THE RELATIONSHIP BETWEEN RECREATIONAL AND LEISURE-ORIENTED LIVING PATTERNS AND LAND USE IN THE URBAN FRINGE: A CASE ANALYSIS

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Lewis W. Moncrief

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ABSTRACT

THE RELATIONSHIP BETWEEN RECREATIONAL AND LEISURE-ORIENTED LIVING PATTERNS AND LAND USE IN THE URBAN FRINGE: A CASE ANALYSIS

By

Robert Emmet Manning

A national history of population and economic growth has resulted in steadily increasing demands for land and continually shifting land use patterns. A seemingly important factor of recent note in this process is the widespread emphasis on the recreational and amenity values provided by land resources. The significance with which these values are now held is reflected in the national trend toward sharply rising participation rates in outdoor recreation and other leisure time activities and the popular movement toward enhancement of the quality of the environment. This research was designed to investigate the relationship between recreational and leisure-oriented values and changes in land use patterns.

The research approach taken was a case analysis of a large urbanizing area. Personal interviews were conducted with 195 landowners holding parcels in excess of ten acres. The data collected was used to test a series of

eleven hypotheses which had been developed from a review of literature dealing with recreational and related uses of land. The hypotheses concerned the extent to which recreational and amenity-oriented values influence the purchase and holding of land in the urban fringe and how these objectives affect the use and management of this land and landowner attitudes toward public land use policy.

It was found that these values have a profound effect on landownership in the study area. Approximately 50 percent of the sample parcels were held primarily for amenity-related objectives. Land held for these reasons tends to be in less intensive cover types and is used less for the production of economic goods. It is held in smaller parcels for shorter periods of time and is valued at a much higher level as reflected in official assessed values. In addition, amenity-oriented landowners tended to more often undertake management practices which were designed to improve the attractiveness of the land on an individual scale, but which also resulted in reducing the open or rural character of the land. Finally, in regard to attitudes, this group of landowners was more supportive of environmental protection policies, more strongly in favor of limiting future community population growth, and more inclined to favor entry into development rights programs with the state.

At the conclusion of the study the findings are considered within an organizational framework. Through

this modeling process six individual problem areas are identified and recommendations made for further research effort. Several policy implications are discussed dealing primarily with public service programs.

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CHAPTER I

INTRODUCTION TO THE PROBLEM AND TO THE STUDY

General Introduction

A national history of population and economic growth has resulted in steadily increasing demands for land. This has led to growing conflicts among land uses. Notable examples of such conflicts include the expansion of urban and suburban development onto agricultural lands, the encroachment of transportation corridors into park and open space areas, and the competition for forested lands between recreation and commercial timber production.

To help resolve such conflicts and protect the public welfare, some degree of regulation over the use of land has historically been accepted. The form taken by these regulations has been shaped by the changing needs and wants of society and its willingness to accept regulation to achieve these ends.

Early in our country's history land use controls served only such basic purposes as protection from nuisances and fire and other safety hazards. However, with increasing affluence and sophistication the concept of protection of the public welfare has expanded to include

recreational, aesthetic, and other amenity values. The significance with which these values are now held is reflected in the national trend toward sharply rising participation rates in outdoor recreation and other leisure time activities and the popular movement toward enhancement of the quality of the environment.

This research effort is aimed at investigating the relationship between evolving recreational and leisure-oriented living patterns and land use in the urban fringe area.

The Need for Land Use Policy

With conflicts among land uses has come a greater recognition of land as a scarce resource. Although the relatively large geographic size of this country and its comparatively low population density may suggest that land is abundantly available, it is nevertheless fixed in both total supply and location. This latter qualification and man's tendency to concentrate into nodes of economic and cultural activity have served to aggrevate the problem of land resource scarcity.

In a market-oriented economy such as that of the United States, problems of scarcity are normally handled through the role of pricing. Goods or services which are available only in limited quantities are "rationed" to those users who are willing and able to bid the accompanying higher prices. These higher prices reflect the increased

utility which these resources are capable of providing. In this manner the market mechanism is relied upon as a means of allocating resources in a most efficient manner.

There are, however, cases where this market mechanism breaks down. Indeed, Robert Havemen points out that the use of natural and environmental resources is dominated by such market failures in the form of the commons phenomenon, the public good nature of certain resource flows, the existence of external diseconomies, and imposed public land ownership.[1] It is these market failures in the use of natural resources that "provide the basic rationale for collective action to forstall exploitation of them or to secure economic gains which would otherwise be unrealized."[2]

Moreover, the recent national concern over the quality of the environment has begun to focus increasing attention on the subject of land use. While initially concerned primarily with air and water pollution, the environmental quality movement has begun to recognize the intimate relationship between planning alternative land uses and the resulting quality of the environment.[3]

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[1]Robert H. Haveman, "Efficiency and Equity in Natural Resource and Environmental Policy," American Journal of Agricultural Economics 55 (December 1973): 868-78.

[2]Ibid., p. 868.

[3]Donald M. McAllister, ed., Environment: A New Focus for Land-Use Planning (Washington, D.C.: National

Bosselman and Callies have documented the recent legislative and resource management agency concern in this area.[4]

The Nature of the Land Use Policy Problem

It has been suggested that many of the major problems confronting land use policy lie more in the socio-political sphere than in technical considerations.[5] Viewed in this manner, land use planning may be classified as a "no technical solution problem."[6] Garrett Hardin defines a technical solution as one that "requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality."[7]

While it is evident that the natural and physical sciences can provide meaningful information on the biological

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Science Foundation, 1973), pp. 11-12. Virginia Curtis, ed., Land Use and the Environment: An Anthology of Readings (Washington, D.C.: American Society of Planning Officials and the Environmental Protection Agency, 1974).

[4]Fred Bosselman and David Callies, The Quiet Revolution in Land Use Control (Washington, D.C.: U.S. Government Printing Office, 1973), p. 69.

[5]Gordon L. Bultena and David L. Rogers, "Studies of Public Preferences and Group Interactions to Guide Land Use Planning and Control," Land Use Planning Seminar: Focus on Iowa (Iowa: The Center for Agricultural and Rural Development, Iowa State University, 1973), p. 352.

[6]Garrett Hardin, "The Tragedy of the Commons," Science 162 (December 1968):1243-48.

[7]Ibid., p. 1243.

and ecological effects of various land use alternatives, it is societal values which determine the desirability of each of these alternatives. Likewise, economic analysis can be applied to determine the efficiency and equity considerations involved in each of many land use alternatives--but again it is society which must place weights on the costs and benefits identified in order to determine which is most acceptable.

Davis and Bentley have argued a similar case in calling for the separation of facts and values in the analysis of natural resource policy in general.[8] Factual analysis in terms of technical feasibility and economic costs and benefits places constraints upon alternative courses of action. Choice among remaining alternatives, however, is generally a political rather than analytical process.

Bultena and Rogers, in applying this reasoning specifically to land use planning, have stated that:

> It is evident that land use planning will necessitate scientific research on existing uses and future capabilities of land. Effective planning will also require the development of innovative techniques for handling and analyzing voluminous empirical data. But even more, successful land use planning will require a heightened appreciation of the ways people think about land and their institutionalized procedures for land management.[9]

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[8]Lawrence S. David and William R. Bentley, "The Separation of Facts and Values in Resource Policy Analysis," Journal of Forestry 65 (September 1967):612-20.

[9]Bultena and Rogers, "Studies of Public Preferences and Group Interactions," p. 352.

The Role of Behavioral Research in Land Use Policy

It has been shown that choice among alternative land uses necessarily involves value judgments. While such public policy choices are normally made by public decision-makers in the form of legislative bodies, courts, and agency administrators, such actions ultimately reflect (or should reflect) the attitudes and values of society as a whole.

It is here that behavioral research can be useful in the formulation of land use policy. By helping to clarify the present land use situation, especially as it relates to the ways in which people think about land and the needs and wants of society from land, policy may be aimed more directly at fulfilling such needs and wants. In addition, investigation of public attitudes toward alternative land use control mechanisms can aid in the formulation of policies which are more generally acceptable in reaching these objectives.

The importance of the role of the public in resource management appears to be gaining in acceptance. Many federal and state resource agencies have been heavily criticized for their failure to provide for adequate public involvement. In response to such criticisms, many agencies have instituted or increased public hearings on major policy decisions, appointed or expanded citizen advisory panels or engaged in public opinion polling and other citizen participation techniques.

In the judicial arena, the courts continue to provide changing interpretations of Constitutional provisions which have a substantial bearing on resource policy decisions. A recent study in Wisconsin has found strong support for the contention that courts are aware and ultimately concerned with "prevailing morality or strong and preponderant opinion" by the state's citizens.[10] In a similar manner Bosselman et al. have traced a "quiet revolution in judicial attitudes" in response to recent public concern with environmental quality.[11]

The role of the public is especially important in the area of land use planning policy. Such policy, in order to protect the public interest, necessarily involves restrictions on individual autonomy. Individuals may find that their property can no longer be developed and used in a manner which might result in harm to the greater public good. Such restrictions threaten traditional views of property ownership rights.

It is through examination of the above issues that behavioral research can aid in the formulation and justification of needed land use policy.

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[10]Peter W. Amato, Land Use Social Values and Environmental Policy (Madison, Wis.: Wisconsin State Planning Office, Department of Administration, June 1973), p. 191.

[11]Fred Bosselman, David Callies, and John Banta, The Taking Issue (Washington, D.C.: U.S. Government Printing Office, 1973), p. 212.

The Setting of the Study

The structure of land use in Michigan has changed dramatically since the state was first settled in the early nineteenth century.[12] A predominately forested landscape at that time (approximately 95%), most of the forest cover was removed by the early part of the twentieth century, first for farming in the southern part of the state and then for timber in the central and northern areas. Since the end of the timber boom around 1910 much of the state has shifted back into woodland as a result of natural and artificial regeneration.

In the past few decades, this change in land use has been characterized in large part by a major shift of rural land out of agricultural use, as shown in Figure 1. Both the amount of land in farms and the number of acres of cropland harvested reached their modern day peak around 1945 and have sharply declined since that time.[13] The amount of land in farms has been projected to decline even further to around 7.8 million acres in 1985 with a similar decrease in cropland harvested to between 3.6 and 4.25

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[12]William J. Kimball and Gordon Bachman, "Focus on Land Use in Michigan," Land Use in Michigan, Extension Bulletin 610, Cooperative Extension Service, Michigan State University, January 1969, pp. 9-18.

[13]U.S. Bureau of the Census, Census of Agriculture, 1910-1969 (Washington, D.C.: U.S. Government Printing Office).

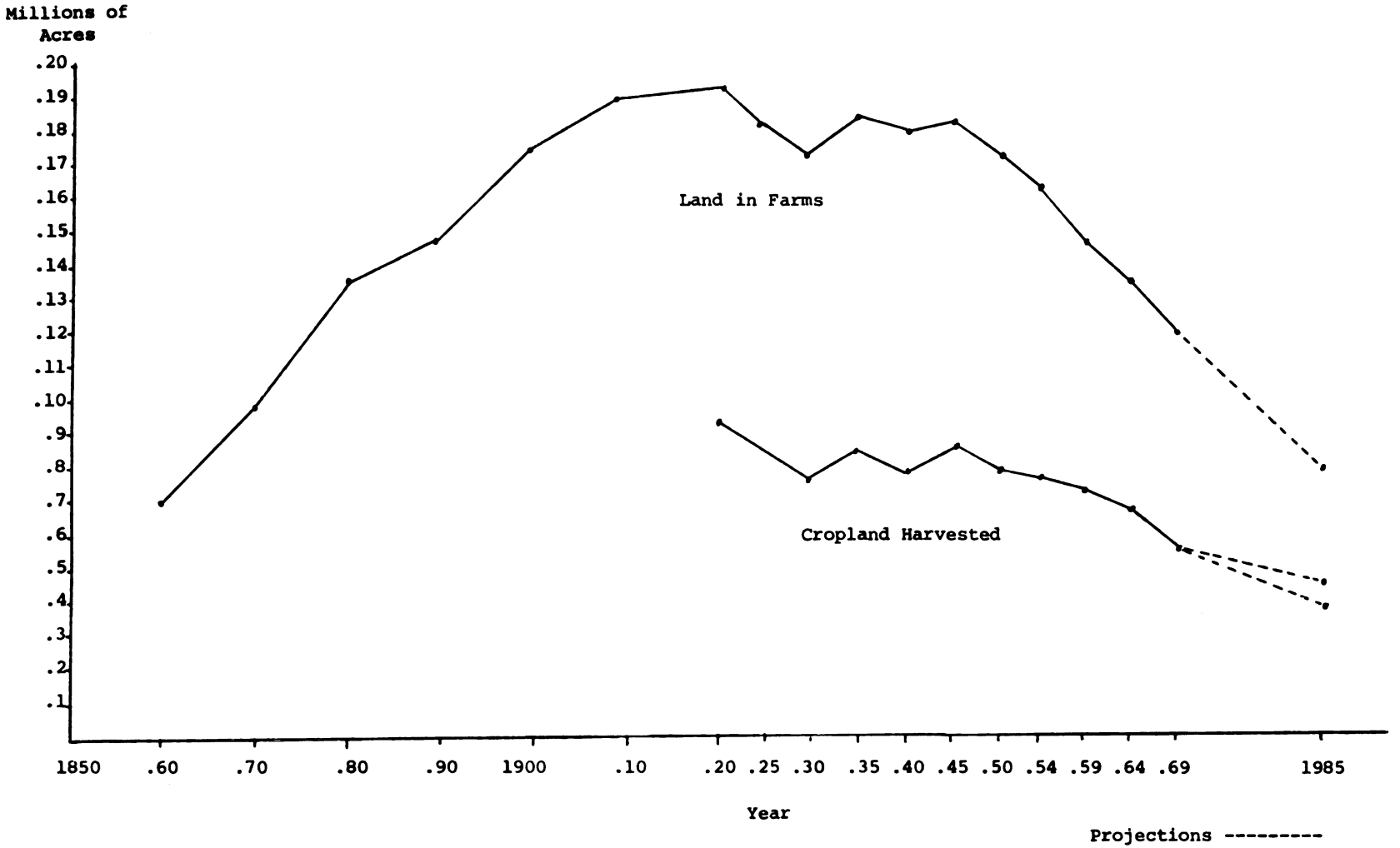

Figure 1. Agricultural Land in Michigan 1850-1985.

Source: Consensus of Agriculture 1910-1969 and Economic Prospects of Michigan Farmers.

million acres.[14] While the recent rise in food prices casts considerable doubt on the reliability of such projections, the overall decline of the agricultural resource base is nonetheless evident.

In addition, much of the rural land once devoted to other uses such as growing of commercial timber is no longer used for the production of such commodities. The U.S. Forest Service reports that, nationwide, extensive areas of both public and private forest lands have been shifted to nontimber uses.[15] Between 1962 and 1970, areas classified as commercial timberland declined by about 8.5 million acres.[16]

However, only a relatively small portion of this rural land which has shifted out of commodity production has shifted into urban uses. Little is known concerning the present use of much of this land, and vast amounts of it give the appearance of being essentially "idle" or unused. While, undoubtedly, some of this land is simply in transition between uses, there is evidence to suggest that much of this "idle" land is being used and managed to satisfy recreational and other amenity objectives.

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[14] K. T. Wright, Economic Prospects of Michigan Farmers, Research Report No. 181 (East Lansing: Michigan State University Agricultural Experiment Station and Cooperative Extension Service, December 1972), pp. 3-4.

[15] The Outlook for Timber in the United States, Forest Resource Report No. 20, Forest Service, U.S. Department of Agriculture (October 1973), p. 3.

[16] Ibid.

Such a change in ownership objectives is likely to have an effect on the way in which this land is used and managed and landowner attitudes toward both the land itself and the desirability of alternative land control mechanisms. As has been noted, the public in general is becoming increasingly important in the determination of land use policy and the owners of private land make up a highly relevant portion of the affected public. Investigation into the nature and extent to which land use changes are occurring as a function of increasing recreational and leisure-oriented living patterns should help guide the formulation of effective land use policy.

