing/playing	15	18
Boating	7	9
Playing sports	6	7
Water skiing	3	4
Canoeing	1	1
Walking for pleasure	1	1
Swimming	1	1
Total	85	100
4. Location of Activities:		
South Waverly to Moores Park	140	53
South Waverly to Oldsmobile plant	46	17
Oldsmobile plant area	2	1
Moores Park area	45	17
River Street--Point	3	1
Downtown	6	2
North Lansing dam	6	2
North Lansing	6	2
Tucumseh area	11	4
Total	265	100

to the Oldsmobile Plant area and the Tucumseh area is surprising since both sections are aesthetically pleasing and contain large parks--Grand River Park and Tecumseh Park, respectively.

The household survey also investigated why some respondents had not previously used the rive or its surrounding lands for recreation (Table 5). The three most frequent were "no need" (20 percent), "no desire" (18 percent), and "pollution" (19 percent). The greatest geographic difference in response for these variables was for "no desire." Ten percent of south side respondents indicated "no desire" compared to 30 percent of non-south side respondents. When non-users were asked if they would use the river after pollution problems were corrected, 50 percent indicated they would not and 15 percent were unable to give an opinion. Approximately 85 percent of the respondents would not use the Grand River even after pollution abatement reside in non-south side locations. Household survey respondents were asked if there were any water oriented activities that they prefer but did not take part in along the river. Swimming was shown to be a highly preferred activity that people did not participate in along the river.

Fishing and power boating were also listed by many respondents (i.e., fishing, 16 percent; and boating, 13 percent) as activities that were preferred, yet not undertaken

Table 5

Water Oriented Activities Preferred But Not Undertaken on the Grand River and the Reasons for Non-Use or Future Use--Household Survey Respondents

Variable	Number of Respondents	Percent of Respondents
1. Non-Users Reasons for Not Using:		
Pollution	32	21
Not suitable	13	9
Distance	0	0
No equipment	6	4
No facilities	18	12
No chance	22	15
No desire	28	18
No need	30	20
Total	149	100
2. Would Use River If Improved:		
Yes	53	35
No	75	50
No idea	21	15
Total	149	100
3. Preferred Water Activities--Not Undertaken on the Grand River:		
Fishing	74	16
Relaxing	23	5
Canoeing	33	7
Walking for pleasure	14	3
Swimming	186	39
Power boating	62	13
Picnicking	18	4
Playing sports	51	11
Water skiing	13	3
Total	474	100
4. Reasons Why River Not Used--For Preferred Activities:		
Pollution	212	49
Debris/trash	14	3
Not suitable	62	14
Distance	0	0
No equipment	22	5
No facilities	56	13
No chance	17	4
No desire	21	5
No need	25	6
Total	429	100

along the river. Water pollution was cited most often as being the major restraining factor.

Because previous research has shown interpersonal contacts are a major means by which individuals obtain information concerning recreation opportunities, respondents were asked about their friends' attitudes concerning recreational use of the Grand River in Lansing.[1] They were requested to rank on a scale of 1 (totally undesirable) to 5 (highly desirable) how they thought their friends felt about the river. Of the total non-users, 149 (84 percent) believed that their friends were either neutral or felt that the river was undesirable. About 80 percent of the users thought their friends were neutral or felt the river was desirable.

River Recreation Attitudes Toward the Grand River: On-Site Pollution

The on-site survey also collected socioeconomic data from respondents. A complete tabular presentation of these data is included in Appendix F. In summary, the socioeconomic profile of river recreation participants was a 27 year old married white male (although a large proportion of the respondents were black)[2] with a high school education, an annual income slightly over $9,000, a

---

[1]Cappelle, "Space Searching Behavior," pp. 150-170.

[2]Twenty-five percent of respondents were black compared to 9 percent of blacks living in the city.

blue-collar job, and one automobile. Figure 12 illustrates users' residential locations. The highest percentages of users lived in the south side, particularly in areas close to the river and south of Moores River Drive. All other sections contained relatively few users.

General Attitudes of the On-Site Sample

The users' general level of satisfaction with their current recreation activities was measured by the same question as in the household study. The users' mean satisfaction value was 69.9, indicating a slightly higher degree of recreation satisfaction than that of the household respondents.

Table 6 summarizes responses concerning favorite water related activities. Swimming was the most popular (25 percent), with fishing a close second (24 percent). Canoeing was mentioned by only 3 percent of the respondents.

Several questions were asked regarding respondents' river recreation activities in areas other than the Grand River in Lansing. A large majority had used other rivers on previous occasions (72 percent), mostly those rivers close to Lansing (Red Cedar, Looking Glass, and Maple). A relatively small portion of users had traveled far from Lansing. Fishing and canoeing were the most important activities on other rivers (Table 7). Swimming again ranked low as a river activity. Respondents were asked

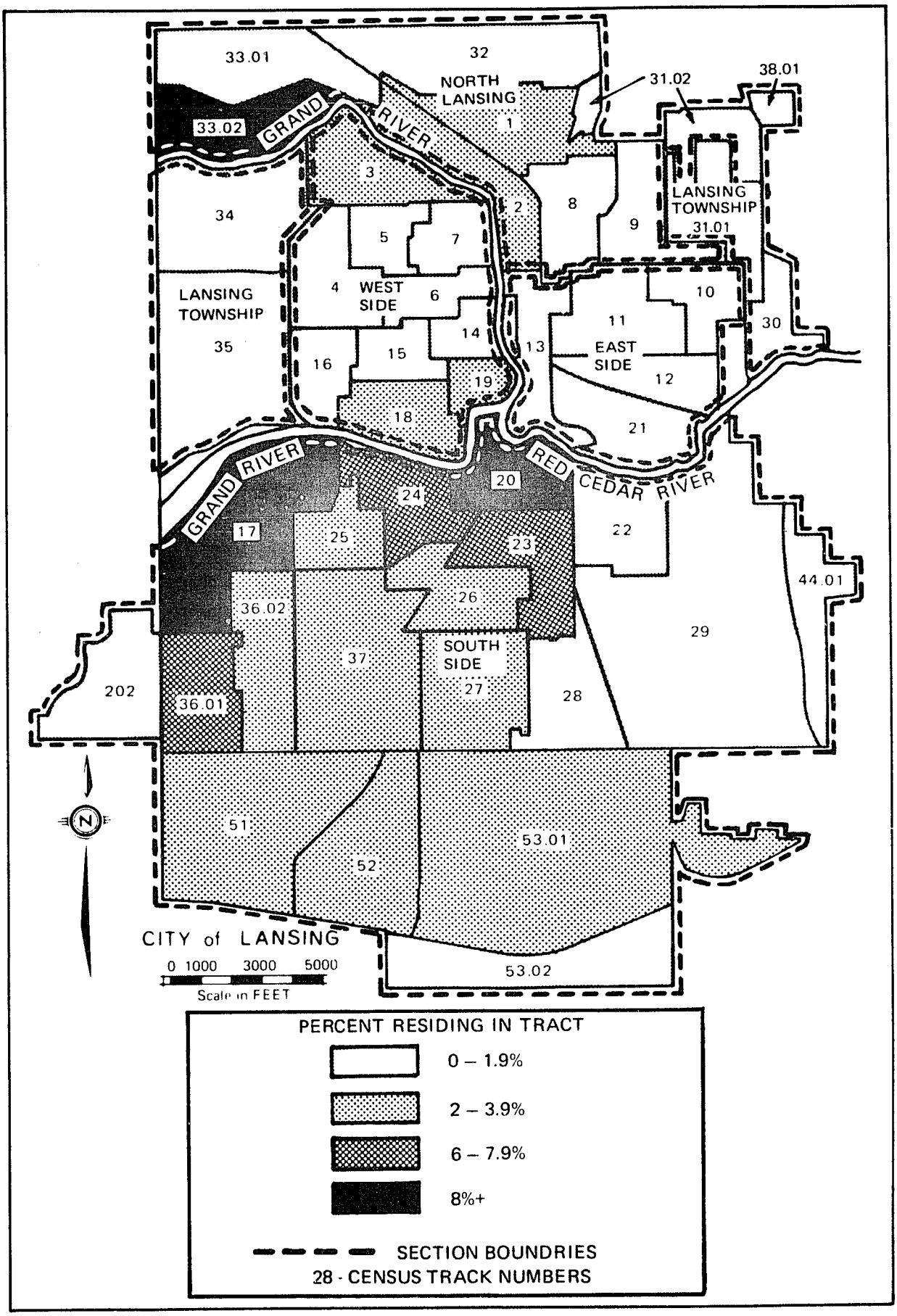


Figure: 12 RESIDENTIAL LOCATIONS OF GRAND RIVER USERS

Table 6

Preferred Water Oriented Activities--On-Site Survey Respondents

Activity	Number of Respondents	Percent of Respondents
Swimming	90	25
Fishing	85	24
Boating	50	14
Water skiing	42	12
Relaxing	27	8
Picnicking	21	6
Walking for pleasure	19	5
Playing sports	10	3
Canoeing	10	3
Total	354	100

the areas with which they were most familiar (Table 8). Responses demonstrated the great importance of the South Waverly Road and Moores River Drive in familiarity and river recreation. Conversely, the downtown, North Lansing, and River Street areas were least known and rated as least desirable.

Table 9 lists the activities in which the on-site respondents participated along the Grand River and indicates the modes of transportation they used to get there. Fishing and relaxing were the most popular activities. Picnicking was also fairly popular. Canoeing was only mentioned by

Table 7

Previous River Use--On-Site Survey Respondents

Variable	Number of Respondents	Percent of Respondents
1. Use of River Previously:		
Had used another river	124	72
Had not used another river	47	27
No answer	2	1
Total	173	100
2. Rivers Used:		
Grand (other than Lansing)	12	6
Red Cedar	60	30
Maple	17	8
Thornapple	11	5
Looking Glass	27	13
Pine	9	4
Au Sable	16	8
Manistee	10	5
Other	40	20
Total	202	100
3. Activities on Rivers (other than Grand in Lansing):		
Fishing	72	39
Relaxing (kids playing)	24	13
Canoeing	38	21
Walking for pleasure	7	4
Swimming	7	4
Power boating	14	8
Picnicking	16	9
Water skiing	3	2
Playing sports	3	2
Total	184	100

Table 8

Knowledge Concerning the Grand River--On-Site Survey Respondents

Variable	Number of Respondents	Percent of Respondents
1. Most Familiar Area:		
South Waverly to Moores Park	71	41
South Waverly to Olds plant	27	16
Olds area	3	2
Moores Park area	28	16
River Street--Point	7	4
Downtown	5	4
North Lansing dam	7	3
North Lansing	7	4
Tucumseh area	12	7
None	6	4
Total	173	100
2. Most Desirable Area:		
South Waverly to Moores Park	113	65
South Waverly to Olds plant	25	15
Olds area	0	0
Moores Park area	15	9
River Street--Point	2	1
Downtown	1	1
North Lansing dam	2	1
North Lansing	2	1
Tucumseh area	7	4
None	6	4
Total	173	100
3. Least Desirable Area:		
South Waverly to Moores Park	1	1
South Waverly to Olds area	0	0
Olds area	33	19
Moores Park area	14	8
River Street--Point	33	19
Downtown	23	13
North Lansing dam	5	3
North Lansing	26	15
Tucumseh area	1	1
None	37	21
Total	173	100

Table 9

General Grand River Activities and Methods of Transportation--On-Site Survey Respondents

Variable	Number of Respondents	Percent of Respondents
Method of Transportation to the River:		
Drive to river	137	79
Walk	27	16
Bike	9	5
Total	173	100
Activities on Grand (Lansing):		
Fishing	78	32
Relaxing (or children playing)	72	30
Canoeing	1	1
Walking for pleasure	12	5
Swimming	2	1
Power boating	18	7
Picnicking	38	16
Water skiing	6	2
Playing sports	16	4
Total	243	100

one respondent. Most users reached the river by automobile. Use of the Grand River by on-site respondents' children is summarized in Table 10. Approximately 52 percent of the on-site users had children. About 90 percent of these children used the river for recreation and their activity patterns were similar to their parents' (fishing, relaxing, and picnicking were the most frequent activities).

The number of times per month and number of hours per occasion of Grand River recreational use were recorded

Table 10

Children's Use of River--On-Site Survey Respondents[a]

Variable	Number of Respondents	Percent of Respondents
Children Used the River for Recreation:		
Yes	80	89
No	10	11
Total	90	100
Activities Undertaken by Children:		
Fishing	39	33
Relaxing/playing	37	31
Canoeing	1	1
Walking for pleasure	2	2
Swimming	2	2
Power boating	9	8
Picnicking	24	20
Water skiing	0	0
Playing sports	4	3
Total	118	100

[a]Ninety respondents had children.

for each respondent (Table 11). The median number of occasions per month was four; however, nearly 15 percent of the users went to the river more than 15 times a month. Moreover, 7 percent of the on-site respondents said they used the Grand River every day of the month. The average number of hours of use per occasion was three.

Table 12 tabulates respondent preferences for water-oriented activities. The most preferred activity was swimming (25 percent), with fishing a strong second

Table 11

Number of Recreation Occasions per Month (During Season) and Hours per Occasion--On-Site Survey Respondents

Variable	Number of Respondents	Percent of Respondents
1. Number of Occasions per Month During the Summer Season:[a]		
0-2	64	37
3-5	48	28
6-8	14	8
9-11	14	8
12-14	7	4
15+	25	15
Total	172	100
2. Number of Hours per Occasion:[b]		
0-2	77	45
3-5	83	49
6-8	11	7
9+	2	1
Total	173	100

[a]Mean = 7; median = 4.

[b]Mean = 2.8.

Table 12

Preferred Water Recreation Activities and Preferred Activities Not Undertaken on Grand River and Reasons for Non-Use--On-Site Survey Respondents

Variable	Number of Respondents	Percent of Respondents
Preferred Activity:		
Fishing	85	24
Relaxing (kids playing)	27	8
Canoeing	10	3
Walking for pleasure	19	5
Swimming	90	25
Power boating	50	14
Picnicking	21	6
Water skiing	42	7
Playing sports	10	3
Total	354	100
Preferred Water Recreation Activities Not Undertaken on Grand River:		
Fishing	19	10
Relaxing (kids playing)	2	1
Canoeing	7	4
Walking for pleasure	7	4
Swimming	85	46
Power boating	26	4
Picnicking	1	1
Water skiing	34	18
Playing sports	3	2
Total	184	100
Reasons Why River Not Used for Preferred Activities:		
Pollution	104	58
Not suitable (logistics)	18	10
Distance	1	1
No equipment	21	12
No facilities	17	9
No chance	8	4
No desire	3	2
No need	9	5
Total	181	100

(24 percent). Canoeing and playing sports had the fewest mentions (3 percent each).