To be of greatest use, the study will focus on an urban fringe area, for it is here that the greatest changes in land use are occurring.

Objectives of the Study

The primary objective of this research study is to investigate the way in which land use, including related public attitudes, is affected by evolving recreational and leisure-oriented living patterns. More specifically, the objectives of the study are threefold:

1. Determine the extent to which recreational and amenity values influence the purchase and/or holding of land in the urban fringe.
2. Determine how recreational and amenity values affect the use and management of these urban fringe lands.

3. Determine how recreational and amenity values affect landowner attitudes toward public land use policy.

The way in which these objectives interrelate and form the basic model of the research study is shown in Figure 2.

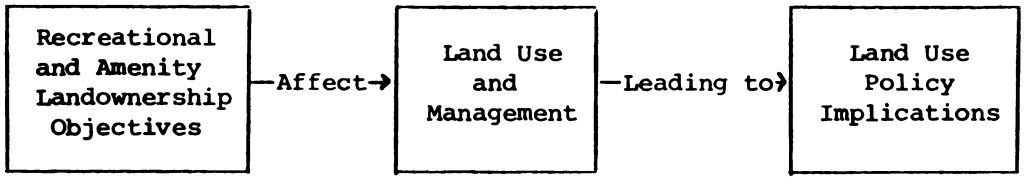

Figure 2.--Basic Research Model.

CHAPTER II

REVIEW OF THE PERTINENT LITERATURE

In this section pertinent literature is reviewed in several subject areas. The first part provides an overview of recreation and amenity as a land use. Use of public land is briefly considered, but the primary emphasis is placed on private and public use of private land. This is followed by a short discussion of the role of amenity factors in location decisions.

Next, several studies are reviewed which deal with selected characteristics and attitudes of three classes of landowners. A recent study in New York State is discussed separately due to its direct relevance to this research study.

Finally, there is a conceptual discussion of attitudes and their relationship to behavior.

Recreation and Amenity as a Land Use

In the usual manner of thinking, the land used for recreation and leisure purposes is simply the amount of public land which has been designated as available for

recreation. The Outdoor Recreation Resources Review Commission has reported this figure to be about 234 million acres for the forty-eight contiguous states, representing about 12.1 percent of the land area.[17]

However, this represents only a partial analysis in two important respects. First, there are many areas of public land which have multiple uses, including recreation. The priority of uses which has been assigned determines whether or not these areas are classified as recreation lands. There can be little doubt that many areas designated as forest, farm, or grazing land additionally provide substantial recreational and amenity benefits.

In the second respect, this analysis does not take into account the amount of private land used for recreation. This omission is due mainly to the lack of data in this area. Clawson et al., in their analysis of land use in the United States, have placed most of their emphasis upon the public sector because ". . . while a great deal of private land is used for recreation, little or no data exist as to its extent, location, and forms of use."[18] They go on to state:

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[17] Outdoor Recreation for America, Outdoor Recreation Resources Review Commission (Washington, D.C.: U.S. Government Printing Office, January, 1962), p. 223.

[18] Marion Clawson, Burnell R. Held, and Charles H. Stoddard, Land for the Future (Baltimore: The Johns Hopkins Press, 1960), p. 125.

> There is a basic difficulty in that most privately owned land used for recreation has another primary use. Men may own forest tracts for recreational purposes, yet their land will ordinarily be classified as forest. The same is true of many farms.[19]

Also writing on land for recreation, Barlowe has stated that "Only scattered data are available to indicate the areas of privately owned land which are used for recreation."[20] After a discussion of the nature of some of these uses, he concludes that "From a practical standpoint, we must recognize that we have more recreational land in private ownership than in public ownership in the United States."[21]

The idea of suburban or rural land ownership for its recreational or amenity values is certainly not new even in this country. As early as 1921 William Smythe used terms such as "the invisible city of homes" and "the garden city" to describe this phenomenon.[22] Urbanization, along with increasing affluence, mobility, and leisure time have resulted in the remarkable popularity of this practice. G. P. Wibberly has described this as the most interesting phenomenon of U.S. development:

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[19] Ibid.

[20] Raleigh Barlowe, "Land for Recreation," in Land Use Policy and Problems in the United States, ed. Howard W. Ottoson (Lincoln: University of Nebraska Press, 1973), p. 271.

[21] Ibid.

[22] William E. Smythe, City Homes on Country Lanes (New York: The MacMillan Company, 1921).

> Because of high prices for plots in or close to a city, a would-be buyer or builder of a private house considers living in a "rural residence," as it is called, within 50 miles of the city. The distance is much less of a handicap to an American than to a British worker because of higher salaries or wages, the fast large car and the good motor roads which allow unchecked fast speeds into the heart of most American cities. Because of high incomes on the better farm land and in city jobs, there is a migration of farmers from the poorer and smaller farms. These are then available at reasonable prices to city workers prepared to spend an hour or more a day travelling to and from town. A white framed house with a large barn and, perhaps a "quarter section" (160 acres) of land is bought by such a man. He lives in the house, often making considerable improvements to it. The barn will house his one or two cars and a pony or so for the children. The land will probably be allowed to go back to natural scrub and woodland with the exception, possibly, of one or two of the best fields where some part-time farming enterprise, involving very little labour, is carried on. And at the weekend the city dweller will enjoy his plot of wild countryside and the game which has come back in with the reversal of the land to its natural vegetation.[23]

Population census data bear out this analysis. Since the decade of the 1920s population of metropolitan ring areas has grown faster than that of central cities.[24] Between 1960 and 1970 population rose 26.8 percent in ring areas compared with 6.4 percent for central cities. During the same time period population in nonmetropolitan areas grew by nearly 7.0 percent.

Recreational and amenity uses of private land are not limited to the owners of such land. Many privately owned rural properties support public hunting and other low

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[23]G. P. Wibberley, Agriculture and Urban Growth (London: Michael Joseph Ltd., 1959), p. 220.

[24]James Heilbrun, Urban Economics and Public Policy (New York: St. Martins Press, 1974), pp. 30-31.

intensity recreational activities. Even when the public is not granted access to privately owned lands, substantial public recreational benefits may still be involved. That the public delights in simply viewing an attractive countryside is most evident in the fact that driving for pleasure is one of our nation's most popular recreational activities.[25] In recent years there has been a great deal of public support to preserve certain private lands in permanent open space.

There has been very little literature developed in this country on the extent to which private lands are used by the public in this manner. The British, however, have provided what may be some interesting insights into this matter. Because of their island habitat, the British have long been aware of the finite nature of the land resource and so have been forced to deal more explicitly with its use.

Burton and Wibberley in their study of outdoor recreation in the British countryside have determined that approximately three million acres of rural land in England and Wales, or about 8 percent of the land area, are in effective recreational use.[26] This figure represents almost

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[25]Bureau of Outdoor Recreation, The 1965 Survey of Outdoor Recreation Activities (Washington, D.C.: U.S. Government Printing Office, 1965), p. 3.

[26]T. L. Burton and G. P. Wibberley, Outdoor Recreation in the British Countryside, Studies in Rural Land Use (report No. 5, Wye College, England, 1965).

exclusively public land. The authors go on to say, however, that this is only a part of the total supply of recreation areas. Large portions of the countryside act as "visual" recreation areas and "In this sense, a very large part of the whole rural area of the country may be considered as being given over to recreational uses."[27]

Patmore analyses the demand for outdoor recreation in England and Wales and the land and water resources available to meet that demand.[28] A recurring conclusion is the apparent relative unimportance of recreation in terms of the actual exclusive use of land. However, large areas of rural landscape, devoted primarily to agriculture and woodland, are needed as a backdrop for recreation. This stems from the fact that the demand for recreation is primarily linear (along roads and footpaths) with interspersed nodes of intensive activity. Based on his findings, the author goes on to say that "The protection of that visual form [of the countryside] is as much a part of the effective use of rural areas for outdoor recreation as the creation of laybys and picnic areas . . ."[29]

The degree to which the British rely on private lands for public recreation and amenity uses is evident in

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[27]Ibid., pp. 17-18.

[28]J. Allan Patmore, Land and Leisure (Newton Abbot, England: David and Charles, 1970).

[29]Ibid., p. 141.

Johnson's analysis of the English national park system.[30] These parks differ radically from the traditional American concept in that they are almost entirely composed of private land. Little physical access is granted to the public and the parks serve primarily as areas of high visual amenity. Local economic activity such as farming and forestry are permitted to continue.

The Significance of Amenities for Location Decisions

Because this research study is concerned mainly with residential location as opposed to the location of industrial or commercial activities, the following discussion is devoted primarily to the factors involved in residential location decisions. Broadly speaking, these factors can be divided into economic considerations, consisting primarily of the cost of the residence and transportation costs (in terms of both time and money), and noneconomic considerations which can be thought of chiefly in terms of amenities such as increased space and quality of the environment.

> Location decisions affecting residential developments can be influenced by economic considerations in much the same way as those involving commercial and industrial establishments. Yet while the problem of household location is similar in many ways to that of commercial and industrial locations, it is also different. Consumer satisfactions and personal

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[30] Warren A. Johnson, Public Parks on Private Land in England and Wales (Baltimore: The Johns Hopkins Press, 1971).

> preferences play a bigger role and economic considerations a lesser role with residential location decisions.[31]

Residential location decisions can be viewed within a framework whereby families seek out the greatest amount of amenity factors within the economic constraints placed upon them. Greater amounts of space, privacy, recreational opportunities, and overall quality of the living environment are available only at increasing monetary and temporal costs. However, with our national tradition of ever-increasing prosperity, leisure time, and personal mobility, the economic constraints on location decisions continue to be relaxed ever further. For many families the result has been that increased significance may be placed upon amenity values.

In describing his theory of the growth of the urban field, John Friedman reaches a similar conclusion and states that "Economic differences are declining as a factor in the location decisions of families."[32] This conclusion is based partly on the works of Stanback and Knight,[33] and

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[31]Raleigh Barlowe, Land Resource Economics: The Economics of Real Property (Englewood Cliffs: Prentice-Hall, Inc., 1972), p. 302.

[32]John Friedman, "The Future of the Urban Habitat," Environment: A New Focus for Land-Use Planning, ed. Donald M. McAllister (Washington, D.C.: National Science Foundation, 1973), p. 82.

[33]Thomas M. Stanback and Richard V. Knight, The Metropolitan Economy (New York: Columbia University Press, 1970).

Schwind.[34] The former authors have determined that there are fundamental changes occurring in the importance of factors affecting the location of jobs, this being due primarily to shifts in our economy away from the goods sector and to the service sector (data is provided showing that employment has grown more rapidly in recent years in the service sector and now outnumbers the goods sector). Whereas in the goods sector producing activities have typically located in close proximity to the industry's resource requirements (primarily natural resources and transportation), the service sector is more oriented toward markets and labor supplies and has resulted in an increase in the number of "footloose" firms. Such firms have typically strong amenity orientations.

In his study of migration and regional growth, Schwind states that "Migration decisions are generally influenced by consideration of environmental amenities."[35] He goes on to say that:

> As the retired population grows, as higher education is extended to wider groups of the population, and as income from wages and salaries increase generally, we should expect consumption preferences to be increasingly influential in migration decisions.[36]

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[34]Paul J. Schwind, Migration and Regional Development in the United States 1950-1960 (Chicago: The University of Chicago, 1971).

[35]Ibid., p. 23.

[36]Ibid., p. 24.

Landowner Characteristics and Attitudes

Woodland Owners

Perhaps the most intensively studied group of private landowners are those whose property supports the growth of trees in the form of woodlots or forests. This is due to our nationwide forest land ownership pattern whereby 59 percent of our forest resources are in small private holdings.[37] The so-called "small ownership problem" has long been recognized in the field of forestry and arises from the typical low timber productivity of forest land held in small private ownerships.

The importance with which this problem is viewed is evidenced by the number of public programs of educational, advisory and financial assistance to private forest land owners for the purpose of stimulating timber management and production. Examples include the Extension Forestry Program of the U.S. Agricultural Extension Service, the Cooperative Forest Management Program (federally funded and state administered), assistance programs by the Soil Conservation Service, and incentive payments for forestry practices by the Agricultural Conservation Program.[38] In

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[37] The Outlook for Timber, p. 2.

[38] Dean N. Quinney, "Small Private Forest Landownership in the United States--Individual and Social Perception," Natural Resources Journal 3 (January 1974):380-81.

addition, there have been numerous state and private assistance and incentive programs.

It is only recently, however, that research in this area has focused on woodland owners themselves rather than resource inventorying. Quinney, based on recent research including some of his own, calls attention to "the differences which can exist between society's opinion (as represented by some public forestry programs) of the small private forest land ownership resource and that as perceived by the owners themselves."[39] He concludes that the historical view of woodland owners in terms of economics of the firm (dominance of the profit motive) is misleading and that many other objectives of ownership often take precedence.

Beazley and Holland, in perhaps the most comprehensive of all studies on private woodland owners, suggest a similar notion that "It is necessary to recognize that owners may entertain various value notions associated with their woodlands simultaneously."[40] The authors measured 228 variables for each of 244 owners of three acres or more of woodland in two Illinois counties. Factor analysis reduced these variables to a total of forty-six first order

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[39]Ibid., p. 385.

[40]Ronald I. Beazley and I. Irving Holland, Predicting the Success of Alternative Government Incentive Programs: A Case Analysis of Small Woodland Owner Behavior (Southern Illinois University at Carbondale, 1973), p. 7.

and sixteen second order factors. Utilizing regression analysis, these factors accounted for the variance of expressed preference for alternative government forestry incentive programs to the order of approximately 50 percent. However, factors were so complex, typically being composed of approximately twenty individual and highly diverse variables, that they offered little intuitive or operational meaning.

The studies reviewed below provide additional indication of the extent to which nonmonetary objectives influence the use and management of private woodlands. These lands, in each case, often appear to have been purchased and held with little regard for their forest products' income potential. The objectives of ownership in many cases are primarily amenity-oriented.

Sutherland and Tubbs[41] interviewed 180 woodland owners in central Wisconsin to determine their characteristics and attitudes toward their forest land and why they did or did not respond to specific forestry programs. It was found that 52 percent of the owners were farmers and that 43 percent were wage earners, businessmen or professionals, or retired persons. Fifty-eight percent of farmers used their forest land for timber growing.

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[41]Charles F. Sutherland, Jr., and Carl H. Tubbs, Influence of Ownership on Forestry in Small Woodlands, Lake States Forest Experiment Station Paper No. 77 (Forest Service, U.S. Department of Agriculture, November, 1959).

However, less than half of all other occupational groups did so. The authors concluded that these latter groups ". . . are more likely to be interested in values of the forest connected with recreation and residence . . ."[42] Seventy-two percent of all owners undertook no forestry practices. By far the most popular practice that was undertaken was planting. The percentage of owners by occupational group indicating no interest in forestry was as follows:[43]

Occupation	% Owners Not Interested in Forestry
Farmer	22
Part-time farmer	38
Wage earner	48
Business and Professional	50
Retired and other	52

Quinney[44] conducted a similar study of 178 owners of nonplatted rural lands between five and five thousand acres in Michigan's Upper Peninsula. Thirty-two percent of the Upper Peninsula's nine million acres of forest land is

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[42]Ibid., p. 6.

[43]Ibid., p. 18.

[44]Dean H. Quinney, Small Private Forest Landowners in Michigan's Upper Peninsula, Lake States Forest Experiment Station Paper No. 95 (Forest Service, U.S. Department of Agriculture, February, 1962).

held in nearly 30,000 small private ownerships. Owner occupational groupings were found as follows:[45]

Occupation	% of Owners
Wage earner, business or professional, or retirned	38
Absentee (no occupation given)	25
Farmer	17
Housewife-widow	10
Other	10

Objectives of ownership were for recreational purposes (27%), residence (19%), farm use (19%), investment (14%), inactive (14%), timber values and use (6%), and mineral exploitation (1%). There was a very low response to or even knowledge of available forestry aids or assistance. In summarizing the author states:

> . . . it appears that if forest practices and productivity on the lands of the Upper Peninsula small private owners are to be improved, public forestry programs should better coordinate and consolidate efforts and, through recognizing the changing nature of the owner and his environment, establish channels and service institutions which are most effective in reaching and influencing him.[46]

Schallau[47] studied 207 woodland ownerships in the urbanizing area of Southern Michigan. Full-time farmers

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[45]Ibid., p. 8.