The on-site survey respondents were asked if there were any water oriented activities that they preferred but did not take part in along the river. Swimming again was shown to be a highly preferred activity that people did not participate in along the river (see Table 12). Fishing, however, which was also highly preferred, was generally considered to be a desirable Grand River activity.

Finally, respondents were asked about their friends' attitudes concerning recreational use of the Grand River in Lansing. Of the total on-site respondents, 107 (62 percent) felt that their friends would perceive the river to be desirable, 30 (17 percent) felt that their friends would perceive the river to be undesirable, and 36 (21 percent) had no opinion.

Results of the Mean Distance Matrix--Household Survey

The multidimensional scaling algorithm measures the perceptual distances among the original 15 concepts for all respondents. A mean distance matrix is computed to investigate the perceived dissimilarity (or similarity) among the concepts (i.e., smaller distances indicate more similarity, greater distances indicate less similarity).

The mean distance matrix (Table 13) for the household sample (N = 314) shows that concepts perceived as most

Table 13

Mean Distance Matrix for 15 Salient Urban River Recreation Concepts--Household Survey Respondents

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	77.53	0.00													
3. Females	80.81	27.78	0.00												
4. Males	65.28	31.38	50.72	0.00											
5. Children	59.60	27.53	31.19	42.23	0.00										
6. Picnicking	56.73	37.78	34.64	52.48	24.71	0.00									
7. Fishing	64.28	62.45	76.08	28.96	36.68	36.80	0.00								
8. Swimming	123.31	61.01	46.16	34.39	26.65	31.58	48.94	0.00							
9. Industry	41.72	80.95	73.38	35.48	113.44	119.37	115.68	127.34	0.00						
10. Nature	54.58	29.46	41.38	37.17	30.28	24.37	29.38	32.53	116.88	0.00					
11. Relaxing	56.70	30.70	35.39	32.32	38.05	20.82	26.93	26.54	127.01	24.94	0.00				
12. Bicycling	70.18	63.55	44.29	46.54	22.00	34.27	64.85	53.94	120.50	26.64	32.47	0.00			
13. Danger	62.65	94.55	53.57	59.02	54.21	92.35	68.07	58.08	57.02	77.08	107.24	70.50	0.00		
14. Clean water	126.96	38.47	35.09	37.62	44.69	31.85	43.46	27.29	112.67	37.74	44.48	83.21	90.40	0.00	
15. Power boating	62.20	76.62	60.25	34.21	60.72	50.79	64.40	74.93	99.72	56.16	52.68	109.91	61.99	62.11	0.00

similar to the river include industry (41.72 units apart), nature (54.58 units apart), relaxing (56.70 units apart), picnicking (56.73 units apart), and power boating (62.20 units apart). The concepts perceived as most similar to the respondents themselves (i.e., "me") include children (27.53 units apart), females (27.78 units apart), nature (29.46 units apart), and relaxing (30.70 units apart). Most dissimilar to the self-concept, "me," are danger (94.55 units apart), industry (80.95 units apart), and power boating (76.62 units apart).

Mean Distance Matrices by Residential Location

In order to test for differences due to residential location, the household sample was divided into two groups, (1) south side residents, and (2) residents of all other sections of the city (Table 14). Generally, those living in other sections of the city (i.e., east, west, north, and Lansing Township) perceived the 15 concepts as being more dissimilar (average distance of 8.5 units farther apart) than south side residents. South side residents' responses indicated that the "Grand River" as a concept was, on the average, 49.56 units away from the concept of "danger" in perceptual space. Residents of other sections of the city placed the two concepts 73.45 units apart, on the average. Similarly, the differences between the subgroups' average perceptual distances were as follows (units in parentheses

Table 14

Arithmetic Differences Between the Mean Distance Matrices for Non-South Side Residents and South Side Residents for 15 Urban Recreation Concepts--Household Survey Residents[a]

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	17.49	0.00													
3. Females	11.12	7.05	0.00												
4. Males	18.83	14.05	5.39	0.00											
5. Children	1.84	15.55	0.62	2.82	0.00										
6. Picnicking	17.72	4.98	7.03	0.71	15.89	0.00									
7. Fishing	1.07	1.12	-2.82	11.83	12.10	8.05	0.00								
8. Swimming	6.56	8.20	4.53	5.95	8.41	8.07	10.52	0.00							
9. Industry	5.92	9.63	-6.09	4.11	-6.75	9.61	14.86	18.15	0.00						
10. Nature	-1.04	6.90	7.63	6.67	10.82	12.54	15.58	17.33	13.90	0.00					
11. Relaxing	6.56	5.81	9.58	11.17	0.44	9.96	11.48	8.64	8.30	11.98	0.00				
12. Bicycling	7.24	4.94	9.75	12.03	3.44	5.66	19.18	18.63	14.87	9.76	8.56	0.00			
13. Danger	23.89	6.05	-11.79	-5.24	0.04	22.23	7.24	7.03	16.01	-9.64	18.16	17.88	0.00		
14. Clean water	-1.55	9.32	10.36	6.63	4.08	4.51	-35.40	7.10	32.83	17.41	20.34	17.08	17.00	0.00	
15. Power boating	14.14	6.52	2.06	7.86	8.41	1.68	11.07	11.41	9.41	12.27	5.64	4.21	16.69	15.62	0.00

[a]Mean Difference = 8.48.

are the differences between non-south side and south side residents average distances). Most different perceptions included the "Grand River" and "Danger" (non-south side residents 24 units farther apart), "Grand River" and "children" (non-south side residents 19 units farther apart), "Grand River" and "picnicking" (18 units farther apart), "Grand River" and "me" (18 units farther apart). South side residents generally rated most of the given concepts closer to "danger" and to "clean water" (except "females," "children," and "nature"). Non-south side residents saw fishing as considerably less dependent on clean water. Additional results of the multidimensional scaling are presented in Appendix G.

Multidimensional Space for the Household Survey

The original dissimilarity matrix was factor analyzed using the metric multidimensional scaling algorithm (Table 15). The common multidimensional space can best be summarized by four dimensions; 90 percent of the total variance for the 15 concepts were explained by these factors. The first dimension was bipolar with high positive loadings for "industry" (89.75), "Grand River" (52.44) and "danger" (40.78), and negative loadings for "swimming" (-40.78), "clean water" (-35.10) and "relaxing" (-32.81). Positive and negative loadings were indicative of directional relationships among the variables, not of positive

Table 15

Spatial Coordinate Matrix--Household Survey Respondents

Concepts	Urbanized River	Enhanced Urban River Recreation	Recreation Danger	Non-Urban River Oriented Recreation
Grand River	52.44	53.68	-9.35	-5.30
Me	-5.02	-4.49	-12.79	38.20
Females	2.34	-16.22	9.68	19.25
Males	14.47	14.47	-14.70	-5.76
Children	-15.73	8.40	14.25	-6.68
Picnicking	-26.18	16.60	-10.10	1.82
Fishing	-15.93	10.56	-7.31	-23.36
Swimming	-40.89	-28.13	20.43	-11.98
Industry	89.75	-22.28	-2.63	21.76
Nature	-20.97	14.99	-1.13	-2.13
Relaxing	-32.81	22.83	-18.40	8.67
Bicycling	-17.89	29.14	43.16	15.05
Danger	40.78	-19.04	36.10	-34.03
Clean water	-35.10	-48.68	-14.90	-7.48
Power boating	10.76	-9.65	-40.13	-34.51
Percent explanation	42%	20%	15%	13%

or negative attitudes of respondents. This factor, Dimension I, accounted for 42 percent of the total variation in the 15 concepts. It is considered an "urbanized river" dimension because the concepts with high positive loadings are indicative of urbanized/industrialized rivers; conversely, concepts with high negative loadings are severely curtailed by the presence of highly urbanized/industrialized areas.

The second dimension, also bipolar, explained 20 percent of the data variance. This factor had high positive loadings for "Grand River," "bicycling," "relaxing," and "nature," and high negative loadings for "clean water," "swimming," and "industry." It is labeled "enhanced urban river recreation" because the environmental setting appears to be the critical factor. Concepts with high positive loadings were related to the environmental quality of riparian lands, while concepts with high negative loadings were related to water quality.

Three concepts, "bicycling," "danger," and "swimming," were strongly positive on Dimension III, which explains 15 percent of the total variance. "Power boating," "relaxing," and "clean water" loaded negatively on this dimension. The dimension is labeled "recreation danger" because it appears to differentiate concepts that are perceived to be dangerous from those considered to be safe.

The final, least significant, dimension accounted for 13 percent of the total variance. The variables that loaded positively include the self-concept ("me"), "industry," "females," and "bicycling," while "power boating," "danger," "fishing," and "swimming" loaded negatively. This factor was named "non-urban river oriented recreation." Two concepts, "power boating," and "fishing," which are dependent on water, were strongly negative, as was "danger," while the self-concept, "industry," and "females" loaded positively. Dimension IV, therefore, may be identifying a lack of interest in river oriented recreational activities.

Multidimensional Space by Residential Location

In order to test the possible effects of residential location on river perceptions, the household population was divided into two groups (i.e., south side and non-south side). Each group's original dissimilarity matrix was factor analyzed using metric multidimensional scaling algorithm. Approximately 88 percent of the variance in the 15 concepts for south side residents was explained by four factors (Table 16).

The "urbanized river" dimension was the most significant factor extracted; however, its relative importance was somewhat less for the south side residence group than

Table 16

Spatial Coordinate Matrix for South Side Residents--Household Survey Respondents

Concepts	Urbanized River	Enhanced Urban River Recreation	Urban River Danger	Non-Urban River Oriented Recreation
Grand River	53.91	49.71	16.58	-3.55
Me	-3.74	-6.50	0.53	-39.44
Females	-1.48	-10.32	-15.37	-17.14
Males	13.87	-13.61	1.55	-8.37
Children	-21.04	14.41	-4.72	9.13
Picnicking	-22.84	16.51	9.78	-3.86
Fishing	-15.78	6.46	13.85	17.85
Swimming	-39.20	-21.24	-19.66	17.89
Industry	84.04	-28.95	-10.95	-15.53
Nature	-19.08	9.80	2.98	2.47
Relaxing	-31.00	17.36	16.86	-15.73
Bicylcling	-15.67	34.51	-41.31	-2.81
Danger	37.61	-6.17	-22.31	43.29
Clean water	-30.80	-48.72	6.18	-5.61
Power boating	11.25	-13.25	46.01	21.44
Percent explanation	40%	21%	14%	13%

for the entire population (i.e., it only explained 40 percent of the total variance). The second dimension, "enhanced river recreation," was similar to the entire population, although slightly more important (i.e., 21 percent of the variance explained).

The third most important factor extracted explained 14 percent of the total variation for south side residents and was more difficult to interpret. It appeared to be differentiating safe, acceptable river activities (i.e., positive loadings on "power boating," "Grand River," "fishing," and "relaxing") from the more dangerous activities (i.e., high negative loadings on "bicycling," "danger," and "swimming"). This dimension is thus labeled "urban river danger."

The final dimension, as in the case of the population as a whole, appeared to be characterized as a "non-urban river oriented recreation" dimension. Thus, for south side residence sub-group, only Dimension III was somewhat different from the population as a whole since this dimension appeared to be characterizing dangers more associated with urban rivers than for the entire population.

The multidimensional scaling matrix for the non-south side residents is shown in Table 17. The multi-dimensional space can be summarized by four dimensions that explain 90 percent of the total variance in the

Table 17

Spatial Coordinate Matrix for Non-South Side Residents--Household Survey Respondents

Concepts	Urbanized River	Enhanced Urban River Recreation	Recreation Danger	Non-Urban River Oriented Recreation
Grand River	50.67	56.48	1.26	-9.69
Me	-6.13	-1.13	-16.00	37.41
Females	5.35	-19.93	4.56	20.07
Males	14.95	-14.83	-10.51	3.92
Children	-11.45	2.15	18.30	-3.82
Picnicking	-29.08	17.10	-10.08	2.11
Fishing	-15.36	12.35	-1.67	-28.03
Swimming	-42.03	-34.61	15.12	-10.75
Industry	94.79	-14.11	-10.01	23.61
Nature	-22.31	19.40	2.78	-2.15
Relaxing	-34.02	27.56	-14.47	5.34
Bicycling	-19.88	21.87	46.33	18.48
Danger	43.59	-32.20	35.54	-29.70
Clean water	-39.24	-34.53	-20.44	9.72
Power boating	10.17	-4.59	-40.70	-36.51
Percent explanation	43%	20%	14%	13%

15 concepts. Again, the most important dimension for this sub-group is the "urbanized river" factor (43 percent of the total variation). Dimensions II, III, and IV are comparable to the entire respondent population.

Results of Multidimensional Scaling--On-Site Survey

Each on-site respondent was given the same 105 paired concept comparisons as in the household study. The entire sample completed the MDS survey (N = 173).

Mean Distance Matrix--On-Site Survey

Analysis of user sample data produced the mean distance matrix presented in Table 18. Concepts most similar (i.e., closer in perception space) to the river were "relaxing" (29.52 units apart), "nature" (35.81 units apart), "fishing" (35.83 units apart), and "industry" (37.10 units apart). Most dissimilar were "clean water" (110.83 units apart) and "swimming" (106.92 units apart). Most similar concepts to "me" included "children" (16.78 units apart), "relaxing" (17.78 units apart), and "nature" (20.22 units apart). Most dissimilar were "danger" (80.10 units apart), "industry" (64.29 units apart), "power boating" (57.01 units apart), and "swimming" (51.56 units apart). Again, "nature" and "relaxing" were relatively close to all other concepts, except "industry" and "danger."