[46]Ibid., p. 19.

[47]Con H. Schallau, Small Forest Ownership in the Urban Fringe Area of Michigan, Lake States Forest Experiment Station Paper No. 103 (Forest Service, U.S. Department of Agriculture, August, 1962).

accounted for 25 percent of ownerships, followed closely by wage earners (19%), businessmen and professionals (16%), retired persons (16%), and part-time farmers (14%). Objectives of ownership were found to be as follows:[48]

Objective	%
forest products	52
inactive (no reason given)	19
pasture	11
clear for agriculture	5
recreation	4
investment-speculation	3
residence	2
other	4

The most frequent woodland improvement activity was tree planting (20% of owners had undertaken this practice). However, only 13 percent of all planting had been done for the purposes of timber production. Most of it was done for the creation of aesthetic values.

In investigating the effect of urbanization on woodland ownership, it was found that owners not in urban fringe areas were more likely to have objectives of timber production than those in fringe areas.[49] In general,

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[48]Ibid., p. 7.

[49]Fringe area was defined on the basis of population density and included zones of one hundred or more persons per square mile.

owners expressed very little interest in forestry programs including taxation policies such as forest yield taxes and capital gains provisions for the sale of timber products.

A recent study in Massachusetts[50] examined 1927 owners of three or more acres of woodland in Berkshire County. In general, owners were found to be mature, highly educated, high income persons. Only 35 percent were born on a farm or other rural place. Forty-one percent were businessmen and professionals, 14 percent retired, 10 percent housewives, 9 percent farmers, and 9 percent laborers. Woodland use was found to occur as follows:[51]

Use	%
personal recreation	54
satisfaction of owning land	41
residence	40
timber production	34
wildlife development	28
nature study and conservation	25
production of other forest products	19
speculation	15
other	8

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[50]Richard G. Babeu, Arnold D. Rhodes, and William P. MacConnell, Forest Owner Characteristics and Attitudes in Berkshire County, Massachusetts (Massachusetts Agricultural Experiment Station and Cooperative Extension Service Bulletin No. 549, November, 1965).

[51]Ibid., p. 12.

Again there was found to be very limited use of public or private forestry assistance programs. There was not a great deal of concern with tax policies and less than one-quarter felt that taxes were too high. Forty-two percent of all owners felt that as much forest land as possible should remain permanently uncut. This "preservationist" attitude was more prevelant among better educated, higher income, business or professional owners and among the smaller holdings. These people had also undertaken more forest improvement activities (primarily planting) and had engaged in less timber sales. By far the most common reason for no timber sales was fear of destroying the forest, its beauty and its usefulness. Regarding posting activity, the older, better educated and more affluent owners were more likely to post their land.

The authors conclude that "Their [the woodland owners] concern appears to be that the forest should be protected and conservatively managed so as to preserve its amenity value as an element of the landscape but not necessarily to preserve every tree in the forest."[52]

Larsen and Gansner[53] investiaged a sample of 394 non-industrial woodland owners in three regions of

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[52]Ibid., p. 39.

[53]David N. Larsen and David A. Gansner, Pennsylvania's Private Woodland Owners--A Study of the Characteristics, Attitudes, and Actions of an Important Group of Decision-Makers, U.S.D.A. Forest Service Research Paper NE-219 (Upper Darby, Penn.: Northeast Forest Experiment Station, 1972).

Pennsylvania. Ownerships were divided by acreage class--224 small holdings (1-99 acres), 124 medium holdings (100-499 acres), and 46 large holdings (500 or more acres). White collar workers and retired persons accounted for approximately half of all small and medium holdings and nearly 90 percent of large holdings. Only about 15 percent of all holdings are encumbered by mortgages, leases, or other legal or financial commitments.

Regarding present land use, owners of smaller holdings cited residence, satisfaction of ownership, and personal recreation most often. Larger holdings tended more toward income producing uses such as production of forest products or speculative value.

In general, owners of larger holdings are more inclined to the production and sale of timber products. A large majority of all owners stated that they plan to keep all of their woodland.

Finally, brief reference is made to two additional studies in New York. Conklin[54] determined that although there are more trees now than ever before, this forest is cut by many invisible lines of private ownership and that the average size is too small for timber management. He maintains that owners are interested primarily in recreational values. He states that these areas may be viewed

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[54]H. E. Conklin, "The New Forests of New York," Land Economics (May 1966).

as forests from the air, but are but "woods" from the ground and terms them "suburban forests." Hamilton[55] has documented the reluctance of suburban forest land owners to open their lands to commercial logging.

Landowners in the Rural-Urban Fringe

The studies reviewed below investigate factors related to the sale of land located in the rural-urban fringe.

Smith[56] attempted to explain landowner behavior in terms of selling or not selling their land. He interviewed both persons who had sold their land and those who had not in the fringe area of Greensboro, North Carolina. The study findings provided substantial support for the hypothesis: "Landowner behavior is a function of the motivation for holding the land; landowners with only the investment motive are more likely to sell than landowners with some supplemental motive, because less satisfaction is derived from ownership of the land."[57] The hypothesis was not supported on the basis of original purpose of acquistion but was on the purpose for holding during the base time

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[55]Lawrence Hamilton, "National Resource Readings," Journal of Soil and Water Conservation (July-August 1973).

[56]John Edward Smith, "Toward a Theory of Landowner Behavior on the Urban Periphery" (Master's thesis, The University of North Carolina at Chapel Hill, Center for Urban and Regional Studies, 1967).

[57]Ibid., p. 85.

period. The most important nonpecuniary motive for holding the land was the opportunity to live on it and farm either as a way of life or as a hobby or recreation.

In summary, eight variables of significance or possible significance were isolated which explain the selling behavior of landowners in the rural-urban fringe. Three of these variables were direct monetary measures (net worth, net annual holding cost, and liquidity) and five were related to nonpecuniary motivations (major purpose for holding the land, occupational interest in real estate, residency status, education, and ownership status).

Smith also reviewed a study by Lessinger[58] which focused on the selling behavior of agricultural landowners in Santa Clara County, California. The author tested several theoretical models ranging from purely economic motivations to a combination of economic and intangible motivations. The analysis supported the "hold-out" model which suggests that "some non-agricultural motive constrains farmers to hold out their land as long as they can get a minimum agricultural income."[59]

Strong conducted a similar study in the Philadelphia metropolitan area in order to "learn more about the factors

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[58]Jack Lessinger, "The Determinants of Land Use in Rural-Urban Transition Areas: A Case Study of Santa Clara County, California" (Ph.D. dissertation, University of California, 1957) cited by Smith in Toward a Theory.

[59]Ibid., p. 221.

which motivate property owners to sell or to retain their land."[60] Two samples of fifty persons each were interviewed, one constituting persons who had sold their urban fringe land in the previous year and the other composed of persons who had retained their land to the present time. Minimum parcel size was five acres.

The author found that the reason for retaining the land affected the owner's attitudes toward development controls. Of those retaining their land because of its beauty or personal ties, 81 percent favored low density restrictions and 62 percent favored a policy of no further growth. Of those retaining the land due to rising land values or income derived from the land, only 38 percent favored low density and 13 percent favored no further growth. Of the entire group of landowners who were unwilling to sell their land, 65 percent favored restrictive regulations and 45 percent favored controls to prevent further growth. It was also found that current land use was closely related to the owner's reasons for retention.

In summary, the study isolates two distinct groups of landowners who were unwilling to sell. The first group, comprising 67 percent of the sample, holds land because of its beauty or personal ties. Most of these persons reside on the land and this is the major land use, although some

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[60]Ann Louise Strong, "Factors Affecting Land Tenure on the Urban Fringe," Land-Use Controls Quarterly 3 (Winter 1969):1.

may also farm. These people plan to continue their present land use indefinitely and they heavily favor development restrictions. The second group makes up the remaining 33 percent of the sample and these people retain their land because of the income it provides them or because of rising land values. They may reside on the land or leave it vacant and they strongly oppose development regulations.

Farmland Owners

The last broad classification of landowners concerned with here are those whose land is classified as agricultural. A great deal of data exists about this land in the form of the censuses of agriculture which have been conducted periodically for over one hundred years. Based on the 1964 census, Higbee[61] decries the fact that planners have typically considered all farmers as basically similar. He considers this view to be much too simplistic and recognizes a very large group of these agricultural landowners as "pseudo-farmers." This is based on the fact that although the 1964 Census identified a total of 3.7 million farms, operators on 2.2 million of these farms averaged five times more income from work away from their farms than they earned on them. Moreover, 44 percent of all farmers produced only 5 percent of the nation's agricultural commodities. The author concludes that many of these farms

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[61]Edward Higbee, "Agricultural Land on the Urban Fringe," Metropolis on the Move (New York: John Wiley and Sons, Inc., 1967).

are held chiefly for their residential or speculative values and that their owners, therefore, are relatively indifferent to agricultural policies and programs. If they are to be influenced in the use and management of their land, they must be appealed to on the basis of their other interests.

Gasson[62] provides some interesting insights into the influence of urbanization on the ownership and use of farmland. Her study was set in Southeastern England where she carried out a survey of approximately 600 farms in six regions at increasing distances from the city of London. Landowners were divided into full- and part-time farmers and the latter were found to be increasing where the influence of the urban area was strongest. A definite trend was noted away from tenant farming to owner-occupiers, this being particularly true for part-time farmers. Both owner-occupied and part-time farms tended to be considerably smaller than tenant and full-time farms. Sixty-nine percent of part-time farmers were engaged in administrative, professional or managerial occupations.

Portions of the study data were then compared to similar data collected in the National Farm Survey of 1941. Regarding the occupation of part-time farmers, it was found that in 1941 over one-half of the part-time farmers used

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[62]Ruth Gasson, The Influence of Urbanization on Farm Ownership and Practice (Wye College, England: Studies in Rural Land Use, Report No. 7, 1966).

their farms either to complement or as a continuation of their other occupational activity (their other occupation was somehow farm related), whereas now more than two-thirds of them obtained part of their incomes from occupations in no way related to farming. "This suggests that while part-time farming in the past was often an economic necessity, today it is increasingly becoming a recreation."[63] The author goes on to state that the implications of this finding are that many, and an increasing number, of part-time farmers are "treating the farm merely as a home and place of recreation, if not leisure."[64]

There is an additional analysis concerned with the differences in farm practice between full- and part-time farmers. Part-time farmers seem to favor enterprises which demand the least managerial attention and tend to strive for technical efficiency, whereas full-time farmers are more concerned with economic efficiency.

Rural Landowners in New York State

The last study reviewed in this section examined rural lands and owners in three central New York counties.[65] The counties were located at increasing distances from the

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[63]Ibid., p. 24.

[64]Ibid., p. 74.

[65]Bruce T. Wilkins and Eugene C. Erickson, Rural Non-Farmed Lands and Their Owners: A Study of Three Central New York Counties (Ithaca, N.Y.: Office of Regional Resources and Development, Cornell University, June, 1971).

major Northeastern population centers, but all three were predominately rural in nature. The emphasis of the study was placed upon owners of non-cropland.

It was found that most owners (57%) had purchased their property for reasons of an economic nature. However, when farmers were excluded from the sample, approximately one-half of the land was acquired for non-economic reasons (most frequently for isolation and the attributes of a rural environment).

The study data were typically analyzed by residency-occupational groupings rather than ownership objectives. These groupings were as follows:

farm--Occupation given as farmer and the landowner is a resident in the county in which the surveyed parcel of land is located

non-farm--All other landowners

On-Site--The owner lives on, or contiguous to, the sampled parcel.

Neighborhood--The owner lives in the county in which the sampled parcel is located, but not on the land contiguous to that parcel.

City/Absentee--The individual owner lived in either a major urban center or the county in which the parcel is located, or in another county.

Institution--A firm, group, or governmental unit owns the parcel.[66]

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[66]Ibid., p. 23.

The primary variables explored in the study included personal and family characteristics of the owner, orientation to the natural environment, and community activity and identity. Significant differences were often found to exist within each of these variables between residency-occupational groupings and degree of rural-urban place.

Attitudes and Behavior

Because a portion of this research study is concerned with public attitudes toward land use policy, it is desirable that some consideration be given to the concept of attitude. The following discussion is devoted to defining the term "attitude" and then determining its relationship to behavior.

The Nature of Attitudes

"The concept of attitude is probably the most distinctive and indispensable concept in contemporary American social psychology."[67] Because of this importance, the concept has received a great deal of attention both from a theoretical standpoint and techniques of measurement.

The term "attitude" has been variously defined by a number of authors. Gordon Allport has examined a representative selection of sixteen definitions or characterizations of the term and has found a common thread running

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[67]Gordon W. Allport, "Attitudes," in Readings in Attitude Theory and Measurement, ed. Martin Fishbein (New York: John Wiley and Sons, Inc., 1967), p. 3.

through each regarding the concept of "preparation or readiness for response."[68] Based upon this study Allport has constructed the following general definition:

> An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related.[69]

The concept of attitude is usually considered as a hypothetical construct which is not directly observed, but is inferred, either from external behavior or, more commonly, from verbal expressions.[70]

Some authors have attempted to distinguish between the concept of attitude and other closely related terms. Cooper and McGaugh describe several of these terms, including "belief," "bias," "doctrine," "faith," "ideology," "judgment," "opinion," and "value."[71] Each of these terms comprise a type of attitude, the distinction generally being made on the basis of the relative strength with which the attitude is held.

While there is some confusion and disagreement about the precise definitional aspects of attitude, several

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[68]Ibid., pp. 7-8.

[69]Ibid., p. 8.

[70]R. N. Sawyer and T. E. Harbaugh, "A Methodology for the Construction of Attitude Measuring Instruments," Water Resources Bulletin 6 (May-June 1970), pp. 401-02.

[71]Joseph B. Cooper and James L. McGaugh, "Attitudes and Related Concepts," in Attitudes, ed. Marie Jahoda and Neil Warren (Baltimore: Penguin Books, Inc., 1966), pp. 26-31.

well-established empirical measurement techniques have been developed. These advancements have allowed for the concept of attitude to be put to practical use in the solution of real world problems. By measuring the direction and strength of attitudes, predictions may be made about behavior in alternative situations.

The three basic types of attitude measurement are discussed here.[72] The census measures the extent to which a certain attitude (technically an opinion) exists in a given population. In its most common form, answers to a questionnaire are tabulated to find the range and distribution of public opinion. The intensity with which opinions are held does not enter into the analysis.

The a priori scale attempts to measure such intensity by arrangement of alternative statements of predetermined strength along a single continuum. This method provides for rank ordering of attitude intensity, but intervals between scale values are not necessarily equidistant. Scale scoring is arbitrary. The familiar Likert-type scale falls within this class.

The psychophysical or rational scale is similar to the a priori scale except that interval distances along the continuum are considered as standardized in accordance with discriminable differences among attitudinal alternatives. It is interesting to note that it has been shown that

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[72]Allport, "Attitudes."

agreement between the a priori and rational scales is approximately .90. Thus, the more simple a priori scale may produce results which are nearly as reliable as the psychophysical scale. The most commonly found psychophysical device is the Semantic Differential.

The Relationship Between Attitudes and Behavior

It has been shown that attitudes are essentially predispositions or "anticipatory sets" of responses to social stimuli.[73] As such, they should be predictive of individual behavior in given situations.

However, it has also been noted that attitudes are most often measured through verbal responses to symbolic situations.[74] There can be no assurance, therefore, of perfect correlation between attitudes so derived and overt behavior. It is only with appropriate caution that the study of attitudes should be employed for predictive purposes.

This is not to say, however, that the study of attitudes is not useful in the solution of practical problems. Its use requires the conventional assumption that by investigating attitudes and opinions, potentials for action and behavior are revealed. This assumption is

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[73]Richard T. LaPiere, "Attitudes Versus Actions," in Readings in Attitude Theory, ed. Fishbein, p. 26.

[74]Ibid.

justified when it is explicitly treated in well-conceptualized studies. The assumption also receives considerable support from the dissonance theory of Festinger and others which puts forth the notion that "thoughts, beliefs, attitudes, and behavior tend to organize themselves in meaningful and sensible ways."[75]

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[75]Robert B. Zajone, "Balance, Congruity and Dissonance," in Attitudes, ed. Jahoda and Warren, p. 261.

CHAPTER III

HYPOTHESES, VARIABLES, AND RESEARCH MODEL

Hypotheses and Measurement of Variables

The major hypothesis underlying the basic thrust of this study is that recreational and other amenity-oriented values motivate much of present behavior in the acquisition and holding of land in the urban fringe. These values in turn affect the way in which these lands are used and managed and landowner attitudes toward land use policy.

The series of specific hypotheses which has been developed below are first discussed briefly in conceptual terms and are then followed in empirically verifiable form. Incorporated within the section is a brief discussion of how relevant variables are to be measured. The hypotheses are grouped in accordance with the threefold objectives of the study.

To simplify the terminology, the tern "non-economic" will be used to denote recreational and other amenity-oriented values and "economic" will refer to the more familiar, financially-related land ownership objectives such as farming, commercial timber production, and

investment. This is not to imply that recreation and other amenity land uses do not involve monetary or economic considerations. The terminology is simply a shorthand notation designating primary groupings of land ownership objectives.

Landowners and Their Objectives

The primary conceptual concern here is the major reason for owning the property. These ownership objectives will be classified as either economic if they relate to traditional financial concerns or non-economic if they are primarily amenity-related. Common forms of amenity objectives may be expected to include recreation, enjoyment of nature, and a rural setting. It is expected that non-economic values will be found to be the major reason for land ownership and that these reasons are becoming increasingly important.

The rationale for this hypothesis is twofold. First, the literature reviewed in Chapter II indicates the high frequency in which recreational and amenity values are found to be associated with land ownership. This appears to be true with all classes of landowners studied. Secondly, the rapid rise in affluence in most parts of the country and the resulting emphasis on recreation and other leisure time activities has been taken into account. This accounts for the expected increase in incidence of non-economic landowners.

Hypothesis No. 1: Non-economic objectives are cited more often than economic objectives as the major reason for owning land in the study area.

Hypothesis No. 2: Non-economic objectives are becoming increasingly important as the rationale for acquisition and holding of land in the study area.

Land ownership objectives will be measured both directly and indirectly. Using the direct approach, landowners will be asked to state the major reason for owning their property. Probes will be used by knowledgeable interviewers to help in drawing out this information. These open-ended responses will then be classified and grouped as basically either economic or non-economic in nature.

It is recognized, however, that this approach may have some serious limitations. In some cases landowners may find it difficult to identify a single most important reason for ownership or they may be hesitant to do so for a variety of reasons. Some answers may be ambiguous and difficult to classify.

For these reasons an indirect measurement technique will also be employed. Using the Semantic Differential technique landowners will be asked to describe their land in terms of a series of polar adjectives. These adjectives will relate to land both in terms of its physical characteristics and the psychological and economic values which ownership may fulfill. The ability of adjective pairs to discriminate in intuitively meaningful ways between

ownership objectives as previously determined will serve as a check on validity of the original measure.

The extent to which non-economic ownership objectives are increasing in importance will simply be measured by the relationship between ownership objectives and the length of property ownership. A pattern of more recent acquisition by non-economic owners will indicate the rising importance of these land use activities.

Information concerning selected demographic characteristics of landowners will also be sought. Socio-economic status and physical mobility of owners may help to explain land ownership patterns and trends. It is expected that landowners having primarily non-economic ownership objectives are of a higher socio-economic status and are more physically mobile than landowners whose objectives are primarily economic.

This is due to the relatively high income thought to be necessary to acquire and hold comparatively large tracts of land which are used little if at all to generate income. In addition, it is widely believed that the appreciation of nature and natural environments is most often associated with higher occupational categories and educational levels. These variables typically represent the most mobile groups within the population.

Hypothesis No. 3: Non-economic landowners are of a higher socio-economic status than economic owners.

Hypothesis No. 4: Non-economic landowners are more physically mobile than economic owners.

Measurement of the variables involved in these hypotheses is a relatively straightforward process. The concept of socio-economic status is a function of both social and economic variables such as occupation, education, and income. Data on each of these three variables will be gathered. Mobility consists of three important aspects: the physical mobility of day-to-day living, the length of time a family resides in one residence, and movement of the family from one geographical area or region to another. Respondents will be asked to provide information in regard to each of these aspects.

Land Use and Management

There are three conceptual concerns within this section. The first involves the attitudes of owners toward land or the degree to which they are oriented to the natural environment. Many of the amenity values of land ownership are tied directly to the quality of the natural environment. They are concerned either with recreational or leisure activities which require a high quality natural environment for their setting or simply with the aesthetic or visual appeal of the landscape. On the other hand, economic land ownership objectives would seem to be less directly tied to the quality of the environment. For this reason it is suggested that owners holding their land for

non-economic objectives are more oriented toward concern for and protection of the natural environment.

Hypothesis No. 5: Non-economic owners are more environmentally oriented than economic owners.

The primary measurement method for environmental orientation will be a Lickert-type attitudinal measurement device. The instrument will consist of a series of statements, both positive and negative, dealing with environmental protection issues. The degree to which respondents agree or disagree with each statement, and their combined total score, will indicate concern for and orientation to the natural environment.

Two secondary measures of this variable will also be employed. Persons who are concerned with the environment might be expected to be found more often to belong to conservation or environmental organizations. Information on this type of membership will be sought. Finally, persons who are more concerned with the natural environment may be expected to have taken some action to increase their knowledge about the local environment. Purchase of flora and fauna identification aids is a likely action in this regard, and data will be gathered on the extent of such actions.

The second conceptual concern of this section involves an overall examination of the land use situation in the study area. It is hypothesized that land use varies in accordance with the purpose for which it is owned, and

that marked differences exist in land use between economic and non-economic owners. The rationale for this hypothesis stems partly from the rather obvious observation that most land is more readily usable for one purpose than another or is otherwise more desirable or suitable for one use than another. For example, rolling, wooded property is usually considered more suitable for recreational use, whereas flat, fertile land is more suitable for agriculture.

This relatively simple hypothesis takes on added significance when one considers the effect of man on land use. Changing human values can alter traditional relationships such as that suggested above. Perhaps more importantly, those who control land can often bring about changes in land use which are designed to be more suitable to their individual ends. Changes in land cover, ownership and activity patterns, and relative values are all important aspects of the following hypothesis.

Hypothesis No. 6: Land use patterns associated with non-economic owners differ significantly from those of economic owners.

As suggested above, land use will be measured in regard to four separate aspects: land cover, tenure, value, and activity. Such a broad interpretation of land use is desirable to insure a relatively complete coverage of this important variable. Each of these aspects of land use is discussed more fully in the chapters on study findings.

The final area of interest in this section deals with land management practices. This area differs from

the previous subject of land use in that it deals less with the land itself and more with conscious decisions and actions on the part of landowners. Here again the suggestion is made that management practices differ in accordance with the reasons for which land is owned. More specifically, it is hypothesized that management practices adopted by non-economic landowners tend to be substantially different from those of economic owners. Emphasis will be given in the analysis to how or in what ways these actions tend to differ.

Hypothesis No. 7: Land management practices adopted by non-economic landowners differ significantly from those of economic owners.

The subject of land management will be broken into four categories for measurement purposes: actions which cause physical alterations to or on the land, practices which are designed to effect wildlife resources, outdoor recreation activities or practices, and actions having to do with processing or the production of economic goods. The research hypothesis will be supported or refuted on the basis of an aggregate examination of all of these measures.

Landowner Attitudes Toward Land Use Policy

Landowner attitudes toward land use policy may be considered in either general or specific terms. In the general sense attitudes may indicate directions for broad policy issues. Two such issues central to the subject of land use are community development and the role of

government in directing this development. Due to the widespread conception of the deleterious effects of population and economic growth on the quality of the environment, at least in the haphazard and unplanned way in which this growth often occurs, it is expected that landowners having primarily non-economic ownership objectives will more strongly favor regulating future community growth than those landowners with economic objectives. Non-economic objectives are related primarily to the amenity values which flow from property ownership and these values are directly dependent upon the quality of the environment. It is also expected that non-economic owners will more strongly favor government action in regulating future community growth.

Hypothesis No. 8: Non-economic landowners more strongly favor regulating future community growth than do economic owners.

Hypothesis No. 9: Non-economic landowners more strongly favor government action in regulating future community growth than do economic owners.

More specifically, attitudes may be related to individual land use planning policies or control mechanisms. The options available to government to direct land use are many and can be broadly classified under five basic governmental powers--taxation, eminent domain, spending, public land ownership, and the police power.

The success of any public policy to direct land use can be seen to be a function of both its effectiveness and its acceptance by the affected public. Effectiveness means

that if the policy is implemented in the manner designed, it will result in achievement of its objectives. Public acceptance refers to the idea of receptivity to the policy on the part of those directly affected by it, thereby allowing implementation. It is with this latter concept that the study of attitudes is most directly applicable.

Taking into account a proper scope for this research project, the number of policy options studied must be limited to a very narrow range. Two planning and control mechanisms were selected for study which have direct applicability to landowners in the urban fringe area. Both concern the control of development through the preservation of open space or low density areas.

The first involves preferential taxation of farm or open space land in accordance with the concept of use-value assessment. This policy has particular application to Michigan with the recent passage of the Farmland and Open Space Preservation Act.[76] This Act allows for owners of several classes of farm or other open space land to enter into development rights agreements or easements with the State, whereby land is agreed to be kept in particular low density or open space uses for a period of ten years or more in return for certain income or property tax benefits.

This type of preferential taxation has received a great deal of attention in recent years, and similar laws

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[76]Farmland and Open Space Preservation Act, State of Michigan, Enrolled House Bill No. 4244, 1974.

to that of Michigan's have been enacted in many states. At the same time serious questions have arisen as to the effectiveness of this type of program.

The primary question has been that of a quid pro quo as it relates to the use-value concept. It is felt by some that this type of arrangement offers substantial benefits to selected private landowners, yet has no guarantee of long term public benefits in return. Landowners who enter into such agreements may enjoy reduced tax rates while simply holding land for development a few years hence. Even when rollback provisions are included in the agreement, such penalties are commonly only a small part of the seller's potential profit. When such is the case, the public loses benefits provided by the open space.

For this reason it is expected that there will be no significant difference between economic and non-economic owners as to favorable inclination to placing land under the development rights agreements or easements provided by the Michigan Act. These arrangements provide landowners with some protection against sharply rising holding costs which tend to force land into higher and more intensive use. Landowners who are primarily interested in the speculative value of their property stand to benefit as much, if not more than owners who intend to continue to hold their land for its amenity values.

Hypothesis No. 10: There is no difference between economic and non-economic owners as to the favorableness of placing their land under a preferential taxation program.

The other specific land use policy option to be investigated is the separation of development rights from the land. This option goes beyond that of use-value assessment in that the development rights are not merely leased for a temporary period of time, but are purchased on a permanent basis.

It is expected that landowners with primarily non-economic objectives will be more inclined to favor the principle of selling their development rights to the state. This arrangement provides for long term protection against developmental pressures, including sharply rising property taxes, while allowing continued use of the land for the purposes for which it was purchased.

Hypothesis No. 11: Non-economic landowners more often favor placing their land under a development rights program than do economic owners.

Attitudes toward these two land use programs will be measured through landowner responses to hypothetical programs based on the program principles outlined above.

Research Model

Based on the concepts and variables discussed in this chapter, the basic model of the research study (as presented in Figure 2 earlier in this report) has been expanded as shown in Figure 3. The additions represent

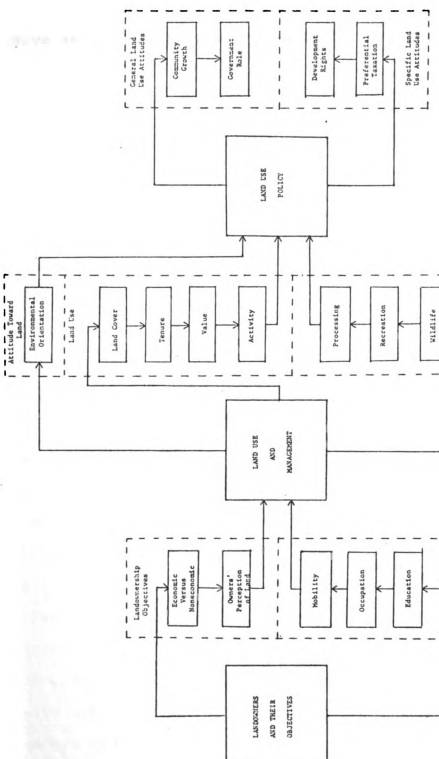

Figure 3.--Expanded Research Model

the specific concerns which will be investigated. The arrows indicate the flow of the conceptual development and serve as an outline for the analysis to be presented later.

CHAPTER IV

RESEARCH METHODS

Design of the Sample Survey

The Sample Area

Based on the financial resources available for the study, a decision was made to limit the sample area to a single Michigan county. This allowed for a sampling intensity designed to insure the reliability of the results. Kent County, the county selected for study, was chosen by a process of elimination based primarily on the criteria outlined below.

In keeping with the overall purpose of the study, a relatively populous area with a definite urbanizing character was sought. For this reason consideration was limited to the southern portions of the State. The area under consideration was further limited to the western portion of southern Michigan on the basis of two additional criteria. First, the sample area should avoid extremely heavy agricultural areas which typify much of mid- and eastern Michigan. This enhances the probability of including a substantial number of amenity-oriented owners

in order to test the research hypotheses. Second, most of the metropolitan areas of the central and eastern portions of the state are otherwise atypical in that they are often dominated by a single economic sector, such as the automobile industry, government, or universities, thereby reducing the generalizability of the study.

Finally, the southwest portion of the state presented three likely possibilities for study in the form of counties which are dominated by a single large urban place. These were Calhoun, Kalamazoo, and Kent Counties containing the cities of Battle Creek, Kalamazoo, and Grand Rapids, respectively. Kent County was chosen on the basis of its having a smaller percentage of agricultural land (43.9% as opposed to 63.7% and 51.5% for Calhoun and Kalamazoo Counties, respectively).

The Sampling Procedure

Again, based on the financial resources available for the study, it was decided to cluster sample within the County. In this way limited geographical areas serve to represent the sample area as a whole and sampling costs are reduced accordingly. For this purpose the County was divided into a number of distinct land use regions and one township was selected as being representative of each region. Sampling was done only within these selected townships.

Since little data was available on a sub-county basis for the purpose of regionalizing the county, this process was done on a judgment basis with assistance from knowledgable Kent County officials. After meetings with representatives of the West Michigan Regional Planning Commission, the Soil Conservation Service, and Cooperative Extension Service, the county was divided into seven land use regions as shown in Figure 4. Table 1 contains a brief description of each region, including the townships within each region, a brief characterization of distinctive land use features, and the townships selected to represent each region. Due to the heavily urbanized nature of Region VII, it was excluded from the sample. The time-distance zone locations of each of the sample townships around the Grand Rapids urban area is shown in Figure 5.