Table 18

Mean Distance Matrix--On-Site Survey Respondents

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	41.74	0.00													
3. Females	72.92	22.45	0.00												
4. Males	48.72	22.99	47.88	0.00											
5. Children	47.23	16.78	23.88	31.55	0.00										
6. Picnicking	43.75	27.75	23.76	39.78	15.96	0.00									
7. Fishing	35.83	36.38	53.95	21.73	24.83	31.19	0.00								
8. Swimming	106.[illegible]	1.56	33.97	27.13	19.71	26.65	46.15	0.00							
9. Industry	37.[illegible]	64.29	61.42	29.22	98.51	101.26	87.84	100.54	0.00						
10. Nature	35.81	20.22	32.61	23.75	23.87	17.10	18.31	25.92	101.27	0.00					
11. Relaxing	29.52	17.78	32.20	24.41	36.46	19.15	21.88	19.51	108.80	24.11	0.00				
12. Bicycling	55.09	47.32	36.81	35.72	20.38	37.98	69.32	53.68	99.17	21.87	40.74	0.00			
13. Danger	45.92	80.10	58.13	50.17	52.67	67.81	60.97	43.02	48.93	60.30	89.86	53.22	0.00		
14. Clean water	110.83	32.04	31.29	20.49	39.10	30.65	35.76	24.74	90.02	23.58	36.10	79.81	78.79	0.00	
15. Power boating	46.74	57.01	52.58	28.21	46.59	43.48	47.74	56.08	87.64	48.50	48.68	96.17	52.39	60.54	0.00

Multidimensional Space for the On-Site Survey

The original dissimilarity matrix was analyzed using the metric multidimensional scaling algorithm which provides loadings on orthogonal dimensions in multidimensional space (Table 19). The multidimensional space can best be summarized by four dimensions that explained 91 percent of the variance in the 15 concepts.

The loading patterns and dimensions extracted were very similar to those found in the household study. Dimension I (urban river) was slightly less important in the on-site survey (39 percent of the total variance) than in the household survey (43 percent explanation). Dimension II (enhanced river recreation) was slightly more important for users (22 percent) than the general population (20 percent).

Comparisons Between Household and On-Site Surveys Distance Matrices

A comparison between the household sample and the on-site sample distance matrices is shown in Table 20. Household respondents' average perceptual distances were 10.26 units farther apart for all concepts than on-site respondents. The difference between the subgroups' average perceptual distances were as follows (units in parentheses are the differences between household and on-site residents' average distances). Most different perceptions included the

Table 19

Spatial Coordinate Matrix--On-Site Survey Respondents

Concepts	Urbanized River	Enhanced Urban River Recreation	Recreation Danger	Non-Urban River Oriented Recreation
Grand River	45.33	45.40	-10.60	2.77
Me	-1.59	4.48	-9.54	-29.26
Females	-4.39	-14.11	10.95	-14.77
Males	11.28	-11.74	-4.17	-6.46
Children	-16.05	9.38	8.47	8.17
Picnicking	-20.96	12.75	-1.32	1.99
Fishing	-6.15	6.92	-20.26	7.26
Swimming	-33.34	-27.20	14.82	14.54
Industry	72.19	-28.34	-0.24	-20.08
Nature	-18.57	13.91	1.79	3.87
Relaxing	-26.93	22.07	-14.35	-9.32
Bicycling	-7.53	24.75	45.28	-9.33
Danger	33.17	-15.13	25.86	34.21
Clean water	-32.51	-36.85	-12.17	-13.06
Power boating	6.07	-6.30	-34.51	29.47
Percent explanation	39%	22%	16%	13%

Table 20

Arithmetic Differences Between the Mean Distance Matrices for the Household and On-Site Surveys

Concepts[a]	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	35.79	0.00													
3. Females	7.89	5.33	0.00												
4. Males	15.56	8.39	2.84	0.00											
5. Children	12.37	14.60	7.31	10.68	0.00										
6. Picnicking	12.98	10.03	10.88	12.70	8.75	0.00									
7. Fishing	28.45	26.47	22.13	7.23	11.85	5.61	0.00								
8. Swimming	16.39	9.45	12.19	7.26	6.94	4.93	2.79	0.00							
9. Industry	4.62	16.66	11.96	6.26	14.73	18.11	27.84	26.80	0.00						
10. Nature	18.77	9.24	8.77	13.42	6.41	7.27	11.07	6.61	15.61	0.00					
11. Relaxing	27.18	12.92	3.19	7.91	1.58	1.67	5.05	7.03	18.21	0.83	0.00				
12. Bicycling	15.09	16.23	7.48	10.82	1.62	-3.71	-4.47	0.26	21.33	4.77	-8.27	0.00			
13. Danger	16.73	14.45	-4.56	8.85	1.54	24.54	7.10	15.06	8.09	16.78	17.38	17.28	0.00		
14. Clean water	16.13	6.43	3.80	17.13	5.59	1.00	7.70	2.55	22.65	14.16	8.38	3.40	11.61	0.00	
15. Power boating	15.46	19.61	7.67	6.00	14.31	7.31	16.66	18.85	12.08	7.66	4.00	13.74	9.60	1.57	0.00

[a]Average difference = 10.26.

"Grand River" and "fishing" (household residents 28.45 units farther apart), "Grand River" and "relaxing" (household residents 27.18 units farther apart), "Grand River" and "industry" (household residents 26.80 units farther apart), "fishing" and "me" (household residents 26.47 units farther apart), "industry" and "fishing" (household residents 27.84 units farther apart), and "clean water" and "industry" (household residents 22.65 units farther apart).

Unidimensional Response for Both Household and On-Site Surveys

Unidimensional responses were solicited for both survey groups on nineteen river-related concepts. These concepts were not considered in the metric multidimensional scaling algorithm, of these measures the greatest disparities between users and household responses were observed in perceptions concerning river accessibility, prevalence of muggings, rapes, alcohol and drug use, and edible fish, with on-site users associating these concepts more with the river than did household respondents. The household population perceived the river as more of a flood danger, more suitable for playing sports, and walking for pleasure than did the on-site sample (see Appendix H).

These nineteen variables were also compared by city section of residence (see Appendix I). Results indicate that south side residents associated the river more with

older people, playing sports, water skiing, prostitution, rape, alcohol and drugs, lovers' lane, and greater accessibility; while non-south side residents perceived greater association between the river and canoeing and edible fish.

Summary

In summation, both surveys revealed differences between river users' and non-users' residence location. Differences were also shown in respondents' perception, attitudes, and behavioral responses toward the recreational use of the Grand River.

Several questions examined respondents' knowledge and familiarity with different parts of the river and perceptions of the desirability for recreation of these sections. Results, for both surveys, indicated that the areas of greatest familiarity and desirability were for south side locations, particularly among south side residents.

The majority of household respondents (60 percent) had used the river or its lands at least once; however, a substantial proportion (40 percent) had never used the river. South side respondents constituted the largest proportion of users with 70 percent of south side respondents indicating previous use. Picnicking, fishing, and relaxing comprised 69 percent of the total household response for activity participation.

The highest percentage of on-site respondents lived in census tract fronting on the river along the south side (i.e., tracts 17, 20, 23, and 24) and on the north side (tract 33.02). All other sections contained relatively few users. As in the household survey, fishing, relaxing, and picnicking were the top three activities comprising 78 percent of total user activity.

The mean distance matrices for the MDS, for both surveys, showed that concepts perceived as most similar to the river include "industry," "nature," "relaxing," and "picnicking." Most dissimilar were "clean water" and "swimming." Finally, the common multidimensional space, for both surveys, can best be summarized by four dimensions which explain over 90 percent of the variance; these have been labeled "urbanized river," "enhanced urban river recreation," "recreation danger," and "non-urban river oriented recreation."

CHAPTER V

THE PERCEPTIONS OF LANSING AREA RESIDENTS REGARDING THE RECREATIONAL USE OF THE GRAND RIVER

This chapter analyzes the perceptions, attitudes, and behavioral responses of Lansing area residents to the recreational use of the Grand River. Non-parametric statistical techniques, chi-square (χ^2) and Kendal tau correlation coefficients, are used to analyze sample responses. Results are compared with hypotheses concerning the residential locations of river users and non-users.

The last part of this chapter concerns the importance of the MDS model for urban river recreation planning and management. The significances of the MDS mean distance matrix and interpretation of perceptual dimensions are discussed.

Discussion of Results

Study results suggest that the Grand River offers a viable recreational area within the city and acts as an alternative site for more distant locations. The use of the Grand River as an alternative site results in time and money savings for users. In addition, the recreation impact

on rural rivers is reduced, thus helping to preserve natural environments. However, certain segments of the population were not utilizing this alternative resource (40 percent of the household sample population had never used any Grand River locations, within the City of Lansing, for recreation). Moreover, these residents were not equitably distributed throughout the city but tended to reside in non-south side locations (i.e., 70 percent of south side respondents indicated past use compared to 48 percent of north side, 45 percent of east side respondents, and 40 percent of Lansing Township respondents). Table 21 shows the relationship measured by the chi-square (χ^2) statistic between recreational use of the Grand River and selected variables for the household study. It shows that use and non-use of the Grand River for recreation is statistically related to respondents' residential location. Significant statistical relationships also existed between the river environments that respondents most prefer, the sections of the river most familiar, and friends' attitudes toward the recreational use of the Grand River. A review of the data suggests that south side residents who were familiar with south side sections of the river having compatible recreation land-uses and good visual appearance tended to be users, and considered these same areas to be the most desirable river environments. A relationship also existed

Table 21

Chi-Square Matrix for the Recreational Use of the Grand River and Selected Variables--Household Survey Respondents

Variable	χ^2	Significance Level
1. Level of recreation satisfaction	21.95	No
2. City section of residence	17.87	.001
3. Census tract of residence	95.08	.001
4. Years at current address	40.86	No
5. River environment most familiar	83.55	.001
6. River environment most preferred	64.90	.001
7. River environment lease preferred	11.54	No
8. Use of other river previously	20.46	.001
9. Most preferred water activities	33.97	.001
10. Friends attitudes toward the river	36.15	.001
11. Occupation	9.11	No
12. Age level	12.36	No
13. Income level	17.96	No
14. Education level	6.08	No
15. Marital status	17.27	No
16. Race	3.63	No
17. Sex	1.45	No
18. Respondent's number of children	16.78	No
19. Children's use of the river	50.40	.001

between recreational use of the Grand River and whether respondents had participated in other river recreation experiences. This suggests that respondents with other river recreation experiences were more inclined to participate in Grand River activities and that the Grand River may be serving as an intervening opportunity for more distant river locations.

Figure 11 shows spatial variations in percentage of river users residing within different sections of the city for the household survey. The south side had the highest percentages of users, particularly in areas south of Moores River Drive. Generally Grand River recreationists teneded to live in areas located adjacent to, or oriented toward more physically appealing sections of the river. An exception to this trend was observed in Lansing Township north of Grand River Park. A possible explanation for the low percentages of users residing in this area may be the limited visibility of Grand River Park. West Main Street, which provided the only access road to the park, did not provide a view of the park because of alignment and topography. In addition, the park entrance sign was obscured. The image of the area as a public park was further impaired by the many riparian residences in the area and the juxtaposition of the park with the Lansing Boat Club. The low visibility of the park was also reflected in the somewhat

low percentages of respondents indicating a familiarity with this section of the river (see Table 3).

North Lansing, although bisected by some physically appealing sections of the river (i.e., Tucumseh Park and the Thomas F. Keenan Natural Area, see Figure 4), also had relatively low percentages of river users. This was probably due to the limited access and visibility of the riparian parks in the area (see Figure 5).

Areas located adjacent to, or oriented toward, physically displeasing sections of the Grand River had low percentages of river users. This was particularly true for the east side of the city and somewhat less apparent on the west side. Although the west side area had physically displeasing riparian lands on three sides, a relative high percentage of users reside in the area. This may have been due to high user preferences for fishing among west side residents (particularly low income ghetto residents of census tracts 15, 16, and 18). Fishing is not necessarily restricted to park land, thus an expanded user area is available. Moreover, a great deal of intra-city migration has occurred from the west side, to the south side of Lansing, particularly from ghetto areas. Hence social contacts may have expanded awarenss of Grand River recreation areas in the case of west side residents.

Table 22 shows Kendall tau correlation coefficients among selected variables from the household study. Income

Table 22

Kendall Tau Correlation Coefficients for Selected Variables--Household Survey Respondents

Variable	1	2	3	4	5	6	7	8
1. Income level	.00							
2. Education level	.2710**	.00						
3. Level of recreation satisfaction	.1464**	.0187	.00					
4. Age level	.1082*	.0656	.0656	.00				
5. Perceived attitude of friends toward Grand River	.0445	.1785	.1785	.0628	.00			
6. Number of years residing at current address	.0550	-.1020*	.0177	.4115**	.0911	.00		
7. Number of children in family	.1621**	-.0787	.0503	.0647	.1458**	.0126	.00	
8. Respondent's attitude toward the recreational use of the Grand River	-.0070	-.0461	-.0538	.0224	.2825**	.0048	-.0417	.00

*Significant at .01.

**Significant at .001.

levels, as expected, were positively correlated with educational levels and with the number of children in the family. Income, however, was not correlated with respondents' attitudes toward the recreational use of the Grand River or with respondents' perceptions of their friends' attitudes toward the recreational use of the river. These facts were of particular interest since several Lansing officials expressed the opinion that income levels are the most important factor in determining which area residents are inclined to use the Grand River (i.e., higher income people were expected to be more inclined to use the Grand River). Study findings suggested that more affluent people had more recreation alternatives and opportunities (i.e., more time and money), tended to be more active, and resided in certain areas within the city. However, income levels were not the major factor in determining which Lansing residents were more inclined to use the Grand River for recreational activities.

The Hypotheses

The first general hypothesis, that people's perceptions and attitudes concerning use of an urban river for recreation activities are related to the location of their residence relative to different sections of the river, is accepted since the data revealed that significant statistical relationships exist between respondents' desires

to use the Grand River for recreation and residential locations. Information about spatial variations in perceptual, attitudinal, and behavioral variables relating to the recreational use of the Grand River is useful in planning river recreation activities and facilities. Planning requires consideration of the recreation desires of potential users as well as the ability of the resources to provide recreation opportunities. South side residents were found to have the most favorable perceptions and attitudes towards the recreational use of the Grand River. Non-south side residents (particularly those on the east side) had unfavorable perceptions and attitudes toward the river.

The specific contentions of the first hypothesis state that those residents living in sections of a city adjacent to or oriented toward more aesthetically appealing sections of a river will have the most favorable perceptions and attitudes toward the recreational use of an urban river. Conversely, those residents adjacent to or oriented towards more aesthetically displeasing sections of an urban river will have unfavorable perceptions and attitudes toward that river. The specific contentions of the first hypothesis are accepted in part. The data show that south side respondents live in areas adjacent to or oriented toward pleasant riparian environments and generally respond most favorably to items related to

Grand River recreation. However, favorable perceptions and attitudes toward the river are not as universal among south side residents as was originally hypothesized. Rather, the most favorable perceptions and attitudes are spatially restricted to the area south of Moores River Drive. This pattern may be due to high degrees of interaction with the Grand River by local residents traveling along Waverly Road, Moores River Drive, and South Logan Street.