Following selection of the sample townships, the next step was to prepare a sampling frame consisting of a list of all possible parcels which could be included in the sample. For this purpose a minimum parcel size of eleven acres was chosen as a limiting criterion. In this manner only relatively large areas of land would be included in the study, thereby increasing the geographical coverage and avoiding small and obviously residential properties. The specific minimum of eleven acres was chosen in deference to the Michigan Subdivision Control Act of 1968, which regulates land sales practices of subdivisions of ten acres or less. The Act has resulted in the frequent occurrence

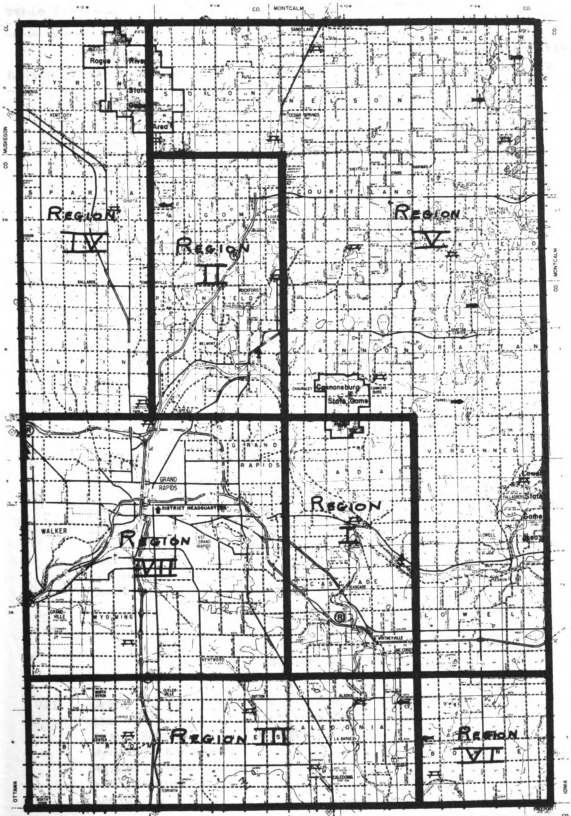

Figure 4.--Land Use Regions Defined Within Kent County.

Table 1.--Land Use Regions Defined Within Kent County.

Region	Townships	Land Use Features	Representative Township
I	Ada, Cascade	Located directly adjacent to Grand Rapids with good transportation access and serving as a traditional area of suburban expansion	Ada
II	Planfield, Algoma	Moderately rural area experiencing rapid urban and suburgan expansion due to a new limited access highway in the region	Algoma
III	Byron, Gaines, Caledonia	Predominately rural area located immediately south of Grand Rapids and surrounding cities, but with relatively poor access; characterized by moderate income agriculture	Gaines
IV	Alpine, Sparta, Tyrone	Predominately rural area characterized by specialialized moderate- to high-income farming (fruit growing area)	Sparta
V	Solon, Nelson, Spencer, Courtland, Cannon, Grattan, Oakfield, Vergennes, Lowell	Highly rural area, but characterized by relatively poor soils and moderate- to low-income agriculture	Oakfield
VI	Bowne	Highly rural area and characterized by relatively good soils and moderate-income agriculture	Bowne
VII	Grand Rapids plus the cities of Grand Rapids, Wyoming, Kentwood, Walker, Grandville, and East Grand Rapids	Almost totally urbanized with very few large parcels	

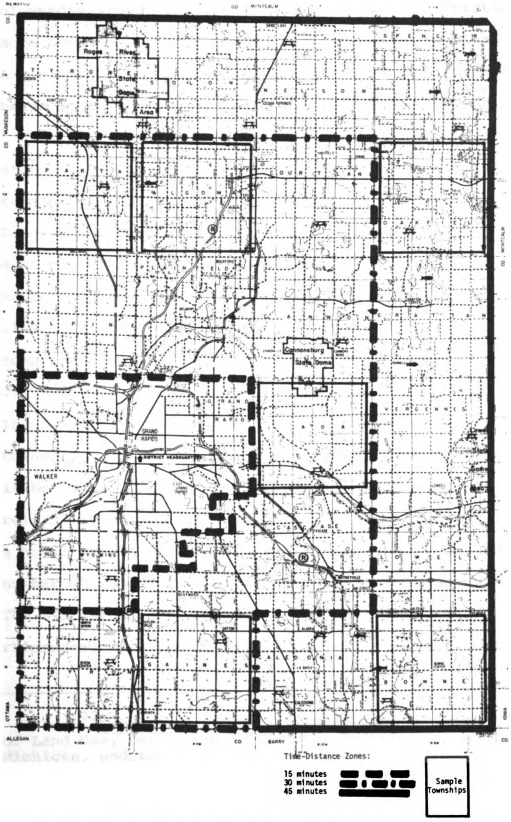

Figure 5.--Time-Distance Zones Around Grand Rapids Urban Area.

of subdivisions comprised of lots which are a fraction of an acre over ten acres in order to avoid these regulations.[77] A minimum parcel size of eleven acres for the research study helps to avoid most of these strictly large lot subdivisions.

The sample frame was prepared through use of standardized aerial tax maps for each of the six sample townships. These maps are kept by the Kent County Property Description and Mapping Department and show the acreage of each parcel and its permanent parcel number.[78] The permanent parcel numbers were recorded for all parcels of eleven acres or more in the six sample townships and thus comprised the sampling frame. The actual sample was then drawn from this list using a random sampling procedure. The sampling intensity was set at 10 percent for each township. The 10 percent level was chosen on the basis of it being a relatively high percentage to insure the reliability of the results. In addition, this resulted in a total sample size of 249, which was felt to be about the number which could be accommodated by the research budget. The 249 parcel numbers thus drawn were then cross-referenced with the county property tax rolls to obtain

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[77] Subdivision in Michigan (a working paper), Office of Land Use, Department of Natural Resources, Lansing, Michigan, undated.

[78] Permanent parcel number refers to a unique number assigned to each parcel of real estate in Kent County and is based on a standard geographical location system.

the names and address of the owners. The sampling frame and sample are broken down by township in Table 2.

Table 2.--Sampling Frame and Sample by Township.

Township	Sampling Frame (Number of Parcels of 11 Acres or More)	Original Sample (10% of Sampling Frame)	Duplicate Owners	Final Sample
Ada	407	41	1	40
Algoma	476	48	6	42
Gaines	376	38	0	38
Sparta	428	43	1	42
Oakfield	426	43	0	43
Bowne	365	36	2	34
Totals	2,478	249	10	239

Data Collection Method

The personal interview method was utilized in the field survey. This was due to several factors. First, the open-ended and relatively complex nature of several of the survey questions required either probes to be used or additional information to be offered by the interviewer. Secondly, it was felt that the survey involved little inherent appeal to the interviewee, and thus required personal administration to assure an acceptable response rate. Finally, the survey instrument was considered to be too lengthy to rely on self-administration.

The survey instrument was prepared in the Spring of 1975 and pre-tested in the East Lansing area, utilizing purposive sampling. On the basis of this pre-test certain sections of the instrument underwent substantial revision in regard to question ordering and wording. This enabled the administration of the interview to "flow" more smoothly from beginning to end. The final interview schedule may be found in Appendix A. It should be noted that approximately one quarter of the questions contained in the survey instrument dealt with an additional recreation study separate from that of the writer's (see especially Part VII, Recreation).

The field survey was conducted in June of 1975 by a battery of five interviewers, all of whom were graduate students at Michigan State University. Two meetings were held with all interviewers prior to the survey to familiarize them with the overall research project and the survey instrument.

In regard to the conduct of the field survey, each member of the sample was first sent a letter explaining the nature and purpose of the survey and the informational requirements; the individual's cooperation was solicited at this time. The letters were sent on Michigan State University stationary; each letter was prepared on a recording typewriter (word processing machine) and personally signed to increase the appearance of individuality. An example of this letter may be found in Appendix B.

In accordance with the letter's explanation, each member of the sample was then contacted by telephone to set up an appointment for an interview time. In addition, immediately prior to administering the interview each respondent was given copies of three recent Agricultural Experiment Station Research Reports, based on similar types of University research projects. This frequently seemed to further legitimize the survey in the minds of the respondents.

Response to the Survey

The questionnaire was administered to 195 respondents for an overall response rate of 81.6 percent. The response rate did not vary dramatically among townships as shown in Table 3.

The two primary reasons for non-response were refusals (14 or 7.2%) and inability to obtain telephone numbers (13 or 6.6%). In addition, five respondents who lived out of state were mailed shortened versions of the questionnaire; only one response was received. Other reasons for non-response included sale of property and inability to contact the person at home.

Analysis of the Data

Questionnaires were returned as completed and the data coded onto specially prepared coding forms. Ten percent of the questionnaires were randomly selected for recoding as a check on accuracy with no significant or

Table 3.--Response Rate by Township.

Township	Number of Respondents	Response Rate
Ada	35	85.4%
Algoma	32	76.2%
Gaines	32	84.2%
Sparta	34	80.9%
Oakfield	35	83.3%
Bowne	27	79.4
	Total 195	Average 81.6%

consistent errors detected. The data was then keypunched to card medium for computer input and verified again for accuracy.

A variety of statistical techniques were used in the analysis procedure. The variable of primary interest throughout the study, ownership objective, was classified and grouped into two major categories--economic and non-economic. This binary coding convention, following Green and Tull[79] and Nie et al.,[80] allowed such normally nominal scale data to assume the properties of ordinal and interval

[79]Paul E. Green and Donald S. Tull, Research for Marketing Decisions (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1975), pp. 325-36 and 335.

[80]Norman H. Nie, C. Hadlai Hull, Jean G. Jenkins, Karl Steinbrenner, and Dale H. Bent, Statistical Package for the Social Sciences (New York: McGraw-Hill Book Company, 1975), pp. 5-6.

scale measurement. The resulting dichotomy provided for the use of higher powered statistical procedures in the testing of many of the hypotheses. For example, relationships between ownership objective and other ordinal and interval scale variables could be tested through bivariate correlation analysis. Interval scale data, such as length of ownership and percentage of land in selected land cover types, was tested using Pearson Product-Moment Correlation, which is a type of regression analysis. The resulting coefficient (r) indicates the goodness of fit of the linear regression and may take values between +1.0 and -1.0, depending upon whether the relationship between the two variables is direct or inverse.

Ordinal level data, such as income and educational rankings, was tested by means of Spearman and Kendall Rank-Order Correlation. These are nonparametric statistics which make no assumption about a normal distribution of the data. The coefficients r_s and τ both indicate the amount of agreement between two sets of ordinal rankings and may take values between +1.0 and -1.0, again depending upon whether the relationship between the two variables is direct or inverse.

Bivariate relationships between nominally scaled data were tested by means of the familiar chi square statistic. Chi square, however, measures only the probability level at which a relationship is statistically significant. This significance level is highly dependent

upon the size of the sample and says little about the strength of the relationship between the two variables. Where appropriate, the Phi and Cramer's V statistics were also calculated to indicate strength or degree of association. Both statistics take values between 0 and +1, indicating a level of association ranging from the existence of no relationship to that of a perfect relationship. Phi is appropriate for a 2 x 2 contingency table and Cramer's V for larger tables.

In the last chapter on findings a different analytical approach was taken. Following bivariate analysis and testing of the final two research hypotheses, it was decided to re-examine the data set in aggregate in reference to the two hypothetical land use programs. More complex relationships, it was felt, might help to explain further the differences between those groups of respondents who were inclined to favor these land use programs and those who were not inclined to favor them.

For this purpose a correlation matrix was prepared consisting of the variables previously outlined in the research model to determine their relationship or influence on both groups of landowners. The problem of categorical variables was overcome by means of indexing procedures. The methods of this procedure are more fully explained in Chapter VII.

Finally, a note on the significance levels used for hypothesis testing is appropriate. Selection of a

significance level at which to reject a null hypothesis is not strictly a statistical question but rather is more appropriate determined by relating it to the amount of risk one wishes to take in making decisions based on study findings. In studies of a largely exploratory nature, as is the case at hand, quantification of the risk factor is not necessarily a meaningful exercise and the setting of a significance level is largely an arbitrary decision. Because of this a single, uniform α value has not been used in the analysis procedure. Rather, the writer has chosen to display the level of significance at which each statistical test has been calculated. In general, the significance level used to accept or reject the research hypotheses does not exceed .10.

For detailed discussion of all of the statistical procedures used in the study analysis, reference is made to three primary texts consulted by the writer: Green and Tull,[81] Nie et al.,[82] and Blalock.[83]

Computational Algorithms

The analysis was done utilizing the Statistical Package for the Social Sciences (SPSS) and was run on the

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[81]Green and Tull, Research for Marketing Decisions.

[82]Nie et al., Statistical Package.

[83]Hubert M. Blalock, Jr., Social Statistics (New York: McGraw-Hill Book Company, 1972).

CDC 6500 installation of the Computer Laboratory at Michigan State University. SPSS is a system of computer programs containing a large selection of both parametric and nonparametric statistics which were well suited to the study data. The system also allowed for recoding and variable transformation procedures which were often needed throughout the analysis.

CHAPTER V

FINDINGS: LANDOWNERS AND THEIR OBJECTIVES

Landownership Objectives

Economic Versus Non-Economic

The central concern of this study dealt with the objectives of landowners or why people buy and hold land in an urban-fringe area. On the basis of the literature reviewed in Chapter II, it was hypothesized that most ofen these reasons are basically non-economic in nature and are grounded largely in an amenity-orientation.

To test this hypothesis respondents were aksed in an open-ended manner to identify and state their primary reason for owning the survey parcel. These responses were classified into eight categories which were then grouped as being either economic or non-economic in nature. The classification and distribution of responses is shown in Table 1.

As can be seen, "farming constituted the single most important reason for owning land. This category accounts for 31.3 percent of the sample and includes not only field crop production, but also cattle and dairy farming and

Table 1.--Landownership Objectives.

Ownership Objective	Number	Percent
Economic	99	50.8
Farming	61	31.3
Investment	25	12.8
Inexpensive Residence	7	3.6
Business or Commercial	6	3.1
Non-Economic	96	49.4
Rural Environment	59	30.3
Family	13	6.7
Recreation/Nature	11	5.7
Other	13	6.7
N = 195		

fruit crop production. Other reasons of a primarily economic nature included land held mainly for investment purposes, as an inexpensive residence, and property used for business or commercial purposes.

In regard to frequency of response, the category of farming was followed closely by that of "rural environment," which represented 30.3 percent of the sample. "Rural environment" refers to the desire for more living room and to reside in the relative isolation provided by a rural setting. Other reasons of an essentially non-economic nature were "family," which included persons who

had inherited the land or property that was held because it was considered the family home, and "recreation/nature," referring to persons who owned their land primarily for the recreational benefits it afforded or the opportunity to enjoy a close association with nature. In addition, a category of "other" was created to include such miscellaneous reasons as education, retirement, and pride of ownership. This final category accounted for 6.7 percent of the sample.

Examining the overall distribution of the responses, it can be seen that non-economic objectives were cited by ninety-six (96) respondents and thus accounted for very nearly half (49.4%) of the total sample. While this does not support the first research hypothesis in absolute terms, it does provide support for its conceptual basis in that non-economic or amenity-oriented ends are major objectives of landownership in the study area.

Additional light may be shed on this subject by a closer examination of the data. In Table 2 the distribution of responses has been broken down by township. Here, it is noted that the research hypothesis is supported in absolute terms in two of the townships and not supported in the other four. Further, it is noted that these two townships, Ada and Algoma, are those which are most accessible to the urbanized area and which are experiencing the heaviest developmental pressure. Therefore, on the basis of this discussion, it is concluded that the first hypothesis is at least partially supported.

Table 2.--Economic and Non-Economic Owners by Township.

Township	Number	Percent	
Ada			
Economic	11	31.4	
Non-economic	24	68.6	N = 34
Algoma			
Economic	13	40.6	
Non-economic	19	59.4	N = 32
Gaines			
Economic	17	53.1	
Non-economic	15	46.9	N = 32
Sparta			
Economic	23	67.6	
Non-economic	11	32.4	N = 34
Oakfield			
Economic	19	54.3	
Non-economic	16	45.7	N = 35
Bowne			
Economic	16	59.3	
Non-economic	11	40.7	N = 27
ALL LANDOWNERS			
Economic	99	50.7	
Non-economic	96	49.3	N = 195

Hypothesis No. 1: Non-economic objectives are cited more often than economic objectives as the major reason for owning land in the study area.

Result: Partially supported.

The second hypothesis dealt with the time dimension as it relates to ownership objectives and suggests that as a result of an historical trend toward greater affluence and increased emphasis on leisure time and related activities, non-economic objectives are becoming increasingly important as the rationale for land ownership. This hypothesis was tested by examining the relationship between the length of ownership and the primary ownership objective.[84] The appropriate statistic to measure this relationship is the Pearson Product-Moment Correlation and, as shown in Table 3, the coefficient (r) in this case equals -.1140, indicating that non-economic owners tend to have held their land for shorter periods of time. This relationship is significant at the .05 level.