The second general hypothesis states that people's current participation in recreation activities along an urban river are related to the participant's residential location within a city. The data support this; therefore, this hypothesis is accepted.

The specific contentions of this hypothesis are that those areas located adjacent to or oriented toward more physically appealing sections of a river will have the highest percentages of residents that actually use the river for recreation, and those areas that are located adjacent to or oriented toward more physically displeasing sections of a river will have lowest percentages of residents that actually use the river for recreation. These contentions are partially supported. The data show the service areas of Lansing's riverfront parks to be more restrictive than anticipated. Thus, highest use levels were shown in areas immediately adjacent to the river,

particularly in the south side and in the Tucumseh area of north Lansing (i.e., census tract 33.02).

Residents of the western part of Lansing Township (tracts 34 and 35) do not exhibit as favorable perceptions and attitudes toward the Grand River as might be expected given the attractiveness of the river parks in the area. This may be due to limited vehicular interaction (i.e., few streets along the river in this area).

West side residents, particularly low income ghetto residents, responded more positively to the river than might be expected given the river quality in the area. This may be attributed to blacks' and poor families' use of the Grand River for fishing and their inability to utilize other locations.

The third general hypothesis states that sections of a city in which high percentages of river recreationists reside can be identified from the interpretation of area residents' environmental perceptions, attitudes, and behavioral responses. This general hypothesis is accepted since the data show a relationship between the environmental perceptions, attitudes, and behavioral responses of area residents and actual river recreation participation.

The specific contentions of the third hypothesis are that sections of a city which reveal favorable perceptions, attitudes, and behavior will be the same sections in which high percentages of river recreationists reside. The

data did not fully support this hypothesis, since discrepancies exist between the household respondents' indicated behavior and the actual field observations of participation recorded for the on-site study. For example, according to the household survey, west side residents should comprise large numbers of Grand River recreationists (i.e., 59 percent of west side respondents indicated past use of the Grand River), yet the on-site survey shows comparatively low use levels for this section (see Appendix F). This may be attributed to the "hard core" users who reside in the west side and utilize the river almost exclusively for fishing. Thus, before definite conclusions are eached concerning the effects of residential location on river recreation participation, more in-depth survey research is needed at the census tract and census block levels.

Significance of Multidimensional Scaling

As previously stated, multidimensional scaling is not a hypothesis testing technique. MDS is a descriptive technique by which hidden or underlying regularity in an empirical data matrix is revealed. MDS is used in this study to identify the perceptual dimensions around which respondents' views of an urban river are organized. Several results of the MDS have implication for Grand River recreation planning and management.

The first area of importance involves the identification of river concepts (including activities) that respondents consider to be most similar or dissimilar to the recreational use of the Grand River. Those concepts identified by both household and on-site respondents as most similar to the Grand River were "industrial development," "natural areas," and "relaxing." Both respondent groups agreed that swimming and clean water were the most dissimilar concepts, despite documented evidence that river water quality has improved dramatically in recent years (particularly above Moores Dam). Thus, it appears Moncrief's environmental opinion lag was operating in regard to Grand River water quality.[1]

The household population perceived picnicking as very similar to the river, and picnicking was the most popular river activity for this group. On-site observations indicated picnics as the third most popular activity along the river. Thus, there appears to be a strong relationship between perceptions and behavioral responses for recreational activities along the Grand River.

By investigating the MDS distance matrix, planners, public officials, and recreation managers can identify many urban river recreational factors critical to planning,

---

[1]Moncrief, "User Related Study of Three Michigan Rivers," pp. 12.3-12.5.

decision making, and management. Activities can be compared for compatibility and possible "substitutability."[1] For example, this study demonstrates that fishing and relaxing are perceived to be quite similar recreational pastimes. On-site survey results indicate that these activities (fishing and relaxing) are by far the most common activities along the river with 35 percent and 40 percent of the total use, respectively. Thus, the provision along the river of fishing sites may (and should) also meet the need for areas suitable for relaxation. The on-site survey also shows that fishing, which is a highly preferred water recreational activity, is a viable use of the Grand River, particularly for children and black males, although respondents had unfavorable perceptions concerning river water quality. Additionally, fishing is closely associated with natural areas; industrial areas are perceived as unfavorable for fishing (this perception is supported by the distribution of suitable fish habitat areas along the river). The popularity of fishing along the river, despite the industrialization of the river corridor and unfavorable perceptions concerning water quality, suggests that for some residents travel to other more desirable locations may not be possible. This is supported by the unidimensional matrix

---

[1]John C. Hendee and Rabel Burdge, "The Substitutability Concept: Implication for Recreation Research and Measurement," Journal of Leisure Research 6 (1974): 157-162.

(Appendix I). Here, the on-site group sees the river more in terms of fishing than does the household survey group. A large percentage of the on-site respondents believe the fish to be edible (the suitability of Grand River fish for human consumption is questionable). But this group also views the river as being more inaccessible and prone to dangers (e.g., rape, muggings, etc.) than does the household population.

The second area of importance in the MDS results involves interpretation of the underlying dimensions of variation in the data. This research has identified four dimensions that appear to influence urban river recreational use. The first two dimensions explain 62 percent of all variation in the 15 concepts. The urbanization dimension is less important for on-site users and south side residents than for non-south side residents. Perceptions of river urbanization are a function of primary knowledge gained through interaction with the resource and/or secondary information sources. Thus, it appears that the extent of perceived urbanization tends to influence river recreational behavior. The second dimension (enhanced river recreation) also involves site "naturalness" and is more important for on-site users and south side residents, who interact with the more natural sections of the Grand River, than for the household survey in general. This concept is

also a function of individual interaction with the resource and/or secondary sources of information.

This investigation helps answer some of the questions regarding the relationships among recreational perceptions, attitudes, and actual behavior. It appears that some variation in river recreationists' perceptions, attitudes, and behavior is influenced by residential location which in turn influences use and non-use. The activity of fishing is an exception to this pattern. Fishing, as a river recreational activity, appears to have strong traditional appeal, particularly for blacks (who primarily reside in areas other than the south side of Lansing). For example, in the on-site survey, 50 percent of the non-south side residents indicated they use the Grand River for fishing, compared to 21 percent of south side residents. Also, 21 percent of the non-south side household population indicated that they participated in fishing, while only 14 percent of south side said they took part. Moreover, 59 percent of all west side residents are fishermen.

Summary

In summation, the first hypothesis is accepted in part. The data show that respondents' desires to use the Grand River for recreation activities are related to the location of their residence relative to different sections of the river. However, favorable perceptions and attitudes

toward the river are not as universal among south side residents as was originally hypothesized. Rather, the most favorable perceptions and attitudes are spatially restricted to the area south of Moores River Drive. The second hypothesis is accepted in part. The data show that people's current participation in recreation activities are influenced by the location of residence. However, more favorable responses than expected were recorded from black residents who primarily live in the west side. In addition, high use levels are more restricted to areas immediately adjacent to the river than was originally hypothesized. The third hypothesis is also accepted in part. The data show a statistical relationship between the environmental perceptions, attitudes, and indicated behavior of area residents and actual river recreation participation. Discrepancies do exist, however, between the household respondents' indicated behavior and actual field observations.

Finally, MDS shows that an environmental opinion lag exists between perceived river water quality and actual water quality conditions. MDS results indicate a strong relationship exists between perception and behavioral responses for recreation activities along the river. It also appears that some variations in river recreationists' perceptions, attitudes, and behavior are influenced by residential location.

CHAPTER VI

CONCLUSIONS AND IMPLICATIONS

This investigation examines the recreational perceptions, attitudes, and behavior of the residents of Lansing, Michigan as they affect the actual and potential recreational use of the Grand River. To date, few data have been available on consumer perceptions, attitudes, and behavior toward the recreational use of urban rivers and no data have previously existed for the Grand River.

Conclusions

Several conclusions can be drawn as a result of this research which are significant from a geographic viewpoint.

The Influence of Residential Location on Perceptions, Attitudes, and Behavior

Testing of the hypotheses supported the concept that levels of familiarity with and use of urban recreation opportunities varies with residential location. Most favorable perceptions and attitudes toward the recreation use of the Grand River, as well as the greatest numbers of actual users, were found in sections of the city oriented in a

sectoral pattern toward or juxtaposed with aesthetically pleasing sections of the river. Conversely, non-favorable perceptions, attitudes, and fewest users were found in sections of the city oriented in a sectoral pattern toward or juxtaposed with aesthetically displeasing sections of the river. Similar spatial patterns have been identified for both residential and river recreational preferences.[1] The findings of this study support previous research in that the environmental learning process and hence the level of environmental familiarity within a city was influenced by the location of residents relative to potential activities and their levels of attractiveness.[2]

Variations in the importance of the perceptual dimensions in both studies appear to be related to the physical quality and natural characteristics of the river that respondents interact with most often. The location of this interaction has been primarily determined by residential location. Similar perceptual dimensions have been identified for neighborhood preferences in Chicago.[3] Thus, it is concluded that recreation perceptions, attitudes, and

---

[1]See Johnston, "Activity Spaces and Residential Preferences," pp. 199-211; and Ready, "Perceptions by Area Residents of the Merrimack River," pp. 106-108.

[2]Horton and Reynolds, "Effects of Urban Spatial Structure on Individual Behavior," pp. 36-48.

[3]Peterson, "A Model of Preference," pp. 19-31.

behavior concerning an urban river were influenced by residential location.

Spatial Distribution of Non-Users Residences

The responses of both household and on-site populations showed essentially favorable attitudes toward recreational use of the Grand River. Analysis of these responses indicated considerable room for improvement in levels of recreation satisfaction for Lansing area residents. It is also apparent that the Grand River had the potential for improving these satisfaction levels. However, 40 percent of Lansing residents sampled had never used the Grand River for recreation. Moreover, these residents were not equally distributed, tending to live in neighborhoods juxtaposed with or oriented toward more physically displeasing sections of the river. Chubb also found Lansing residents in the model cities area either unaware or having little desire to use parks.[1] Similarly, a number of studies have identified the non-use phenomenon of local parks.[2]

---

[1]Chubb, Recreation in the Lansing Model Cities Area, pp. 48-65.

[2]See H. P. Bangs and S. Muhler, "Users of Local Parks," Journal of the American Institute of Planners 36 (1970): 330-334; Seymore M. Gold, "Nonuse of Neighborhood Parks," Journal of the American Institute of Planners 38 (November 1972): 369-378; Ready, "Perceptions by Area Residents of the Merrimack River," pp. 106-107; and Rugg, "The Use and Non-Use of Urban Parks," pp. 77-113.

This investigation also supported the findings of previous research in that recreation behavior and attitudes differed between sections of a city and that inequities existed as to the availability of water-based recreation activities.[1] Simply recognizing disparities and providing accessibility to water-based opportunities, however, may not eliminate the problem. This is because of variations between city sections in the quality of the resource and citizens' understanding regarding the potentials of the resource for recreation. The conclusions of Hecock's 1970 study were supported since the physical characteristics of a recreation resource are shown to attract different user groups to different location.[2] Results indicated that residents of different sections of a city selected different areas of the river for recreation use, or did not participate at all because the river was simply not known or was perceived unfavorably for their preferred recreation activities.

Variations in residents' knowledge and preferences must be taken into consideration to insure responsive river recreation planning and management. Thus, it is concluded

---

[1]See Goodale, "Leisure Behavior and Attitudes in Selected Minneapolis Census Tracts," p. 101; Ready, "Perceptions by Area Residents of the Merrimack River," pp. 106-107; and David, "Floodplain Lands for Parks and Recreation," pp. 221-226.

[2]Hecock, "Recreation Behavior Patterns," pp. 237-250.

that the Grand River, although a viable recreation resource, was capable of offering greater and more equitably distributed recreation opportunities if appropriate planning and management measures were instituted.

Viable Grand River Recreational Activities

The MDS mean distance matrices for both surveys show that the respondents' most preferred Grand River recreational activities were relaxing and picnicking. Respondents also indicated a preference for participating in these activities in a natural environment. These expressed preferences were reflected in recreational use of the Grand River with picnicking and relaxing being indicated most often as activities in which household respondents had participated. Moreover, this participation primarily occurred within the natural environments along Moores River Drive. Chubb also found picnicking to be a significant recreational activity for model cities residents.[1] Thus, it appears that these user-oriented activities, if developed and/or promoted within natural settings, represent the most viable waterfront activities. Fishing, although not perceived as being particularly urban river oriented or receiving generally high personal preference ratings, did show high recreational use levels in the

---

[1]Chubb, Recreation in the Lansing Model Cities Area, pp. 54-55.

household survey. Moreover, results of the on-site survey indicated that fishing, along with relaxing and picnicking, was a prevalent Grand River recreational activity. Fishing was of particular importance because of its high preference levels among blacks who were spatially restricted in residential locations and/or are limited in their ability to utilize resource-oriented sites.[1] For blacks, the river was a valuable resource for recreation and/or subsistence. Although this group was small compared to the total number of users, they utilized the Grand River more frequently and for longer periods of time than the average user and thus represented an important user group in terms of recreation participation levels. Planning and development policies usually do not adequately reflect the needs and desires of user groups. The fact that differences exist between users and planners regarding the recreational potential of a resource are well documented in the literature.[2] The possible development of swimming areas along the Grand River illustrates the problem with such disparities. It has been shown that users require high water quality standards for

---

[1]Fishing also has the highest preference and use ratings for lower income respondents.

[2]See Lucas, "Wilderness Perception and Use," pp. 18-41; Stankey, "Perception of Wilderness Recreation Carrying Capacity," pp. 299-302; and Peterson, "A Comparison of Sentiments and Perceptions," pp. 194-206.

swimming.[1] This study showed that the sample residents overwhelmingly viewed the river as undesirable for swimming, primarily because of unfavorable perception concerning water quality. Conversely, Grand River users did not appear to be particularly concerned with water quality for fishing. Ditton and Goodale reported a similar finding for Green Bay fishermen.[2] Thus, a third study conclusion is that fishing, relaxing, and picnicking opportunities should be developed and/or promoted along the Grand River.

Future Waterfront Development

The Lansing residents sampled in this study had definite environmental perceptions concerning the Grand River which were reflected in recreation attitudes and behavior. Residents not living on the south side generally had unfavorable perceptions concerning the river which may well have accounted for the very limited use of non-south side riparian parks in the past. Moreover, there is reason to believe that these residents generally perceived the river as repulsive in terms of land and water quality and retained these attitudes for some years, despite

---

[1]See David, "Public Perceptions of Water Quality," pp. 453-457; Ditton and Goodale, Marine Recreational Uses of Green Bay, pp. 73-74; Moncrief, "User Related Study of Three Michigan Rivers," pp. 12.3-12.5; and Ready, "Perceptions by Area Residents of the Merrimack River," pp. 61-73.

[2]Ditton and Goodale, Marine Recreational Uses of Green Bay, pp. 71-72.

environmental improvements. Moncrief identified a similar problem concerning the Red Cedar River.[1] Thus, a fourth and tentative conclusion of this study is that new parks in non-south side locations may not attract significant numbers of users. For example, Riverfront Park, completed in 1976, may have problems attracting users on a continuing basis for several reasons. First, fishing and relaxation represent two of the three most important river recreational activities. Survey results indicate that residents participating in these activities decided which section of a river to use based on fishing potentials and the natural quality of the riparian lands, respectively. Both fishing and relaxing (the latter often carried out in conjunction with fishing as a family activity), are not necessarily park oriented activities and, in any event, Riverfront Park appears to be a relatively poor fishing location. Secondly, urban renewal has eliminated much of the potential neighborhood service area for Riverfront Park. The area is juxtaposed with business and public education developments. Residents who have greatest interaction with the area (i.e., east side residents) generally perceived the river unfavorably and had low recreational use levels.

---

[1]Moncrief, "User Related Study of Three Michigan Rivers," pp. 12.3-12.5.

Implications

The results of this study have raised questions as to how effectively the Grand River has been planned and managed for recreation. It is a major thesis of this investigation that social surveys and subsequent social planning play or should play a critical role in effective planning and management, both present and future. Planning and management policies that reflect user needs and desires will have implications beyond the urban area. Leatherberry writes:

> I believe that to effectively manage country rivers for optimum use, alternative or complementary resources must be available to the user public. Urban-urban fringe river are a potential resource for some who are now using or hope to use backcountry rivers. As I see it, urban rivers are not managed to their full potential.[1]

The results of this investigation have two main implications for urban river recreation planning and management in the City of Lansing and other urban areas. These implications are as follows:

1. Future river recreation planning should include recreation behavior research. The results described earlier indicate that fishing, picnicking, and relaxing were the most important Grand River recreational pastimes at the time of these surveys. It is apparent that, within Lansing,

---

[1]Earl C. Leatherberry, Geographer, North Central Forest Experiment Station, Forest Service, personal correspondence with author, June 1975.

the Grand River was a day use recreation area. Recreationists with the highest participation levels had low incomes, were disproportionately black, and a high proportion were unemployed. Moreover, for some black residents it was probably the only viable water-oriented recreation opportunity. Recreational use of the Grand River was heavily concentrated along Moores River Drive and adjacent parks (i.e., Frances and Moores Parks). People living in this area tended to be users, and the local population involved was growing quite rapidly. Thus, increased use of the Moores River Drive area can be anticipated and may well exceed the river's recreation carrying capacity.[1] Increased use also increases conflicts among users. One example of such conflict was the debate within city government regarding possible limitation of certain types of recreational boating on the Grand River. Conflicts between fishermen and boaters, many of the latter entering from a private launch (the Lansing Boat Club), were reaching dangerous proportions.

Thus, future river recreation planning must involve social management that may take the form of time limitations, quotas, or recreational use zoning for certain activities.

---

[1]Recreation carrying capacity is defined as the amount of recreational use an area can support, both physically and socially, without a reduction in the quality of the recreational experience for the user.

Appropriate social management methods must be based on studies of recreation perceptions, attitudes, and behavior.

To date, urban river recreation planning methods have been based primarily on the engineering feasibility of providing recreation facilities at specific sites. It is poor planning to assume that the river recreation needs of a population are met without first determining what those needs are and how they can best be met.

Recent developments concerning urban river recreation planning have shown the need for social planning as a supplement to more traditional engineering planning methods. This need is critical today because great numbers of waterfront development plans are being formulated across the country with little or no regard to the aspirations and behavior of river constituents. A major recommendation of the National Urban Recreation Study, completed in 1978, is that more social planning should be done within urban areas.

A 1977 policy statement by the National Recreation and Park Association reflects the same theme:

> NRPA and the recreation and park agencies should promote social planning to encourage identification of needs, coordination and mobilization of public and private resources, integration of services, and meaningful citizen participation. Social planning should be given an increased importance in the selection and prioritization of recreation services and resources.[1]

---

[1]National Recreation and Park Association, Statement of National Policy (Arlington, Va.: National Recreation and Park Association, Draft No. 2, 1977), pp. 3, 23-27.

Section 201 and Section 208 (PL 92-500) of the Federal Water Pollution Control Act (1972) were amended in 1978 to mandate recreation and open space planning as an integral part of area-wide, water-quality management. The amendments read as follows:

> Section 3. Section 201 (g) of such Act (33 U.S.C. 1284) is amended by adding at the end thereof the following new paragraph:
>
> 5. The Administrator (E.P.A.) shall not make grants from funds authorized for any fiscal year beginning after September 30, 1978, to any state, municipality or intermunicipal or interstate agency for the erection, building, acquisition, alteration, remodeling, improvement, or extension of treatment works unless the grant applicant has satisfactorily (emphasis added) demonstrated to the Administrator (E.P.A) that the applicant has analyzed the potential recreation and open space opportunities in the planning of proposed treatment work. . . .
>
> Section 24. Section 208 . . . is amended and an identification of open space and recreation opportunities that can be expected to result from improved water quality, including consideration of potential use of lands associated with treatment works and increased access to water-based recreation.[1]

Results of this investigation demonstrate that satisfactory analysis of the "potential recreation and open space opportunities from improved water quality" cannot be accomplished without social planning. EPA officials indicate that the agency also views social planning as an essential aspect of urban river recreation planning.

---

[1]U.S., Congress, House, A Bill to Amend the Federal Water Pollution Control Act, H.R. 9464, 95th Cong., 1st Sess., 1977, pp. 1-4.

This study has shown that social survey research should be considered an integral part of PL-92-500 funding requirements and that other federal, state, and local agencies should initiate similar requirements.

2. Citizens need to be informed about riverfront recreational opportunities. This investigation has also revealed that a large proportion of residents were unaware of existing riverfront recreational opportunities. Generally, south side residents were more informed about existing recreational opportunities and had higher recreation participation levels than did non-south side residents. It is important that the city conduct a public education program to inform the citizenry about existing sites, particularly Grand River Park, Tecumseh Park, and the Thomas Keenan Natural Area. More information should be available concerning existing river recreational opportunities, particularly fishing. Special methods should be used to inform black and poor families of fishing opportunities. These information programs should not be directed solely at neighborhood associations or interest groups, but should be city-wide in scope, with particular attention being directed toward the residents of the east and north sides. A wide range of projects could be initiated, from such simple things as reversing the entrance sign at Grand River Park to the organization of facility tours, slide shows,

exhibits, fishing competitions, workshops, and similar events.

Future Research

The results of this investigation indicated that Lansing residents had generally unfavorable attitudes and perceptions about the downtown area. It also indicated that people's behavior was influenced by their perceptions and attitudes. This may cause considerable problems for the City of Lansing in promoting recreational use of Riverfront Park in particular and in attracting citizens, in general, downtown. It is hoped that similar studies will be conducted in the future to determine what effect, if any, the development of downtown recreation areas will have on the perceptions, attitudes, and behavior of Lansing residents regarding the Grand River. The MDS scaling algorithm could prove particularly useful since it is capable of showing perceptual changes over time. For example, results indicate a grea sparity between concept of clean water and Grand River water quality. Subsequent research could determine whether or not improved water quality and general environmental improvements are recognized and acted upon by citizens (or, to use Moncrief's expression, whether or not the "environmental lag" has been reduced). An MDS program providing factor scores would be especially useful, as it would facilitate factor score

mapping and further illuminate spatial variations in recreation use and attitudes. It should be noted, however, that this study is the first application of the MDS algorithm to urban river recreation research data. Additional applications are needed to further the appropriateness and utility of this technique.

Conclusion

In conclusion, problems of urban river recreation planning and development appear to be particularly well suited to geographic investigation. This study extends the knowledge concerning park use and non-use and demonstrates the spatial nature of recreation perceptions, attitudes, and behavior of Lansing residents involving the Grand River. Thus, geographers can apply their spatial expertise in a similar way to solve many other contemporary urban recreation planning problems.

APPENDIX A

ON-SITE SURVEY METHODOLOGY

APPENDIX A

ON-SITE SURVEY METHODOLOGY

Sample Size

The major considerations given in determining an adequate sample size included:

1. The objectives of this investigation were exploratory in nature (i.e., to achieve a basic understanding of area residents' perceptions, attitudes, and behavior toward the Grand River). Therefore, confidence limits could not be stringently established. The hypotheses are structured to allow a wide confidence limit.

2. The majority of data obtained by the on-site study were measured on either nominal or ordinal scales; therefore assumptions as to the normality of the sampling distribution are not appropriate. Thus, only non-parametric statistical techniques are utilized (i.e., chi-square and Kendall's tau). The requirement for these techniques are independent random samples, and nominal and ordinal measurement scales, respectively. Both of these requirements are met in the on-site study data. The sample size (N = 150) is adequate for these tests, and levels of significance were set at conservative levels (only .01 and .001 levels of significance are considered).

3. Determination of sample size is influenced by the size of the total population and the number of sub-groups or sample units for which generalizations are made (i.e., as the size of the aggregate unit of analysis decreases, the sample variances increases and sample size must also increase). The unit of analysis for this survey and the level for which generalizations were desired was the City of Lansing. Strenuous efforts were taken to increase the homogeneity of the on-site sample and thus decrease the sample variance (see sampling procedure below).

4. Investigation of the reliability of the metric multidimensional scaling process, using environmental concepts, indicates that reliability increases as sample size increases with the curve of the coefficient flattening out between 75 and 100 cases. The major requirements for MDS reliability are the homogeneity of the sample populations (considered in the sample design) and the homogeneity of the concepts to be measured. For this study, all 15 concepts are homogeneous since they all deal with Grand River recreation. Moreover, these concepts were determined from previous investigations to be significant variables in explaining water-based recreation activities.[1]

---

[1]Dr. Joseph Woelfel, Department of Communication, Michigan State University, who developed the MDS method used in this research, indicated that sample sizes used for this study are well within tolerances for acceptable metric application (see Barnett, 1972).

Sampling Procedure

The sample population was divided into spatial and temporal units as described below:

1. Public park users.[1] Public park users were defined as people recreating in public parks along the Grand River. Empirical observations, interviews with city planners, and results of the pilot study indicate that park users represent approximately 85 percent of the Grand River user population; therefore 85 percent of the sample population was drawn from public park users. The major recreation areas considered in this segment of the study include Grand River Park, Frances Park, Moores River Park, North Lansing Dam, Tucumseh Park, and Moores River Park. The parks to be surveyed on any given day were selected at random and matched to a randomly selected time frame. When the interviewer arrived at the park, he mentallay divided the park area into quadrants. Each quadrant was assigned a number (i.e., 1, 2, 3, 4) in a clockwise direction and the sampling order for each quadrant was determined from a random numbers table. The interviewer selected numbers, either 1 or 2, from a fish bowl to determine whether each quadrant would be surveyed in a circular clockwise (1) or counterclockwise (2) manner. Users within each quadrant were interviewed as they were encountered. If a quadrant

[1]The Lansing Boat Club declined to participate in this study, so percentages for the on-site study concerning power boaters are low.

was vacant, users in the next selected quadrant would be interviewed. If an entire park area was vacant for 10 minutes, the researcher would move to a predetermined alternative park.

Because of insufficient on-site populations, River Side Park, Cooley Gardens/Scott Park, Riverfront Park, and the Thomas F. Keenan Natural Areas were treated differently from the parks mentioned above. The sampling technique used for these areas was to select one park for each survey day. If any users were observed, the procedure described above was employed. A typical survey day is summarized below:

Typical Survey Day--August 4, 1975[1]

10:00 a.m. to 12:00 noon

River Side Park: Quadrants 4N, 1N, 3C, 2C

Alternatives:
Grand River Park: Quadrants 3N, 2N, 4C, 1C
North Lansing Dam: Quadrants 2C, 1N, 4C, 3C

12:30 p.m. to 2:30 p.m.

North Lansing Dam: Quadrants 1C, 3C, 4N, 2C

Alternatives:
Tecumseh Park: Quadrants 1N, 3N, 2N, 4N
Grand River Park: Quadrants 4N, 1N, 2N, 3N

3:00 to 5:00 p.m.

Moores River Park: Quadrants 3N, 2C, 1C, 4N

Alternatives:
Tecumseh Park: Quadrants 1N, 4C, 3C, 2C
North Lansing Dam: Quadrants 4N, 1N, 3C, 2C

6:00 p.m. to 8:00 p.m.

North Lansing Dam: Quadrants 4N, 3C, 2C, 1C

Alternatives:
Tucumseh Park: Quadrants 4C, 3C, 1N, 2N
Frances Park: Quadrants 1C, cN, 2C, 4C

---

[1]Quadrants to left of main entrance were always labeled #1 and #4; quadrants to the right were always #2 and #3. The letter C indicates clockwise direction and the letter N indicates counterclockwise direction. If rainy, the interviewer skipped to the next time frame.

2. Non-park users. Non-park river recreation participants are defined as any person recreating on city owned or private waterfront lands not designated as public parks. It was determined that this group represented approximately 15 percent of Lansing's river recreation user population; therefore, 15 percent of the on-site sample population contacted were non-park users. Because of the relatively inaccessible locations of the place where this use occurred, the only feasible method for contacting these users was traveling along the river in a canoe. Three days were randomly chosen for this (i.e., July 4, 6, and 20). The sample day extended from 9:00 a.m. to 5:00 p.m. The researcher contacted all the people observed using the river during these periods. The greatest numbers of non-park users were contacted between Grand River Park and the Oldsmobile Plant, and along the North Lansing section of the river.

APPENDIX B

ON-SITE SURVEY QUESTIONNAIRE

APPENDIX B

ON-SITE SURVEY QUESTIONNAIRE

Lansing Citizen Opinion Study

Part I

I am from Michigan State University doing a study on people's opinions about Lansing and the background of its citizens. The information I receive will be confidential and only used in calculating totals; no names or addresses are needed. It will help in planning Lansing's future. Can you please spare 20 to 25 minutes?

_____ 1. What (if any) are your major gripes about the City of Lansing?

_____ 2. If zero (0) represents total dissatisfaction with current recreational activities and one hundred (100) represents total satisfaction, how satisfied are you?