Stating this relationship in another way, it can be said that property acquired more recently tends to have been purchased more for non-economic reasons than for economic purposes. This conclusion then supports the research hypothesis. In addition, Table 3 also displays

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[84]Ownership objective was a binary coded variable which was coded as (1) = Economic and (2) = Non-economic. This convention is followed throughout the analysis and is done for purposes of scale transformation. The rationale for this procedure is more fully explained in the section on statistical procedures contained in the preceding chapter.

Table 3.--Mean Years Owned by Ownership Objectives.

	Mean Years Owned
Ada	
Economic	18.3
Non-economic	18.7
Algoma	
Economic	24.5
Non-economic	16.1
Gaines	
Economic	15.5
Non-economic	16.6
Sparta	
Economic	21.1
Non-economic	10.8
Oakfield	
Economic	17.1
Non-economic	15.9
Bowne	
Economic	18.5
Non-economic	15.2
ALL LANDOWNERS	
Economic	19.07
Non-economic	16.06

Pearson Product-Moment Correlation:

r = -.1140
significance = .057
N = 194

the average number of years owned for both economic and non-economic owners by township and for the sample as a whole. In all but two cases (Ada and Gaines Townships) non-economic owners have acquired their land more recently. This simple measure lends additional support to the hypothesis.

Hypothesis No. 2: Non-economic objectives are becoming increasingly important as the rationale for acquisition and holding of land in the study area.

Results: Supported.

Landowner Perceptions of Land

Due to the very central role of ownership objectives in the research study, it was decided to develop an additional test to measure this important variable. This measure should be indirect, as opposed to the direct measure just discussed, and the correspondence between the two measures would serve as a check on the validity of the study classification.

For this purpose a Semantic Differential instrument was designed in which respondents were asked to describe their land in terms of a series of polar objectives. The instrument used in the study is shown in Table 4. The polar adjectives contained in the instrument relate to pnysical, psychological, and economic dimensions of land. Respondents rated their land on a scale of one to seven in regard to each of the adjective pairs.

Table 4.--Polar Adjectives Used in Semantic Differential.

	1	2	3	4	5	6	7	
Big	___	___	___	___	___	___	___	Little
Dull	___	___	___	___	___	___	___	Exciting
Wild	___	___	___	___	___	___	___	Civilized
Work	___	___	___	___	___	___	___	Leisure
Productive	___	___	___	___	___	___	___	Unproductive
Wooded	___	___	___	___	___	___	___	Open
Valuable	___	___	___	___	___	___	___	Worthless
Attractive	___	___	___	___	___	___	___	Unattractive
Flat	___	___	___	___	___	___	___	Hilly
Secure	___	___	___	___	___	___	___	Insecure

The results of this test are shown in Table 5. Mean scores for each adjective pair are displayed for both economic and non-economic owners. Adjective pairs are grouped according to the dimension to which they refer. Figure 6 displays this information graphically. The Pearson Product-Moment Correlation again provides the appropriate statistic to test for significant relationships between semantic differential scores and ownership objectives. The ability of adjective pairs to discriminate between economic and non-economic owners would provide support for the validity of the original distinction.

As shown in Table 5 five of the ten adjective pairs are able to differentiate economic from non-economic owners at a significance level of .05 or below. In addition, in each of these five cases, the direction of the relationship follows what might intuitively be expected. In regard to the physical dimension, non-economic owners perceive their

Table 5.--Mean Semantic Differential Scores by Ownership Objective.

	Economic	Non-Economic	Pearson Product-Moment Correlation
Physical			
Big-Little	4.75	4.69	r = -.0181 significance = .407 N = 171
Flat-Hilly	3.69	4.34	r = .1756 significance = .011 N = 172
Wooded-Open	4.86	4.35	r = -.1329 significance = .041 N = 172
Psychological			
Work-Leisure	3.37	4.32	r = .2345 significance = .001 N = 172
Wild-Civilized	5.46	4.27	r = -.2936 significance = .001 N = 172
Dull-Exciting	5.40	5.54	r = .0437 significance = .285 N = 172
Attractive-Unattractive	2.03	1.89	r = -.0573 significance = .228 N = 172
Economic			
Productive-Unproductive	2.52	3.67	r = .2789 significance = .001 N = 171
Valuable-Worthless	1.82	2.03	r = .0892 significance = .122 N = 172
Secure-Insecure	1.91	1.94	r = .0088 significance = .454 N = 171

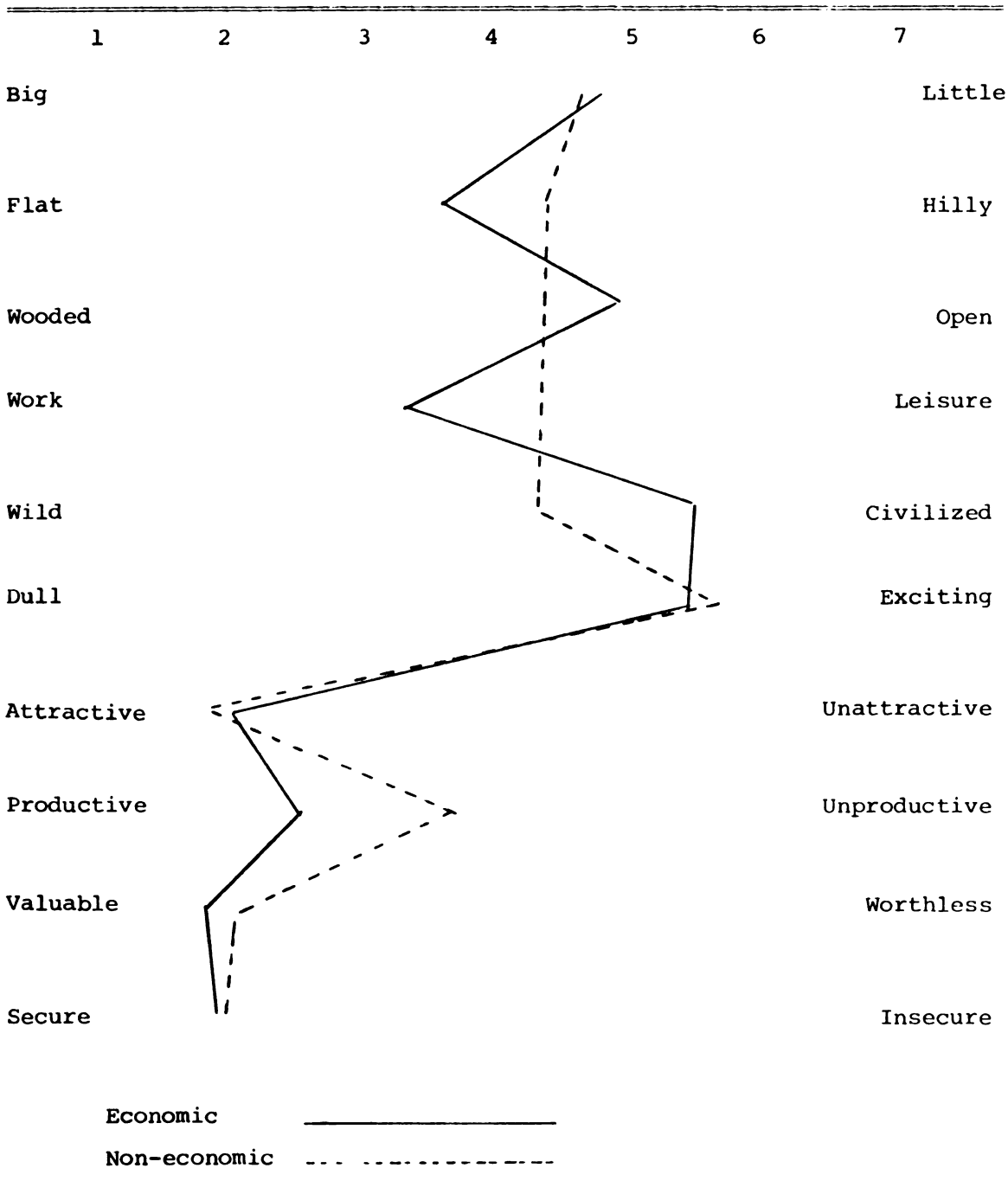

Figure 6.--Mean Semantic Differential Scores by Ownership Objective.

land to be more hilly and wooded than that of economic owners. This is not surprising considering the traditional appeal of rolling, forested land for recreational and other amenity purposes. With respect to the psychological dimension, non-economic owners think of their land more in terms of leisure and wildness than do economic owners. This is to be expected given the typical association between amenity-oriented land uses and both leisure time activities and the qualities of a natural environment. Finally, in the economic dimension non-economic owners predictably view their land as significantly less productive than do economic owners.

Lastly, it is noted that the differences in mean Semantic Differential scores between economic and non-economic owners for the other five adjective pairs also make sense on an intuitive basis. However, the relationship between scores and ownership objectives by respondent is not statistically significant.

In conclusion, it may be stated that the Semantic Differential test provides further support that the distinction between economic and non-economic owners is real and correct.

Social Characteristics of Landowners

Socio-Economic Status

The next conceptual concern dealt with determining socio-economic differences between economic and non-economic

landowners. It was hypothesized that non-economic owners were of a generally higher socio-economic status than economic owners, this proposition being based on the idea that amenity related uses are typically highly consumptive land uses which only those of a higher economic class can readily afford. In addition, the values provided by natural environments are often thought to be more widely appreciated by those of a higher educational background.

Based on this reasoning the two measures of income and educational level were used to test the hypothesis. Data were also gathered on occupation, but this was done for descriptive, not analytic purposes. This is due to the self-fulfilling relationship between occupation and ownership objectives; obviously most of those who own their land primarily for farming will be classified as farmers and so on.

Table 6 shows the relationship between total family income during 1974 and primary ownership objective. The statistical relationship of this interval scale data is appropriately tested through use of Kendall Rank-Order Correlation. The coefficient (τ) in this case equals .0246 which is not statistically significant even at the .10 level. It should be noted however that non-economic owners did account for considerably more of the respondents in the highest income category.

One possible explanation for the lack of a statistical relationship is that income was given interms of gross

Table 6.--Income by Ownership Objective.

	Total Family Income During 1974			
	Less Than $10,000	$10,000-14,999	$15,000-24,999	$25,000 or More
Economic	26	20	23	14
Non-economic	24	19	12	20

Kendall Rank-Order Correlation:

$\tau = .0246$

significance = .324

N = 158

rather than net. In this regard, farmers may often have relatively high gross incomes, but much smaller net revenues when production costs are substracted.

The relationship between the educational level of the landowner and the primary ownership objective is shown in Table 7. Again, Kendall Rank-Order Correlation is used to test the statistical significance of the relationship. The coefficient (τ) equals -.0022 which is not statistically significant.

The only conclusion to be reached from the above discussion is that the data do not support the research hypothesis.

Table 7.--Education by Ownership Objective.

	Years of Education				
	0-8	9-12	13-15	16	More Than 16
Economic	17	51	7	3	9
Non-economic	19	43	6	9	6

Kendall Rank-Order Correlation:

$\tau = -.0022$

significance = .483

N = 170

Hypothesis No. 3: Non-economic landowners are of a higher socio-economic status than landowners.

Results: Not supported.

Occupational categories of both economic and non-economic owners are shown in Table 8 for descriptive purposes. As might be expected, non-economic owners account for a higher percentage of respondents in the typically white collar occupations, while economic owners comprise over 80 percent of all farmers.

Mobility

The final area of interest in this chapter concerns the physical mobility of landowners. There are three important aspects of mobility which have relevance for land use; these are the physical mobility of day-to-day living, the length of time a family resides in one residence, and

Table 8.--Occupation by Ownership Objective.

	Professional-Technical-Managerial	Sales-Clerical	Craftsman	Operative-Laborer	Farmer	Retired	Unemployed
Economic	16 (40.0)[a]	3 (33.3)	12 (38.7)	3 (20.0)	42 (80.8)	12 (54.5)	3 (27.3)
Non-economic	24 (60.0)	6 (66.7)	19 (61.3)	12 (80.0)	10 (19.2)	10 (45.5)	8 (72.7)

N = 180

Chi Square = 31.709

DF = 6

Significance = .000

[a]Column percentages.

movement of the family from one geographical area or region to another. It was hypothesized that non-economic owners are more mobile than economic owners in all of these aspects.

In regard to the physical mobility of daily living, the most significant movement of the family and that which has the greatest implication for land use, is typically the commute to work. Data on this variable is shown in Table 9.

Table 9.--Distance Travelled to Work by Ownership Objective.

	Mean Number of Miles
Economic	20.2
Non-economic	27.6

Pearson Product-Moment Correlation:

r = .1398

significance = .105

N = 82

From the table it can be seen that non-economic owners travel a substantially greater distance to work than economic owners (27.6 miles as opposed to 20.2, respectively). The Pearson Product-Moment Correlation coefficient (r) of .1398 indicates that this relationship is statistically significant at the .10 level.

Data relating to the second aspect of mobility, length of residence, is shown in Table 10.

Table 10.--Number of Years at Present Address by Ownership Objective.

	Mean Number of Years
Economic	26.8
Non-economic	20.3
Pearson Product-Moment Correlation:	
r = -.1735	
significance = .011	
N = 176	

Greater mobility on the part of non-economic owners means that this group would have resided at their present address for a relatively shorter period of time. The data bear out this analysis. The Pearson Product-Moment Correlation coefficient of -.1735 indicates that this is a strong relationship which is significant at the .01 level.

The final aspect of mobility involves the movement of the family between geographical areas. This variable was measured in two ways. First, the birth place of the respondent was classified into one of three geographicl areas of increasing mobility--those born in Kent County, those not born in Kent County but in Michigan, and those born outside Michigan. From the data in Table 11 it can be seen that a smaller proportion of non-economic owners were born in Kent County while a larger proportion were born outside of the State. This tends to support the hypothesis

Table 11.--Birth Place by Ownership Objective.

	In Kent County	Outside Kent County but in Michigan	Outside Michigan
Economic	54 (52.4)[a]	25 (58.1)	11 (37.9)
Non-economic	49 (47.6)	18 (41.9)	18 (62.1)

Kendall Rank-Order Correlation:

τ = .0531

significance = .149

N = 175

[a]Column percentages.

of increased mobility on the part of non-economic owners, although this relationship, as measured by Kendall Rank-Order Correlation, is significant only at the .14 level.

The second measure of geographical mobility involved classifying the respondents immediate past residence in the same manner as above. This data is shown in Table 12. It should be noted that the place of immediate past residence is nearly identical for the two groups of landowners. This test is not a good one, however, due to the very limited nature of mobility, as measured in this way, for the sample as a whole. Over 82 percent of the sample resident in Kent County immediately prior to moving to their present Kent County address.

From this discussion it can be concluded that the data do support the hypothesis of increased mobility on

Table 12.--Immediate Past Residence by Ownership Objective.

	In Kent County	Outside Kent County but in Michigan	Outside Michigan
Economic	69 (50.0)[a]	13 (56.5)	2 (33.3)
Non-economic	59 (50.0)	10 (43.5)	4 (66.7)

Kendall Rank-Order Correlation:

$\tau = -.0069$

significance = .448

N = 167

the part of non-economic owners. This is true in regard to all three aspects of mobility and for three of the four measured used.

Hypothesis No. 4: Non-economic landowners are more physically mobile than economic owners.

Results: Supported.

CHAPTER VI

FINDINGS: LAND USE AND MANAGEMENT

Environmental Orientation

The first section in this chapter deals with the extent to which landowners are oriented to the natural environment, the extent to which they are inclined or not inclined to favor environmental protection policies. Based on the reasoning that non-economic or amenity-oriented landownership objectives are often tied directly to the quality of the natural environment, it was hypothesized that this group of landowners would be more oriented toward environmental protection.

Environmental orientation was measured through use of a Lickert-type scale consisting of seven statements which dealt with popular conservationist issues. The instrument appears as Table 1. The statements were worded both in support of and in opposition to traditional conservationist viewpoints. Respondents were asked to indicate their agreement or disagreement with each of the statements on a scale of one to five. Responses were coded so that strong agreement with the conservationist

Table 1.--Environmental Orientation Statements.

1. Protection of the environment is one of our country's most important problems.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2. The needs and wants of future generations should always be taken into account when making decisions about how land is to be used.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3. Environmental quality standards are fine as long as they do not slow down economic growth.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4. It is often desirable for government to adopt policies which are designed to help direct the way in which land is used.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5. Private landowners have a responsibility to the members of their community to maintain their property in an attractive manner.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6. The primary emphasis of our country's natural resources policy should be the promotion of economic growth as opposed to protection of environmental quality.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7. It is important that the government exercise greater control over the ways individuals and companies use our natural resources.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

viewpoint received the highest score of five and strong disagreement received the lowest score of one.

The results of the test are shown in Table 2. It can be seen that the data provide substantial support for the research hypothesis. For all seven of the statements non-economic owners scored higher than economic owners. Using Kendall Rank-Order Correlation, these relationships were statistically significant at the .05 level with the exception of statement number 4.[85]

In addition, the scores for each statement were summed for each respondent to form an overall scale of environmental orientation. Possible scores for the summated scale ranged from 7 to 35, with actual values ranging from 16 to 33. All scores were then grouped into three categories: low (16 to 22, N = 52), medium (23 to 26, N = 60), and high (27 to 33, N = 59) environmental orientation. The relationship between categories and ownership objective was again tested by means of Kendall Rank-Order Correlation. The coefficient (τ) value of .1950 indicates a strong association between non-economic owners and a high environmental orientation. This relationship is significant at the .001 level.

Two additional measures of the degree to which persons are oriented to the natural environment were

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[85]Lickert scales assume only the properties of ordinal scale measurement, thus necessitating the use of a rank-ordering test statistic. (See Green and Tull, p. 197.)

Table 2.--Responses to Environmental Orientation Statements.

	Mean Score		Kendall Rank-Order Correlation
	Economic Owners	Non-Economic Owners	
Statement No. 1	4.09	4.26	τ = .1182 significance = .011 N = 171
Statement No. 2	4.07	4.33	τ = .1619 significance = .001 N = 171
Statement No. 3	2.72	2.91	τ = .0883 significance = .044 N = 171
Statement No. 4	3.08	3.18	τ = .0258 significance = .309 N = 171
Statement No. 5	3.93	4.29	τ = .2178 significance = .001 N = 171
Statement No. 6	3.05	3.40	τ = .1653 significance = .001 N = 171
Statement No. 7	3.12	3.34	τ = .0866 significance = .047 N = 171
Total Environmental Orientation (Summated Score of Statements 1 through 7)	24.03	25.74	τ = .1950 significance = .001 N = 171

utilized in the study. The first concerns the number of persons who owned a book for purposes of wildlife identification, a seeminly logical activity for those persons who are more concerned with and aware of the natural environment. The results of this measure are shown in Table 3.

Table 3.--Ownership of Wildlife Identification Book by Ownership Objective.

	Number Owning Book	Number Not Owning Book
Economic	64 (47.8)[a]	24 (55.8)
Non-economic	70 (52.2)	19 (44.2)
	Chi Square = .553	
	Phi (ϕ) = .069	
	DF = 1	
	significance = .457	

[a]Column percentages.

While a slightly greater number of non-economic owners owned such books, the chi square statistic indiates that this difference is not statistically significant, even at the .10 level. It is striking to note the large percentage of all landowners (over 75%) who possessed such a wildlife identification aid. Such a large percentage reduces the usefulness of this measure.

The final measure used for environmental orientation dealt with landowner membership in conservationist organizations. The results are shown in Table 4.

Table 4.--Membership in Conservation Organizations by Ownership Objective.

	Member of Conservation Organization(s)	Not a Member of Conservation Organization(s)
Economic	1 (12.5)[a]	89 (51.7)
Non-economic	7 (87.5)	83 (48.3)

Chi Square = 3.27

Phi (ϕ) = .161

DF = 1

significance = .070

Here the data support the research hypothesis in that a larger number of non-economic owners are found to belong to such organizations than economic owners (7 as opposed to 1, respectively). The chi square statistic of 3.27 is significant at the .07 level and the phi coefficient (ϕ) of .167 indicates that this relationship is moderately strong. However, the large percentage of all landowners who do not belong to conservation organizations reduces the usefulness of this measure.

Based on the above discussion it can be concluded that the data provide strong support for the research hypothesis. Non-economic landowners are shown to be more environmentally oriented than economic owners on the basis of the primary Lickert-type measurement technique and on one of the two more simple secondary techniques.

Hypothesis No. 5: Non-economic owners are more environmentally oriented than economic owners.

Results: Supported.

Land Use

The concept of land use is quite broad and has been subject to many interpretations over the years. This is particularly true since the term has recently come into wide popular usage. Clawson and Stewart have pointed out that actually land use is composed of several concepts which if not properly sorted out and distinguished may lead to confusion.[86] In this section attention is focused on four of the most widely encountered land use concepts: land cover, tenure, value, and human activity. Descriptive statistics are presented which paint a composite picture of the land use situation in the study area in regard to each of these four concepts. The primary emphasis, however, is placed upon the differences in land use attributable to differences in landownership objectives. These differences are studied in each of the following four subsections, each of which relates to one of the four land use concepts. The entire land use section is then examined in aggregate to determine if it supports the research hypothesis of

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[86]Marion Clawson and Charles L. Stewart, Land Use Information: A Critical Survey of U.S. Statistics Including Possibilities for Greater Uniformity (Baltimore: The Johns Hopkins Press, 1965), pp. 11-12.

significant differences in land use between economic and non-economic owners.

Land Cover

One of the most familiar definitions of land use refers to physical cover on the land. In areas of primarily open space (such as the study area) this concept is concerned almost exclusively with vegatative cover, although some small fraction of the land will be covered by buildings and other man-made structures which should also be considered. Data regarding land cover was gathered in the research study by asking each respondent how many acres of his property were in each of a number of land cover types. Landowners were allowed to respond in terms of percentages if this was easier, these percentages later being converted into acerage figures on the basis of total parcel size.

The results of this portion of the survey are shown in Table 5. The percentage of land in each of seven cover types is shown for economic and non-economic owners. The data is shown by township as well as for the sample as a whole.

The most striking aspect of Table 5 is the large difference in the percentage of land in crops between economic and non-economic owners (44.1 and 28.6%, respectively for the sample as a whole). This difference is highly significant statistically and holds for each of

Table 5.--Land Cover by Ownership Objective.

	% of Land in Crops	% of Land in Woods	% of Land in Open Fields	% of Land in Marsh	% of Land in Brush	% of Land in Buildings and Yard	% of Land in Other Cover	Sum[a]
Ada								
Economic	13.7	24.7	42.3	5.9	3.3	1.6	8.5	100
Non-economic	13.2	37.6	31.7	1.8	5.7	8.2	1.4	100
Algoma								
Economic	42.1	20.3	31.0	0.0	3.1	2.6	0.9	100
Non-economic	19.3	27.5	19.2	5.3	18.7	4.0	2.5	100
Gaines								
Economic	52.1	12.2	17.0	0.0	8.5	4.4	6.1	100
Non-economic	40.8	12.8	39.9	2.2	0.0	3.5	0.9	100
Sparta								
Economic	47.4	10.4	16.9	1.5	5.8	1.5	16.2	100
Non-economic	37.8	17.1	4.8	4.1	3.0	10.3	22.2	100
Oakfield								
Economic	35.0	28.2	12.2	5.7	0.0	1.0	12.8	100
Non-economic	31.4	28.6	15.7	11.1	6.0	5.1	2.2	100
Bowne								
Economic	64.2	9.2	14.1	9.7	0.0	2.6	0.0	100
Non-economic	48.2	18.3	15.0	13.6	0.0	3.3	1.8	100
ALL LANDOWNERS								
Economic	44.1	16.8	20.2	3.7	3.6	2.3	8.3	100
Non-economic	28.6	25.7	22.9	5.7	6.5	5.8	4.1	100
Pearson Product-Moment Correlation:	r=-.2108 sig.=.002 N=195	r=.1664 sig.=.010 N=195	r=.0436 sig.=.273 N=195	r=.0902 sig.=.105 N=195	r=.0908 sig.=.103 N=195	r=.2724 sig.=.001 N=195	r=-.1186 sig.=.049 N=195	

the individual townships. This difference, however, is not unexpected considering the number of farmers included among economic landowners. It does point out that, in terms of agriculture, land held by non-economic owners is much less intensively used than that held by economic owners.

Most of the above disparity in land cover brought about by agriculture seems to be accounted for in the next column of woodland. Here non-economic owners as a whole had 25.7 percent of their land in this cover, as opposed to 16.8 percent for economic owners. Again this relationship is highly significant at the .01 level. In addition, the relationship holds for each of the individual townships. These results are consistent with the notion that amenity-oriented landowners often seek out a forested or wooded environment. The results also lend support to the research hypothesis. Again, property held by non-economic landowners seems to be used on a less intensive basis since the growth of trees is generally considered a low intensity land use. This is especially true considering that only eleven (or 12.8%) of all non-economic landowners had ever sold any timber products off their property.

This pattern of less intensive use by non-economic owners continues to be supported by the next three columns of the table. Non-economic landowners average a greater percentage of land in the largely unproductive uses of open fields, marsh, and brush. The figures for brush land support the idea that amenity-oriented owners tend to

abandon portions of their land to let it return to its natural state. This appears to be particularly true of the two townships with the greatest percentages of amenity-oriented owners, Ada and Algoma.

The sixth type of land cover, buildings and yard, accounts for only a small portion of total land area. It is evident, however, that there is a definite tendency for non-economic owners to have a much greater percentage of their land in this type of cover than economic owners (over twice as much for the sample as a whole). While this type of cover represents a very intensive land use, it must be remembered that it is only a small percentage of total land area and it is not intensive in the usual sense of the production of economic goods.

The last category of land cover, other, is composed of several miscellaneous types; the largest proportion is composed of orchards. It can be seen that economic owners tend to have a greater percentage of land in this type of use.

From this discussion of the land cover data in Table 5, there appears to be a great deal of support for the research hypothesis of different land uses between economic and non-economic landowners. This difference relates primarily to intensity of use as represented by different cover types. The following three subsections continue the examination of land use in regard to the other three land use concepts of tenure, value, and activity.

Land Tenure

An additional land use concept which receives frequent attention is that of land tenure. Tenure is a very broad concept referring to the general ownership and control of land. It involves a number of variables, all of which have implications for the way in which land can be and is used. Variables discussed in this section include parcel size, length of ownership, means of acquisition, rental arrangements, land sales information, financial arrangements under which land is held, and a classification and discussion of ownership types.

Data relating to the first tenure variable, parcel size, is shown in Table 6. Here it can be seen that for the sample as a whole non-economic owners averaged a parcel size of 45.01 acres, as compared to 50.15 acres for all economic owners. However, the Pearson Product-Moment Correlation Coefficient, which measures the relationship between parcel size and ownership objective by respondent takes the value of -.0740, which is significant only at the .15 level. In addition, this negative association between non-economic ownership objectives and parcel size holds only for three of the six individual townships. Thus, the notion of smaller parcel size for non-economic owners, which would be consistent with the major research hypothesis, is only partially supported by the data.

In regard to the second variable, length of ownership, the reader is referred to Table 3 of the previous

Table 6.--Parcel Size by Ownership Objective.

	Mean Number of Acres	Pearson Product-Moment Correlation
Ada		r = -.0087
Economic	43.36	significance = .480
Non-economic	42.62	N = 35
Algoma		r = .0567
Economic	36.31	significance = .379
Non-economic	38.63	N = 32
Gaines		r = .0031
Economic	47.17	significance = .493
Non-economic	47.40	N = 32
Sparta		r = .0876
Economic	51.3	significance = .311
Non-economic	58.09	N = 34
Oakfield		r = -.3468
Economic	57.26	significance = .021
Non-economic	55.00	N = 27
Bowne		r = -.0489
Economic	59.12	significance = .404
Non-economic	55.00	N = 27
ALL LANDOWNERS		r = -.0740
Economic	50.15	significance = .152
Non-economic	45.01	N = 195

chapter which presented data on the mean number of years owned by ownership objective. Referencing the discussion of that table, it can be seen that the data do provide support for the research hypothesis in that non-economic owners tend to have held their property for shorter lengths of time than economic owners. Thus land use does tend to differ between the two ownership groups in regard to this important tenure variable.

All but the least of the remaining tenure variables may be only briefly discussed as few significant differences existed among them in relation to ownership objectives. In regard to means of acquisition, most of the sample had actively sought out their property; nearly 90 percent of all landowners had purchased their land. Seven percent acquired their property through inheritance and 3 percent through gift. Only fifty-three landowners rented out any of their property and this activity did not differ appreciably between landowner types. An even smaller number of landowners (thirty) rented or leased property from others. By far the majority of this group (twenty-four) were accounted for by economic owners.

Land sales information was gathered to determine the extent of participation of the sample in the real estate market. This data is shown in Table 7. As can be seen, the majority of the sample may be considered to be relatively inactive in this regard. The great majority of the sample are not offering their property for sale, and a

Table 7.--Land Sales Information by Ownership Objective.

	Is Land Currently for Sale?		Do You Thank You Will Sell Land Within Next 10 Years?		Bought or Sold Any Other Land Within Last 5 Years?	
	Yes	No	Yes	No	Yes	No
Economic	10	82	30	46	35	56
Non-economic	4	85	26	55	30	57
	Chi Square = .156 DF = 1 significance = .184 N = 181		Chi Square = .635 DF = 1 significance = .425 N = 157		Chi Square = 1.56 DF = 1 significance = .692 N = 178	

large majority do not expect to sell within the next ten years. Further, most of the sample has neither bought nor sold any land, other than the survey parcel, within the past five years.

A rather interesting finding is shown in Table 8 dealing with the financial conditions under which land is held. The large majority of the sample (70.8%) own their property outright or free of financial encumberances. This result is consistent, however, with those of Larsen and Gansner as reported in Chapter II.

The final tenure variable investigated concerns ownership class, here referring to the residential location of the respondent in reference to the survey parcel. The categories as shown in Table 9 are similar to those developed by Wilkins and Erickson in their New York study. Relatively more landowners were found in the On-Site and

Table 8.--Financial Encumberances on Land by Ownership Objective.

	Own Land Free and Clear	Do Not Own Land Free and Clear
Economic	64	25
Non-economic	60	26

Chi Square = .021
DF = 1
significance = .994
N = 175

Adjacent classes and fewer in the Absentee class than was the case in the New York study area. This is not surprising, however, given the differing character of the two study regions. The three western New York counties are often thought of as a resort-type area, often with second home development. The study area at hand is characterized more by farming and rural residential uses.

Finally, it should be noted that significant differences in ownership class do exist between economic and non-economic owners. Non-economic owners are more likely to be found on site, while economic owners are more likely to live either adjacent to the survey parcel or in the local area. The chi square and Cramer's V statistics indicate the high significance and strength of this relationship. These results are consistent with the notion that non-economic owners hold their land primarily for its rural residential value, and such use obviously requires on-site residence.

Table 9.--Ownership Class by Ownership Objective.

	On Site	Adjacent	Neighborhood	Nearby City	Absentee	Institutional
Economic	37	26	15	12	2	7
Non-economic	67	11	2	10	0	6

Chi Square = 26.895

DF = 5

significance = .000

Cramer's V = .371

N = 195

On the other hand, farmers and other economic owners need not reside on-site to be afforded the economic benefits provided by their survey parcels.

Land Value

The next land use concept to be examined is that of land value. While land value is a type of land use only in a very loose sense, it nevertheless has very direct ramifications on the way in which land is used. Obviously, the value of a single parcel of land, as translated into price, has a substantial effect on the use to which that land may be put. In the general case, as the price of land rises, so must the intensity with which it is used.