3. On the city map provided, thirteen bridges have been marked:

_____ North Waverly Road
_____ North Logan Street
_____ North Grand River
_____ East Grand River
_____ Oakland
_____ Saginaw
_____ Michigan (before it was closed)
_____ Kalamazoo
_____ Shiawasee
_____ South Logan
_____ South Waverly Road
_____ I-496
_____ Washington Street

Please indicate the three bridges you use most during a normal week's travel (check appropriate spaces).

_____ 4. On the city map provided, please indicate the number which corresponds to your present residence.

_____ a. How long have you lived there?

_____ b. Please indicate areas you formerly resided within and how long you lived there (only the two most recent moves, if applicable).

_____ 5. On the map provided, please indicate which area along the Grand River with which you are most familiar.

_____ a. Which sections (if any) of the Grand River have the nicest environment in your opinion?

_____ b. Which sections (if any) have the poorest environment?

_____ 6. Have you ever used any other river for recreation? If so, which ones and for what activity?

a. _____

b. _____

c. _____

d. _____

_____ 7. How many minutes did it take you to reach the Grand River?

_____ a. By car?

_____ b. By walking?

____ c. Other?

____ Is this your usual means of getting to the river? If not, what is?

_____

_____ 8. How far do you usually travel to reach preferred recreational sites (besides the Grand River in Lansing)? (State it in miles.)

_____ 9. How often did you or your family use the Grand River, or its banks, for recreation during the last month?

If so, for what activities? Where?

_____

_____

_____

_____ 10. List the water-recreational activities (i.e., activities which involve water or are enhanced by water) which you have participated in and enjoy the most.

_____

_____

_____

a. Which of these activities do you feel the Grand River does or could provide? Any others?

Does	Could (Why not recently?)

_____ 11. How do your friends view using the Grand River (within Lansing) for recreational activities?

1 Highly unfavorable
2 Unfavorable
3 Neutral
4 Favorable
5 Highly favorable

Part II

_____ 1. How many vehicles (in working order) does your household own?

_____ a. Number of cars?

_____ b. Number of motorcycles?

_____ c. Number of bicycles?

_____ d. Number of other vehicles?

_____ 2. What is your present occupation? (Please indicate if unemployed, homemaker, student.)

_____

a. Where do you work?

_____

_____ 3. From the list provided please indicate the letter which corresponds with your (flash card)

a. Age
b. Your household total yearly income before taxes
c. Your last grade of school attended
d. Your marital status

_____ 4. How many children are there in your household?

_____ 5. Do your children presently use the Grand River?

If yes, what activities? _____

_____

_____

If not, why? _____

_____

_____

Observations: Date: _____

Location: _____

_____

_____

Time: _____

Activity: _____

Race: _____

Sex: _____

Other Notes: (e.g., weather conditions, etc.)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Part III: Example of Interview

This questionnaire (Part III) asks you to tell us how different (or in other words "far apart") ideas concerning the Grand River within Lansing are from each other. As an example, let us consider two ideas; first, your drinking water, and secondly, the water in the Grand River are 100 units apart. Now we can use this distance as a ruler to measure how distant, or "far apart," are other ideas concerning the Grand River.

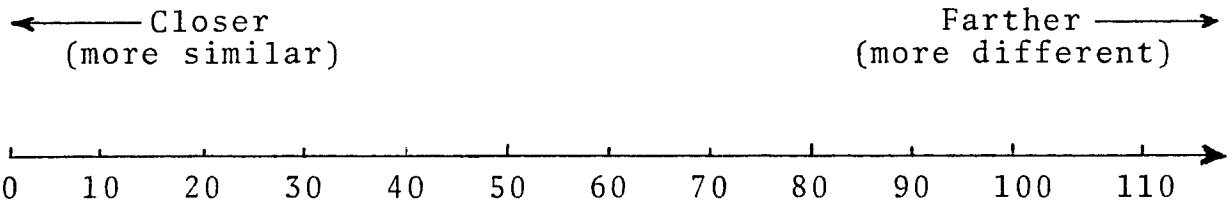
You are supposed to record how many units apart ideas concerning the Grand River on the next few pages are from each other. Remember, the more different the two ideas are from each other, the bigger the number of units apart they are. If you think any of the two ideas are more different than your drinking water and Grand River, then you would give me a number larger than 100. If you think they are not so different, use a smaller number. Remember, the more different the ideas are from each other the higher the number you should say.

The flash card you have been given will serve as your guideline.

Just a note: some ideas may not seem to be useful or in any way related, but a response is important in determining and studying your overall opinions.

SAMPLE FLASH CARD*

Beer and ale . . . . . 5 units
Beer and whiskey . . . . . 50 units
Beer and milk . . . . . 100 units
Milk and whiskey . . . . . 110 units
Beer and bleech . . . . . 225 units



*This format was approved after extensive research during the pilot study and consultation with Dr. Joseph Woelfel.

_____ 1. Grand River and me
_____ 2. Grand River and females
_____ 3. Grand River and males
_____ 4. Grand River and children
_____ 5. Grand River and old age
_____ 6. Grand River and picnicking
_____ 7. Grand River and fishing
_____ 8. Grand River and swimming
_____ 9. Grand River and industry
_____ 10. Grand River and nature
_____ 11. Grand River and relaxing
_____ 12. Grand River and bicycling
_____ 13. Grand River and playing sports
_____ 14. Grand River and danger
_____ 15. Grand River and clean water
_____ 16. Grand River and power boating
_____ 17. Grand River and flood danger
_____ 18. Grand River and Lansing's history
_____ 19. Grand River and cultural areas
_____ 20. Grand River and Bicentenial events
_____ 21. Grand River and canoeing
_____ 22. Grand River and waterskiing
_____ 23. Grand River and muggings
_____ 24. Grand River and rape
_____ 25. Grand Rifer and prostitution
_____ 26. Grand River and alcohol and drug use
_____ 27. Grand River and lovers' lane
_____ 28. Grand River and edible fish
_____ 29. Females and males
_____ 30. Females and children
_____ 31. Females and picnicking
_____ 32. Females and fishing
_____ 33. Females and swimming

_____ 34. Females and industry
_____ 35. Females and nature
_____ 36. Females and relaxing
_____ 37. Females and bicycling
_____ 38. Females and danger
_____ 39. Females and clean water
_____ 40. Females and power boating
_____ 41. Males and children
_____ 42. Males and picnicking
_____ 43. Males and fishing
_____ 44. Males and swimming
_____ 45. Males and industry
_____ 46. Males and nature
_____ 47. Males and relaxing
_____ 48. Males and bicycling
_____ 49. Males and danger
_____ 50. Males and clean water
_____ 51. Males and power boating
_____ 52. Children and picnicking
_____ 53. Children and fishing
_____ 54. Children and swimming
_____ 55. Children and industry
_____ 56. Children and nature
_____ 57. Children and relaxing
_____ 58. Children and bicycling
_____ 59. Children and danger
_____ 60. Children and clean water
_____ 61. Children and power boating
_____ 62. Picnicking and fishing
_____ 63. Picnicking and swimming
_____ 64. Picnicking and industry
_____ 65. Picnicking and nature
_____ 66. Picnicking and relaxing

_____ 67. Picnicking and bicycling
_____ 68. Picnicking and danger
_____ 69. Picnicking and clean water
_____ 70. Picnicking and power boating
_____ 71. Fishing and swimming
_____ 72. Fishing and industry
_____ 73. Fishing and nature
_____ 74. Fishing and relaxing
_____ 75. Fishing and bicycling
_____ 76. Fishing and danger
_____ 77. Fishing and clean water
_____ 78. Fishing and power boating
_____ 79. Swimming and industry
_____ 80. Swimming and nature
_____ 81. Swimming and relaxing
_____ 82. Swimming and bicycling
_____ 83. Swimming and danger
_____ 84. Swimming and clean water
_____ 85. Swimming and power boating
_____ 86. Industry and nature
_____ 87. Industry and relaxing
_____ 88. Industry and bicycling
_____ 89. Industry and danger
_____ 90. Industry and clean water
_____ 91. Industry and power boating
_____ 92. Nature and relaxing
_____ 93. Nature and bicycling
_____ 94. Nature and danger
_____ 95. Nature and clean water
_____ 96. Nature and power boating
_____ 97. Relaxing and bicycling
_____ 98. Relaxing and danger
_____ 99. Relaxing and clean water

_____ 100. Relaxing and power boating
_____ 101. Bicycling and danger
_____ 102. Bicycling and clean water
_____ 103. Bicycling and power boating
_____ 104. Danger and clean water
_____ 105. Danger and power boating
_____ 106. Clean water and power boating
_____ 107. Grand River and hiking
_____ 108. Grand River and walking for pleasure
_____ 109. Grand River and concerts
_____ 110. Grand River and driving for pleasure
_____ 111. Grand River and accessibility

APPENDIX C

LANSING'S GRAND RIVER SURVEY

Waterfront Development Board
Lansing, Michigan

September 1975

RE: Lansing's Grand River Survey

Mr. Keith Ready, a Doctoral candidate in the Department of Geography at Michigan State University, is interested in the Grand River in the City of Lansing and is trying to determine how that River is used and who uses it. Therefore he and a few of his colleagues are conducting a survey of the residents of Lansing to collect the necessary data. Mr. Ready anticipates that the survey will be conducted sometime during the Fall 1975.

The City of Lansing's Waterfront Development Board is very much interested in this survey and the results derived therefrom. Therefore the Board would appreciate your full cooperation with those conducting this survey. If you have any questions, please call Mr. Jon D. Bauer in the Lansing Planning Department at 487-1400.

Ramona Bretz
Kit Carson
Frank Kelly
Jacqueline Schraft
R. C. Sweeney
Florence Vance
Candy Womble

Larry Drolett, Chairman

JDB/me

APPENDIX D

HOUSEHOLD SURVEY QUESTIONNAIRE

APPENDIX D

HOUSEHOLD SURVEY QUESTIONNAIRE[1]

Lansing Citizen Opinion Study

Part I

I am from Michigan State University doing a study on people's opinions about Lansing and the background of its citizens. The information I receive will be confidential and only used in calculating totals; no names or addresses are needed. It will help planning Lansing's future. Can you please spare 20 to 25 minutes?

_____ 1. What (if any) are your major gripes about the City of Lansing?

_____ 2. If zero (0) represents total dissatisfaction with current recreational activities and one hundred (100) represents total satisfaction, how satisfied are you?

3. On the city map provided, thirteen bridges have been marked:

_____ a. North Waverly Road
_____ b. North Logan Street
_____ c. North Grand River
_____ d. East Grand River
_____ e. Oakland
_____ f. Saginaw
_____ g. Michigan (before it closed)
_____ h. Kalamazoo
_____ i. Shiawasee
_____ j. South Logan
_____ k. South Waverly Road
_____ 1. I-496
_____ m. Washington Street

Please indicate the three bridges you use most during a normal week's travel (check appropriate spaces).

---

[1]MDS Format (Part III) remained the same--see Appendix C.

_____ 4. On the city map provided, please indicate the number which corresponds to your present residence (by interviewer).

_____ a. How long have you lived at your present address?

_____ b. Please indicate areas you formerly resided within and how long you lived there (only the two most recent moves, if applicable).

_____ 5. On the map provided, please indicate which area along the Grand River you are most familiar with (indicate no idea).

_____ a. Which sections (if any) of the Grand River have
_____ the nicest environment in your opinion?
_____ (Indicate no idea.)

_____ b. Which sections (if any) have the poorest
_____ environment? (Indicate no idea.)
_____

_____ 6. Have you ever used any river for recreation (besides the Grand)? If so, which ones and for what activity?

a. _____

b. _____

c. _____

d. _____

_____ 7. (Assuming you were to go) How many minutes would it take you to reach the Grand River in Lansing from home?

_____ a. Which mode of transportation would you most likely use?

_____ 8. How far do you usually travel to reach preferred recreational sites (besides the Grand River in Lansing)? (State it in miles; e.g., Lake Lansing or Lake Michigan.)

_____ 9. Have you or your family ever used the Grand River, or its banks, for recreation?

If so, for what activities?

Where?

a. If not, why not? (If not recently, why?)

_____ b. (If appropriate) If condition(s) improved, would you use the river?

_____ 10. List the water-recreational activities (i.e., activities which involve water or are enhanced by water) which you have participated in and enjoy the most.

_____

_____

_____

_____

a. Which of these activities do you feel the Grand River does or could provide? Any others?

Does	Could (Why not currently?)

_____ 11. How do your friends veiw using the Grand River (within Lansing) for recreational activities?

1 Highly unfavorable
2 Unfavorable
3 Neutral
4 Favorable
5 Highly favorable

Part II

_____ 1. How many vehicles (in working order) does your household own?

_____ a. Number of cars?

_____ b. Number of motorcycles?

_____ c. Number of bicycles

_____ d. Number of vehicles?

_____ 2. What is your present occupation? (Please indicate if unemployed, homemaker, student.)

_____

a. Where do you work?

_____

_____ 3. From the list provided, please indicate the letter which corresponds with your

a. Age
b. Your household total yearly income before taxes
c. Your last grade of school attended
d. Your marital status

_____ 4. How many children are there in your household?

_____ 5. Do your children presently use the Grand River?

If yes, what activities? _____

_____

_____

If not, why? _____

_____

_____

Observations: Date: _____

Location: _____

_____

_____

Time: _____

Activity: _____

Race: _____

Sex: _____

Other Notes: (e.g., weather conditions, etc.)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX E

HOUSEHOLD SURVEY METHODOLOGY

APPENDIX E

HOUSEHOLD SURVEY METHODOLOGY

Sample Size

The major factors considered in determining an adequate sample size included:

1. Since the objectives of this investigation were largely exploratory in nature (i.e., to achieve a basic understanding of area residents' perceptions, attitudes, and behavior toward the Grand River), confidence limits could not be stringently established. The hypotheses are structured to allow a wide confidence limit.

2. The majority of data obtained by the household study were measured on either a nominal or ordinal scale, therefore, assumptions as to the normality of the sampling distribution are not appropriate. Thus, only non-parametric statistical techniques were utilized (i.e., chi-square and Kendall's tau). The requirements for these techniques are independent random samples and nominal and ordinal measurement scales, respectively. Both of these requirements were met in the household survey. The sample size (N = 300) was adequate and the levels of significance adopted for both tests were conservative (only .01 and .001 levels of significance were considered).

3. Sample size requirements were influenced by the size of the total population and the number of sub-groups or sample units for which generalizations were made (i.e., as the size of the aggregate unit of analysis decreases, the sample variance increases and sample size must increase). The desirable unit of analysis for this survey, and the level for which generalizations are made, is the City of Lansing as a whole and five sections of the city. Strenuous efforts were taken to increase the homogeneity of the household sample and thus decrease the sample variance (see sampling design below).

4. The sample size obtained for the household survey (i.e., N = 314 for the MDS) are well within the tolerance levels acceptable for multidimensional scaling application (see Appendix A).

Sample Survey Design

A stratified, proportional random geographic sampling technique was used. The following steps were employed to insure a random, representative sample:

1. Site analysis maps (i.e., housing analysis map) were obtained from the Lansing Planning Department for every census tract within the study area. The maps depict road patterns, house locations, and census tract boundaries for the entire study area.

2. A grid composed of one inch squares, drawn on acetate was superimposed on the base map. Each of these squares was consecutively numbered. Each of the one-inch squares was then subdivided into one hundred smaller squares. One of the subdivided squares from each one

inch square was chosen as a possible sample location (i.e., the house located at that point), using numbers generated from a random numbers table as coordinates.

3. The number of respondents from each census tract was determined by the ratio between the number of tract residents to the entire study area population. This procedure assured a proportional sample. On several occasions it was necessary to combine census tracts to achieve appropriate sample size.

4. After the location of the sample houses were determined for each tract, these households were contacted (the base map was taken into the field for reference). If on the first contact there was no response (i.e., no one home), one call back was made. If the call back was unsuccessful, a random selection method was employed in the field to obtain an alternative household.

5. Because of the extensive survey work involved and the need to secure a highly reliable sample, several students (graduate and undergraduate) at Michigan State Uniersity were employed as interviewers. All received extensive training in the proper administration of the questionnaire and their reliability was checked in the field with a follow-up interview conducted by the author. Black students were employed in predominantly black nieghborhoods in order to secure a more reliable response. Seventy-five percent of all surveys (including the entire on-site user study) were completed by the author.

APPENDIX F

SOCIOECONOMIC CHARACTERISTICS OF SAMPLE POPULATIONS

APPENDIX F

SOCIOECONOMIC CHARACTERISTICS OF SAMPLE POPULATIONS

Table F.1

Socioeconomic Characteristics of the Household Survey Respondents

Variable	Number of Respondents	Percent[a] of Respondents
1. Sex:		
Male	215	58
Female	156	42
Total	371	100
2. Education:		
No school	0	0
1-8 years	12	12
9-12 years	56	15
High school	144	39
College, 1-4	113	30
College	27	6
Post college	19	5
Total	371	100
3. Race:[b]		
Black	63	17
White	300	81
Spanish speaking	7	2
Mongoloid	1	0
Total	371	100
4. Marital Status:		
Single	52	14
Married	272	73
Divorced	31	8
Separated	10	3
Widowed	6	1
Total	371	100

Table F.1--Continued

Variable	Number of Respondents	Percent[a] of Respondents
5. Income (combined household):[c]		
Less than $3,000	15	4
$3,000 to $4,999	39	11
$5,000 to $6,999	40	11
$7,000 to $8,999	45	12
$9,000 to $11,999	58	16
$12,000 to $14,999	66	18
$15,000 to $24,999	95	26
Over $24,999	13	4
Total	371	100
6. Number of Cars:		
None	11	3
One	182	49
Two	141	38
Three	27	7
Four	5	1
Five	2	1
Total	371	100
7. Occupation:[d]		
Blue collar	100	27
White collar	99	27
Student	18	5
Homemaker	90	24
Unemployed	39	11
Retired	19	5
Self-employed	6	2
Total	371	100
8. Age:		
18 to 24	70	19
25 to 34	128	35
35 to 44	77	21
45 to 54	61	16
55 to 59	13	4
60 to 64	9	2
65 and over	13	3
Total	371	100

Table F.1--Continued

Variable	Number of Respondents	Percent[a] of Respondents	
9. Number of Bicycles:			
None	151		41
One	47		13
Two	76		20
Three	43		12
Four	29		8
Five	16		4
Six or more	9		2
Total	371		100
10. Number of Children:[e]			
None	141		38
One	54		15
Two	93		25
Three	42		11
Four	26		7
Five	10		3
Six	4		1
Seven	1		0
Total	371		100
11. Current City Section of Residence:			
South side	177	48	47[f]
East side	40	11	12
West side	72	19	19
North side	62	17	18
Lansing Township	20	5	4
Total	371	100	100
Median years of residency = 6.2			
12. Most Recent Section of Residence:			
South side	83		41
East side	19		9
West side	52		26
North side	39		19
Lansing Township	8		4
Total	201		100
Median years of residency = 2.4			

Table F.1--Continued

Variable	Number of Respondents	Percent[a] of Respondents
13. Earliest City Section of Residence:		
South side	15	36
East side	7	17
West side	15	36
North side	4	10
Lansing Township	1	2
Total	42	100
Median years of residence = 2.3		

[a]Percentages are rounded off for all tables.

[b]Race was recorded by observations; thus, figures for Spanish speaking may be low. The 1970 census percentage of black residents was 9.3 percent. This percentage, according to Lansing planners increased considerably after 1970.

[c]The estimated median income for Lansing in 1976 was $10,839. The median income level from the household study is approximately $10,000.

[d]The unemployment rate of workers in Lansing was averaging between 9 and 11 percent during the survey.

[e]The 1970 census indicated 58 percent of Lansing households had children under 18 years of age. The household survey indicated 62 percent of the households had children under 18 years of age.

[f]Percent of total population in section, 1970.

Table F.2

Socioeconomic Characteristics of the On-Site Survey Respondents

Variable	Number of Respondents	Percent[a] of Respondents
1. Sex:		
Male	125	72
Female	48	28
Total	173	100
2. Education:		
No school	1	1
1-8	11	6
9-12	43	25
High school	49	28
College, 1-4	32	19
College	22	13
Post college	15	9
Total	173	100
3. Race:[b]		
Black	43	25
White	127	73
Spanish speaking	2	1
Mongoloid	1	1
Total	173	100
4. Marital Status:		
Single	37	21
Married	107	62
Divorced	17	10
Separated	6	3
Widowed	6	4
Total	173	100
5. Income (combined):		
Less than $3,000	21	12
$3,000 to $4,999	17	10
$5,000 to $6,999	19	11
$7,000 to $8,999	22	13
$9,000 to $11,999	27	16
$12,000 to $14,999	27	16
$15,000 to $24,999	34	20
Over $24,999	6	4
Total	173	100

Table F.2--Continued

Variable	Number of Respondents	Percent[a] of Respondents
6. Number of Cars:		
None	11	6
One	83	49
Two	65	38
Three	9	5
Four	2	2
Five	1	1
Total	172	100
7. Occupation:		
Blue collar	82	47
White collar	37	22
Student	17	10
Homemaker	2	1
Unemployed	23	13
Retired	11	6
Total	173	100
8. Age:		
18 to 24	50	29
25 to 34	54	31
35 to 44	25	14
45 to 54	21	12
55 to 59	4	2
60 to 64	8	5
65+	11	6
Total	173	100
9. Number of Bicycles:		
None	63	36
One	35	20
Two	34	20
Three	23	13
Four	10	6
Five	4	2
Six	1	1
Seven	2	1
Eight	1	1
Total	173	100

Table F.2--Continued

Variable	Number of Respondents	Percent[a] of Respondents	
10. Current City Section of Residence:			
South side	108	63	47[c]
East side	11	6	12
West side	17	10	19
North side	25	15	18
Lansing Township	10	6	4
Total	171	100	100
11. Former City Section of Residence:			
South side	35	37	
East side	13	14	
West side	33	34	
North side	11	12	
Lansing Township	4	4	
Total	96	100	
12. Earliest City Section of Residence:			
South side	9	29	
East side	7	23	
West side	10	32	
North side	4	13	
Lansing Township	1	3	
Total	31	100	

[a]Percentages indicate entire response on three related questions and thus do not equal 100 percent.

[b]Race was recorded by observation, so estimates for Spanish speaking may be low.

[c]Percent of population in section, 1970.

APPENDIX G

MULTIDIMENSIONAL SCALING MATRIX

Table G.1

Mean Distance Matrix--South Side Residents, Household Survey Respondents

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	67.95	0.00													
3. Females	74.72	23.91	0.00												
4. Males	55.24	23.34	47.76	0.00											
5. Children	58.59	18.98	30.85	39.59	0.00										
6. Picnicking	47.03	35.04	30.71	52.09	16.01	0.00									
7. Fishing	63.69	61.83	77.68	22.75	27.23	32.39	0.00								
8. Swimming	119.72	56.51	43.68	31.13	22.04	27.16	43.18	0.00							
9. Industry	38.47	75.66	76.72	33.23	117.14	114.11	107.54	117.40	0.00						
10. Nature	55.15	25.67	37.20	33.52	24.35	17.50	20.85	23.04	109.27	0.00					
11. Relaxing	53.00	27.51	30.14	26.20	38.29	15.37	20.45	21.81	122.46	18.38	0.00				
12. Bicycling	66.21	60.84	38.95	39.95	20.17	31.17	54.34	43.74	112.35	21.29	27.78	0.00			
13. Danger	49.56	91.22	60.03	61.89	54.23	80.17	64.10	54.23	48.25	64.26	97.29	60.71	0.00		
14. Clean water	127.81	33.36	29.42	33.99	42.46	29.38	24.07	23.40	94.69	21.98	33.34	64.81	81.09	0.00	
15. Power boating	54.45	73.05	59.12	29.90	56.11	49.87	58.33	68.68	94.57	49.25	49.59	107.60	53.10	53.56	0.00

Table G.2

Mean Distance Matrix--Non-South Side Residents, Household Survey Respondents

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	85.44	0.00													
3. Females	85.84	30.96	0.00												
4. Males	73.57	37.97	53.15	0.00											
5. Children	60.43	34.53	31.47	42.41	0.00										
6. Picnicking	64.74	40.03	37.88	52.80	31.90	0.00									
7. Fishing	64.76	62.95	74.76	34.08	44.49	40.44	0.00								
8. Swimming	126.28	64.71	48.21	37.08	30.45	35.23	53.70	0.00							
9. Industry	44.39	85.29	70.63	37.34	110.39	123.72	122.40	135.55	0.00						
10. Nature	54.11	32.57	44.83	40.19	35.17	30.04	36.43	40.37	123.17	0.00					
11. Relaxing	59.76	33.32	39.72	37.37	38.73	25.33	32.29	30.45	130.76	30.36	0.00				
12. Bicycling	73.45	65.78	48.70	51.98	23.61	36.83	73.52	62.37	127.22	31.05	36.34	0.00			
13. Danger	73.45	97.27	48.24	56.65	54.19	102.40	71.34	61.26	64.26	87.65	115.45	78.59	0.00		
14. Clean water	126.26	42.68	39.78	40.62	46.54	33.89	59.47	30.50	127.52	50.75	53.68	81.89	98.09	0.00	
15. Power boating	68.59	79.57	61.18	37.76	64.52	51.55	69.40	80.09	103.98	61.86	55.23	111.81	69.32	69.18	0.00

Table G.3

Mean Distance Matrix--South Side Residents, On-Site Survey Respondents

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	43.65	0.00													
3. Females	79.04	25.31	0.00												
4. Males	54.09	27.08	48.85	0.00											
5. Children	53.19	18.91	25.79	34.65	0.00										
6. Picnicking	42.00	31.73	24.62	40.19	15.44	0.00									
7. Fishing	38.07	37.89	57.61	25.61	29.29	32.79	0.00								
8. Swimming	100.15	59.38	33.97	28.81	22.39	28.25	48.49	0.00							
9. Industry	40.01	64.11	61.71	33.48	94.09	101.97	84.90	93.41	0.00						
10. Nature	34.86	23.45	33.72	27.18	23.66	17.37	20.22	26.62	91.01	0.00					
11. Relaxing	28.20	20.40	30.26	27.56	35.19	20.69	17.10	17.72	101.06	22.97	0.00				
12. Bicycling	52.95	46.53	37.62	36.28	19.11	34.21	69.27	51.58	92.23	20.90	36.49	0.00			
13. Danger	42.82	73.48	60.04	51.70	55.64	70.04	60.27	46.00	47.44	61.10	91.87	52.47	0.00		
14. Clean water	106.54	29.19	35.87	32.27	41.81	33.61	38.29	27.41	93.19	23.19	37.72	72.93	80.09	0.00	
15. Power boating	50.35	59.01	51.06	28.56	49.21	47.87	40.08	55.46	85.57	45.67	50.30	87.51	56.34	54.16	0.00

Table G.4

Mean Distance Matrix--Non-South Side Residents, On-Site Survey Respondents

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	38.14	0.00													
3. Females	63.85	19.36	0.00												
4. Males	40.32	17.63	48.83	0.00											
5. Children	37.01	14.23	21.60	26.29	0.00										
6. Picnicking	48.80	18.83	20.70	38.23	16.67	0.00									
7. Fishing	27.98	30.10	44.23	14.83	15.92	27.09	0.00								
8. Swimming	111.40	40.29	32.23	23.23	15.29	23.61	45.27	0.00							
9. Industry	32.27	60.87	61.49	22.60	101.21	94.50	89.80	108.25	0.00						
10. Nature	39.03	13.63	31.16	18.18	23.34	16.70	15.98	26.01	112.54	0.00					
11. Relaxing	33.41	11.76	35.03	18.10	40.43	17.23	17.98	24.52	115.70	26.76	0.00				
12. Bicycling	54.65	45.45	36.58	34.42	23.98	43.20	65.30	54.29	107.52	23.60	58.80	0.00			
13. Danger	51.47	87.10	52.23	46.39	46.30	65.60	64.20	41.54	47.94	62.27	87.45	57.07	0.00		
14. Clean water	112.63	41.69	25.23	26.54	32.67	25.83	30.16	21.78	80.07	25.54	32.49	89.90	75.63	0.00	
15. Power boating	41.36	53.45	56.05	29.12	42.69	48.20	47.25	52.00	84.36	55.00	46.45	110.63	43.74	66.81	0.00

Table G.5

Arithmetic Differences Between the Mean Distance Matrices for the Non-South Side Residents - South Side Residents, On-Site Survey Respondents

Concepts	Grand River	Me	Females	Males	Children	Picnicking	Fishing	Swimming	Industry	Nature	Relaxing	Bicycling	Danger	Clean Water	Power Boating
1. Grand River	0.00														
2. Me	-5.54	0.00													
3. Females	-15.19	-5.95	0.00												
4. Males	-12.87	-9.45	-0.02	0.00											
5. Children	-14.10	-4.68	-4.19	-8.36	0.00										
6. Picnicking	6.80	-12.90	-3.92	-1.96	1.23	0.00									
7. Fishing	-10.09	-7.79	-13.38	-10.78	-13.37	-5.70	0.00								
8. Swimming	11.25	-19.09	-1.74	-5.58	-7.10	-4.64	-3.22	0.00							
9. Industry	-7.74	-3.24	-0.22	-10.88	7.12	-7.47	4.90	14.84	0.00						
10. Nature	4.17	-9.82	-2.56	-9.00	-0.32	-0.67	-4.24	-0.61	11.27	0.00					
11. Relaxing	5.21	-8.64	4.77	-9.46	5.24	-3.46	0.88	7.30	6.90	2.65	0.00				
12. Bicycling	1.70	-1.08	-1.04	-1.96	4.87	-8.99	3.97	2.71	8.35	1.73	5.58	0.00			
13. Danger	8.65	13.62	-7.81	-5.32	-9.34	-4.44	4.93	-4.46	0.99	-1.97	-2.41	3.85	0.00		
14. Clean water	6.09	12.50	-10.64	-5.73	-9.14	-7.78	-8.13	-5.63	-9.95	-1.96	-3.61	10.08	-3.16	0.00	
15. Power boating	-8.99	-5.56	4.99	0.56	-6.52	-0.33	7.17	-3.46	-3.28	6.50	2.23	14.46	-8.65	6.27	0.00

APPENDIX H

UNIDIMENSIONAL RESPONSE

Table H.1

Unidimensional Response

Variable with Grand River	Entire Household Study Mean	Household Study User Mean	Household Study Non-User Mean	On-Site Mean
Old age	84.12	84.23	84.01	79.81
Playing sports	72.83	72.19	73.46	96.17
Flood danger	57.62	53.57	61.67	78.79
Lansing's history	49.31	46.54	52.07	52.39
Cultural events	69.04	65.10	72.97	60.54
Bicentennial events	69.12	69.08	69.16	55.42
Canoeing	58.88	60.47	57.28	45.13
Water skiing	66.86	70.31	63.40	52.82
Muggings	89.35	86.59	92.11	29.77
Rape	105.19	105.64	104.74	50.47
Prostitution	118.47	122.75	114.19	57.10
Alcohol and drug use	78.66	78.98	78.24	39.40
Lovers' lane	70.19	68.86	71.51	48.45
Edible fish	103.79	102.84	104.73	63.04
Hiking	68.55	69.14	70.87	84.37
Walking for pleasure	56.53	54.31	58.75	94.31
Concerts	69.32	66.30	72.33	56.72
Driving for pleasure	61.31	57.22	65.39	44.35
Accessibility	50.65	55.70	65.60	76.50

APPENDIX I

UNIDIMENSIONAL RESPONSE BY CITY SECTION--HOUSEHOLD SURVEY RESPONDENTS

Table I.1

Unidimensional Response by City Section--
Household Survey Respondents

Variable with Grand River	South Side Resident Mean	Non-South Side Resident Mean
Old age	71.00	72.87
Playing sports	62.09	63.20
Flood danger	53.98	48.00
Lansing's history	39.50	36.25
Cultural events	70.35	59.37
Bicentennial events	61.09	61.61
Canoeing	45.11	51.96
Waterskiing	55.65	62.57
Muggings	87.33	82.02
Rape	90.89	94.33
Prostitution	96.32	110.02
Alcohol and drug use	63.79	66.11
Lovers' lane	57.66	56.85
Edible fish	119.48	113.02
Hiking	61.45	60.01
Walking for pleasure	57.28	48.65
Concerts	64.76	59.14
Driving for pleasure	58.31	49.40
Accessibility	45.31	49.15

REFERENCES CITED

Clark, W. A. V., and Cadwallader, M. "Residential Preferences: An Alternate View of Intraurban Space." Environment and Planning 5 (1973): 693-703.

Clarke, Alfred C. "The Use of Leisure and Its Relationship to Levels of Occupational Prestige." American Sociological Review 21 (1957): 301-307.

Chubb, Michael. Recreation in the Lansing Model Cities Area. East Lansing, Mich.: Recreation Resource Consultants, July 1972.

David, E. J. L. "Floodplain Lands for Parks and Recreation, A Case Study of Milwaukee. Land Economics 49 (1973): 221-226.

David, Elizabeth L. "Public Perceptions of Water Quality." Water Resources Research 3 (1971): 453-457.

Dee, Norbert, and Liebman, Jon C. "Statistical Study of Attendance at Urban Playgrounds." Journal of Leisure Research 2 (1970): 145-159.

Ditton, Robert, and Goodale, Thomas. Marine Recreational Uses of Green Bay: A Study of Human Behavior and Attitude Patterns. Madison, Wis.: University of Wisconsin, Sea Grant Program, Report No. 17, December 1972.

Downs, Roger M. "The Cognitive Structure of an Urban Shopping Center." Environment and Behavior 2 (1969): 13-19.

_____. "Geographic Space Perception: Past Approaches and Future Prospect." In Progress in Geography, Vol. 2, pp. 65-108. Edited by Christopher Board et al. New York: St. Martin's Press, 1970.

Gold, Seymore M. "Nonuse of Neighborhood Parks." Journal of the American Institute of Planners 38 (November 1972): 369-378.

_____. "Neighborhood Parks: The Nonuse Phenomenon." Evaluation Quarterly 2 (1977): 319-378.

Golledge, R. G., Briggs, R., and Demko, D. "Configurations of Distance in Intra-Urban Space." Proceedings of the Association of American Geographers 1 (1969): 60-66. Washington, D.C.: Association of Geographers.

Golledge, R. G., and Brown, Lawrence A. "Search, Learning, and the Market Decision Process." Geografiska Annaler 49, Series B (1967): 116-124.

Golledge, R. J.; Brown, Lawrence A.; and Williamson, Frank. "Behavioral Approaches in Geography: An Overview." The Australian Geographer 12 (1972): 59-79.

Golledge, R. J., and Rushton, Gerard. Multi-Dimensional Scaling: Review and Geographical Applications. Commission on College Geography, Technical Paper No. 10. Washington, D.C.: Association of American Geographers, 1972.

Goodale, T. L. "An Analysis of Leisure Behavior and Attitudes in Selected Minneapolis Census Tracts." Ph.D. dissertation, University of Illinois, 1965.

Gould, Peter. On Mental Maps. Ann Arbor, Mich.: University of Michigan, Department of Geography, Michigan Inter-University Community of Mathematical Geographers, Discussion Paper No. 9, 1966.

Hecock, Richard D. "Recreation Behavior Patterns as Related to Site Characteristics of Beaches." Journal of Leisure Research 2 (1970): 237-250.

Hendee, John C., and Burdge, Rabel J. "The Substitutability Concept: Implication for Recreation Research and Measurement." Journal of Leisure Research 6 (1974): 157-162.

Hendee, John; Calton, William R.; and Brockman, Frank. Wilderness Users in the Pacific Northwest: Their Characteristics, Values, and Management Preferences. Portland, Oreg.: Pacific Northwest Forest Experiment Station, U.S. Forest Service, Research Paper PNW-61.

Horton, Frank E., and Reynolds, David R. "Effects of Urban Spatial Structure on Individual Behavior." Economic Geography 47 (January 1971): 36-48.

Huntington, Ellsworth. Civilization and Climate. New Haven, Conn.: Yale University Press, 1915.

Hurst, M. E. A Geography of Economic Behavior. North Scituate, Mass.: Duxbury Press, 1974.

Jacobs, Jane. The Life and Death of American Cities. North Scituate, Mass.: Duxbury Press, 1965.

Johnston, R. J. "Activity Spaces and Residential Preferences: Some Tests of the Hypothesis of Sectoral Mental Maps." Economic Geography 48 (April 1972): 199-211.

Kates, R. W. Hazard and Choice Perception in Flood Plain Management. University of Chicago, Department of Geography, Research Paper No. 70, 1962.

Lime, David W. "Research for Determining Use Capacities of the Boundary Waters Canoe Area." Naturalists 21 (1970): 8-13.

Lindsay, John A., and Ogle, Richard A. "Socioeconomic Patterns of Outdoor Recreation Use Near Urban Areas." Journal of Leisure Research 4 (1972): 19-24.

Lowenthal, David. "Environmental Perception and Behavior." University of Chicago, Department of Georgaphy, Research Paper No. 109, 1967.

Lucas, Robert. "Wilderness Perception and Use: The Example of the Boundary Waters Canoe Area." Natural Resource Journal 3 (1964): 394-411.

_____. User Evaluation of Campgrounds on Two Michigan Forests. St. Paul, Minn.: North Central Forest Experiment Station, U.S. Forest Service, Research Paper NC-44, 1970.

Lynch, Kevin. The Image of the City. Cambridge, Mass.: M.I.T. Press and Harvard University Press, 1960.

McCracken, K. W. J. "Household Awareness Spaces and Intraurban Migration Search Behavior." The Professional Geographer 27 (1975): 166-170.

Moncrief, Lewis. "User Related Study of Three Michigan Rivers." In An Ecological Evaluation of Stream Eutrophication, pp. 12.1-12.5. East Lansing, Mich.: Michigan State University, Institute of Water Resrouces, Tech. Report No. 36, 1973.

Morrill, Richard L. "Views and Opinions: The Future of Geography." The Professional Geographer 27 (February 1975): 1.

National Recreation and Park Association. Statement of National Policy. Arlington, Va.: National Recreation and Park Association, Draft No. 21, 1977.

Peterson, George L. "A Model of Preference: Quantitative Analysis of the Visual Appearance of Residential Neighborhoods." Journal of Regional Sciences 7 (1967): 19-31.

_____. Movitations, Perceptions, Satisfactions and Environmental Dispositions of Boundary Waters Canoe Area Users and Managers. St. Paul, Minn.: North Central Forest Experiment Station, U.S. Forest Service, Research Paper No. 13-253, 1971.

_____. "A Comparison of the Sentiments and Perceptions of Wilderness Managers and Canoeists in the BWCA." Journal of Leisure Research 3 (1974): 194-206.

Pierce, Robert. "Behavioral Correlates of Perceived Stress in the Urban Environment: Spatial Restriction in Metropolitan Detroit." Ph.D. dissertation, Department of Geography, Michigan State University, 1974.

Posey, Milton. "City Not Facing Reality." The Lansing State Journal, 5 November 1975.

Ready, Keith. "Perceptions by Area Residents of the Merrimack River. A Spatial Analysis." Master's thesis, Department of Geography, Miami University of Oxford, Ohio, 1973.

Ritchie, J. R. Brent. "On the Derivation of Leisure Activity Types--A Perceptual Mapping Approach." Journal of Leisure Research 7 (1975): 128-140.

Rossman, Betty B., and Vlehla, Joseph Z. "Psychological Reward Values Associated with Wilderness Use." Environment and Behavior 9 (1977): 41-66.

Rugg, Robert D. "The Use and Non-Use of Urban Parks: Accessibility and Social Characteristics in Relation to Public Outdoor Recreation in Selected Neighborhoods of Ottawa-Hull." Ph.D. dissertation, Department of Geography, University of Ottawa, 1974.

Rushton, Gerald. "The Scaling of Locational Preferences." In Behavioral Problems in Geography: A Symposium, pp. 197-227. Edited by K. R. Cox and R. G. Golledge. Evanston, Ill.: Northwestern University Studies in Geography, No. 17, 1969.

Saarinen, T. F. Perception of the Drought Hazard on the Great Plains. Chicago: University of Chicago Press, Department of Geography, Research Paper No. 106, 1966.

Sauer, Carl O. "The Morphology of Landscape." In University of California Publications in Geography. Vol. 2, pp. 253-282, October 1925.

Smith, Geoffrey D.; Shaw, J. B., and Huckle, Peter. "Children's Perception of a Downtown Shopping Center." Professional Geographer 31 (1979): 157-164.

Stankey, George. "The Perception of Wilderness Recreation Carrying Capacity: A Geographic Study in Natural Resource Management." Ph.D. dissertation, Department of Geography, Michigan State University, 1970.

Steward, Julian H. "The Concept and Method of Cultural Ecology." In Theory of Cultural Change, pp. 5-17. University of Illinois Press, 1955.

Thompson, C. Stassen, and Tinsley, A. W. "Income Expenditure Elasticities for Recreation: Their Estimation and Relation to Demand for Recreation." Journal of Leisure Research 10 (1978): 265-270.

Tolman, Edward C. "Cognitive Maps in Rats and Men." Psychological Review 55 (1948): 189-208.

Toregerson, Warren. Theory and Methods of Scaling. New York: John Wiley & Sons, 1958.

U.S. Congress. Outdoor Recreation Resource Review Commission. Outdoor Recreation for America. A report to the President and to Congress. Washington, D.C.: Government Printing Office, 1962.

U.S. Congress. House. A Bill to Amend the Federal Water Pollution Control Act. H.R. 9464, 95th Cong., 1st sess., 1977.

U.S. Congress. Outdoor Recreation Resources Review Commission. National Recreation Survey, by Abbott L. Ferriss. Commission Report No. 19. Washington, D.C.: Government Printing Office, 1962.

U.S. Environmental Protection Agency. "Careful Planning for Recreation Areas Along Restored Waterways." Newsletter, 5 November 1976.

U.S. Department of Interior. National Urban Recreation Study. Executive Report. Washington, D.C.: Government Printing Office, 1978.

Vaux, H. J. "The Distribution of Income Among Wilderness Users." Journal of Leisure Research 7 (1977): 29-37.

Wheeler, James O. "Location of Mobile Home Manufacturing: A Multidimensional Scaling Analysis." The Professional Geographer 28 (August 1976): 261-266.

White, Gilbert F. Choice of Adjustments to Floods. University of Chicago, Department of Geography, Research Paper No. 93, 1964.

_____. "Formation and Role of Public Attitudes." In Environmental Quality in a Growing Economy, pp. 105-127. Edited by H. Jarrett. Baltimore: Johns Hopkins Press, 1966.

Whitman, Ira L. Evaluating Urban Core Usage of Waterways and Shorelines. Columbus, Ohio: Battelle Memorial Institute, 1971.

Woelfel, J., and Saltiel, J. "Cognitive Processes as Motion in a Multidimensional Space: A General Linear Model." Unpublished manuscript, Michigan State University, East Lansing, 1974.

Wolpert, Julian. "Behavioral Aspects of the Decision to Migrate." Papers of the Regional Science Association 15 (1965): 159-169.