This effect is compounded in that it holds true not only for single or isolated parcels, but for whole units or areas of land as well. This is due largely to the nature of property taxation which is based on a standard percentage (over a local area) of officially assessed value. Assessed value in turn is often affected by the selling price of neighboring parcels as reflected in the market-comparison approach to land appraisal. Thus, the sale price of one or several land parcels may directly affect other, nearby land by raising or lowering its assessed value and so its property tax and holding costs. The classic example of this process is the high priced sale of farm or other open land in an urbanizing area for purposes of higher development. This may cause a rise in

property tax on surrounding farm land, thus diminishing its ability to remain in this lower intensity use.

Land value in the study was measured on the basis of official assessed values which were obtained from appropriate Kent County public records. Assessed value represents what is considered by the local tax assessor to be 50 percent of the property's fair market value. Assessed value for each parcel was then divided by the number of acres in the parcel to obtain an assessed value per acre for comparison purposes.

The data relating to land value are shown in Table 10 and suggest that the value of land held by non-economic owners is substantially higher than that held by economic owners. For the sample as a whole, land held by non-economic owners was assessed at an average of $337.27 per acre, over one-third higher than land held by economic owners ($219.19 per acre). Measuring this relationship by respondent, it was highly significant at the .001 level. Further, the relationship holds for all but one of the individual townships. This result provides additional support for the research hypothesis.

Activity on Land

The final land use concept to be discussed is probably the most familiar aspect, human activity on the land, the purpose for which land is used. In this respect, the concern is more with people than with the land

Table 10.--Assessed Value per Acre by Ownership Objective.

	Assessed Value Per Acre
Ada	
Economic	234.61
Non-economic	564.44
Algoma	
Economic	171.59
Non-economic	261.84
Gaines	
Economic	318.52
Non-economic	307.11
Sparta	
Economic	213.91
Non-economic	281.28
Oakfield	
Economic	198.80
Non-economic	233.26
Bowne	
Economic	180.25
Non-economic	250.08
ALL LANDOWNERS	
Economic	219.19
Non-economic	337.27

Pearson Product-Moment Correlation:

r = .2254
significance = .001
N = 195

itself, yet the usual way of classifying this type of land use is not done in connection with people or landowners, but is done on the basis of land types, land cover, or other natural and physical features. A somewhat different picture emerges on the basis of the study data.

Some of the discussion thus far has already dealt with this concept. For example, in the section on land cover it was determined that 42.8 percent of all surveyed land was in crops; this land then can be safely classified as being used for agricultural production. In addition, 6.9 percent of the land was designated as simply being in "other" types of land cover. However, it was noted that most of this category was made up of land planted in orchards, so this can be added to the overall classification of agricultural. Further, 3.2 percent of the land was occupied by buildings (usually single family homes) and yard, indicating a proper classification of residential.

This is about as far as one can correctly go in classifying activity on the basis of land cover or other natural and physical characteristics. Oftentimes, however, land known to be covered in woods or forests is classified as being in forestry; or perhaps at best this land is classified only as to its natural characteristics with the present use dimension left undetermined. As previously noted, 18.7 percent of the study area was found to be woodland. To classify this as being in forestry would certainly be misleading given the distinterest of most

landowners in forest practices as they relate to timber production and sale.

Moreover, the balance of the study area found to be in open fields, marsh and brush (together totaling 28.4%) would most often be classified simply as idle since it is not engaged in the production of any tangible products, nor is it used for any visible or obvious purpose. Indeed, driving through the study area one is struck by the vastness of this seemingly unused land. But is this land really "idle" or "unused"? The results of this study seem to indicate otherwise. Perhaps the agrument can be made that property held by economic owners, primarily farmers, which is not in crops or buildings and yard is essentially excess land that is either unusable or for which little demand exists. Such land might be correctly classified as idle. This argument does not seem to apply for land held by non-economic owners. These persons typically hold land parcels of considerable size (averaging just over forty-five acres in the study area), of which only a very small portion is used intensively for residential purposes. Yet the balance of the property holds considerable value in terms of production of a variety of intangible benefits. These benefits are typically such amenity related ends as isolation, privacy, attractive living environment, recreation, and close association with nature. In this sense it can be concluded that much of this seemingly idle land in woods, open fields, brush and marsh is very definitely used

in the best traditions of open space. The extent of the value placed upon this use is apparent in the willingness to pay on the part of its owners.

Summary of Results

Examining the previous four subsections in aggregate it is evident that much support exists for the hypothesis of a difference in land use between economic and non-economic owners. Land held for non-economic purposes tends to be in less intensive land cover types and likewise used less for the production of economic goods. It is held in smaller parcels for a shorter period of time and is valued at a much higher level. Thus it is concluded that in these four important ways the research hypothesis is supported.

Hypothesis No. 6: Land use patterns associated with non-economic owners differ significantly from those of economic owners.

Results: Supported.

Land Management Practices

The final section of this chapter deals with selected management practices undertaken by landowners. The treatment is broad in that a wide interpretation is given to this term to include a variety of both actions and decisions which affect the way in which land is used. At the same time, attention is limited to a selected few of these practices which were felt to have the widest

applicability over the study area and those which were felt to have a significant impact on the overall environment.

The research hypothesis to be tested in this section is that the management practices undertaken by non-economic owners tend to differ significantly from those of economic owners. As in the last section the discussion is broken down into four subsections, each of which deals with one of the following groups of management practices: land alteration, wildlife, recreation, and processing. At the conclusion of the section a summary is presented to determine the extent of support for the hypothesis.

Land Alteration

As the term implies, land alteration concerns activities which result in physical changes to or on the land. Respondents were asked which of five common practices they had engaged in and the results are shown in Table 11. With the exception of the establishment of ponds, non-economic landowners tended to be more active in regard to each of the management practices in question. The chi square statistic is significant in each case at at least the .11 level.

It is difficult, however, to draw quantitative conclusions regarding the impacts of these actions on the overall environment. Often such actions have both positive and negative effects, with the resulting desirability of the total impact being a matter of value judgment. For

Table 11.--Land Alteration Activities by Ownership Objective.

	Built Fences	Built Roads	Constructed Trails	Planted Trees	Built Pond	N
	Percentage					
Ada						
Economic	37.5	25.0	0.0	50.0	12.5	8
Non-economic	63.6	36.4	22.7	71.4	9.1	22
Algoma						
Economic	69.2	0.0	0.0	61.5	15.4	13
Non-economic	52.9	5.9	5.9	76.5	11.8	17
Gaines						
Economic	33.3	100.0	0.0	46.2	25.0	13
Non-economic	50.0	100.0	14.3	64.3	7.1	14
Sparta						
Economic	43.5	8.7	0.0	61.9	17.4	23
Non-economic	60.0	20.0	0.0	90.0	30.0	10
Oakfield						
Economic	41.2	5.9	0.0	58.8	0.0	17
Non-economic	43.8	6.3	25.0	66.7	18.7	16
Bowne						
Economic	31.3	0.0	6.3	18.8	6.3	16
Non-economic	63.6	9.1	0.0	54.5	0.0	11
ALL LANDOWNERS						
Economic	42.7	5.7	1.1	50.0	12.3	89
Non-economic	55.6	14.4	13.3	70.5	12.2	90
	x^2=2.46 DF=1 sig.=.116	x^2=2.85 DF=1 sig.=.091	x^2=7.94 DF=1 sig.=.004	x^2=6.85 DF=1 sig.=.008	x^2= DF= sig.=	

example, building fences may inhibit the migratory or cyclic pattern of large animal species such as the deer, thus having a negative impact. On the other hand, fences also provide excellent habitat for some popular small game species such as pheasant and grouse.

While similar mixed conclusions may be drawn about each of the first four management practices examined, adequate treatments of which may be obtained only through individual detailed study, there is one aspect common to all which appears to have negative implications. In each case adoption of the management practice tends to reduce the open appearance of the land and thereby reduces its rural character. The building of fences, roads, and trails all result in linear boundaries or markings which divide land into smaller areas and parcels which are less characteristic of the open countryside. In addition, the planting of trees and return of previously open areas to brush and eventually woodland further reduces the openness associated with rural land. In regard to this conclusion, the finding that non-economic owners are more likely to undertake these management practices takes on added importance. The shift of land to non-economic uses can be seen as having a detrimental effect on the existence of open land near urbanized areas.

The final practice examined in Table 11 is the building of ponds. This was not found to be a common practice; only about 12 percent of the sample had

undertaken such a project. This practice was equally distributed between economic and non-economic landowners.

Wildlife Resources

Three simple measures were gathered on landowner actions designed to attract or retain wildlife on their property. Two logical activities in this regard are the maintenance of birdfeeders and the provision of bird houses or nest boxes and these proved to be popular activities as shown in Table 12, especially among non-economic owners. This group of landowners had a far greater propensity to be concerned with this form of wildlife than economic owners; this relationship, as measured by the chi square statistic, being highly significant. The relatively high value of the phi statistic indicates the strength of the relationship.

The third measure concerned a variety of practices designed to attract other forms of wildlife. Commonly mentioned activities included the planting of food sources in the form of special crops and shrubs. Again these activities proved to be popular, being practiced by 41 percent of all landowners. There was no significant difference, however, between economic and non-economic owners.

Outdoor Recreation

Table 13 displays a series of data relating to outdoor recreational aspects of land. The first three columns concern recreational activities of the landowner

Table 12.--Wildlife Activities by Ownership Objective.

	Maintain Birdfeeder	Maintain Bird Houses	Attract Other Wildlife	N
	Percentage			
Ada				
Economic	0.0	0.0	14.3	7
Non-economic	86.4	63.6	54.5	22
Algoma				
Economic	23.1	38.5	38.5	13
Non-economic	35.3	41.2	41.2	17
Gaines				
Economic	16.7	8.3	33.3	12
Non-economic	28.6	28.6	35.7	14
Sparta				
Economic	34.8	17.4	43.5	23
Non-economic	50.0	60.0	50.0	10
Oakfield				
Economic	17.6	11.8	41.2	17
Non-economic	37.5	37.5	50.0	16
Bowne				
Economic	25.0	25.0	37.5	16
Non-economic	45.5	36.4	27.3	11
ALL LANDOWNERS				
Economic	22.7	18.2	37.5	88
Non-economic	50.0	45.6	44.4	90
	Chi Square=13.2 DF=1 significance=.000 Phi=.283	Chi Square=14.08 DF =1 significance=.000 Phi=.293	Chi-Square=.623 DF=1 significance=.429 Phi=.070	

Table 13.--Outdoor Recreation Activities by Ownership Objective.

	Hunt on Property	Hike on Property	Snowmobile on Property	Post Property	Allow Public Hunting	Allow Public Hiking	Allow Public Snowmobiling	N
	Percentage							
Ada								
Economic	50.0	25.0	12.5	37.5	62.5	37.5	51.7	8
Non-economic	40.9	81.8	18.2	45.5	45.5	36.4	19.0	22
Algoma								
Economic	38.5	46.2	23.1	53.8	92.3	69.2	50.0	13
Non-economic	47.1	76.5	29.4	41.2	64.7	70.6	76.5	17
Gaines								
Economic	41.7	54.5	33.3	38.5	69.2	69.2	61.5	13
Non-economic	35.7	85.7	42.9	14.3	76.9	69.2	61.5	14
Sparta								
Economic	47.8	52.2	39.1	21.7	65.2	17.4	52.2	23
Non-economic	40.0	80.0	30.0	30.0	60.0	40.0	60.0	10
Oakfield								
Economic	35.3	58.8	35.3	41.2	64.7	41.2	58.8	17
Non-economic	56.3	68.8	56.3	50.0	50.0	37.5	43.8	16
Bowne								
Economic	31.3	56.3	31.3	37.5	75.0	75.0	25.0	16
Non-economic	54.5	100.0	18.2	18.2	72.7	54.4	36.4	11
ALL LANDOWNERS								
Economic	40.4	51.1	31.5	36.7	71.1	77.2	54.3	89[a]
Non-economic	45.6	81.1	32.2	35.6	62.4	73.8	54.5	90[a]
	x^2=.290 DF=1 sig.=.589	x^2=16.57 DF=1 sig.=.000	x^2=.002 DF=1 sig.=.959	x^2=0.00 DF=1 sig.=1.00	x^2=1.14 DF=1 sig.=.284	x^2=.047 DF=1 sig.=.827	x^2=.017 DF=1 sig.=.895	

[a]N varies for last three columns.

on his own property. Considering the typically amenity-related objectives of non-economic owners, it seems reasonable to expect this group to more often use their property for recreational purposes. The data show that this is true for the activities of hunting and hiking, although the difference is statistically significant only for the latter. There is virtually no difference between economic and non-economic owners in regard to snowmobiling. Perhaps this is due to the unfavorable reputation of the snowmobile in regard to its effect on the physical environment, remembering that non-economic landowners were more inclined to be concerned with environmental protection.

It would also seem logical that those persons who are more oriented to the amenity aspects of their land would be less inclined to allow recreational use of their property by others. This would seem to enhance the recreational and other amenity benefits by avoiding crowding and maintaining privacy. The data relating to this subject are shown in the last four columns of Table 13. On the basis of posting of land this notion is not supported; a nearly euqal percentage of both groups of landowners posted their property against trespass. However, this measure may be somewhat biased when one considers the relatively smaller size of parcels held by non-economic owners. Perhaps there is felt to be less need for the posting of these smaller tracts due to their lesser desirability for recreational pursuits.

A better measure of this variable would be the actual number of landowners who do or do not allow various public recreational uses. For hunting and hiking a slightly smaller percentage of non-economic owners allow public access than do economic owners; however, the relationship is not statistically significant. For snowmobiling the two groups are nearly identical. Thus, it may be concluded that the study results indicate only a possibly slight tendency toward different management practices for both private and public recreation between economic and non-economic landowners. This tendency is toward greater private and lesser public use on the part of non-economic owners. However, these relationships were generally not statistically significant and held only for hunting and hiking and not snowmobiling.

Processing

The final class of land management practices to be examined is that related to processing or the production of economic goods. Much of the data bearing on this subject has already been presented, but it is useful to explicitly reconsider it in this new light. Economic production is broken into three major categories for this purpose: agriculture, forestry, and other business and commercial uses. These seem to be the most appropriate economic uses of land in the study area.

In regard to agriculture, it was noted earlier in this chapter that 42.8 percent of the survey land was planted in crops. However, this seems to vary substantially between ownership objectives with economic owners averaging 44.1 percent of their land in this use compared to 28.6 percent for non-economic owners. Obviously, this latter group of owners manage their land much less intensively for agricultural production. With respect to forestry, non-economic owners were seen to be more active in tree planting. The 70.5 percent of this group had planted trees on their property and 55.8 percent intended to plant more trees in the future; this compares to 50.0 percent and 34.4 percent, respectively for economic owners. However, with regard to cutting and sale of timber products the results are just the opposite. Of the 21.6 percent of economic owners had sold timer products compared to only 12.8 percent of non-economic owners. Thus, the proper conclusion to be drawn is that land owned for non-economic purposes, while perhaps having greater potential for the production of forest products, is managed for this use on a less intensive basis than land held primarily for economic purposes.

The final category of economic production is other business and commercial uses. By definition land used for these purposes was classified as being owned for economic objectives. Thus, no land held by non-economic owners was used for this type of production. This compares with a

total of six parcels in this category of use which were held by economic owners.

Summary of Results

Again by examining the previous four subsections in aggregate, substantial support may be found for the hypothesis of significant differences in land management practices between economic and non-economic owners. Non-economic owners tended to more often undertake projects which result in reducing the open or rural character of the land. They tended to be somewhat more oriented toward attraction of wildlife and possibly somewhat more possessive of recreational benefits emanating from their land. Finally, they tended to be significantly less inclined to manage their land for purposes of economic production. Thus, it may be concluded that in regard to these four classes of management practices, the research hypothesis is supported.

Hypothesis No. 7: Land management practices adopted by non-economic landowners differ significantly from those of economic owners.

Results: Supported.

CHAPTER VII

FINDINGS: LAND USE POLICY

This chapter is divided into three major parts. The first examines landowner attitudes toward two general issues which have direct implications for the formulation of land policy. The second part focuses more specifically on attitudes toward two particular land policy programs which are currently receiving popular attention and which are applicable to the study area. The analysis is primarily in terms of differences in receptivity to these programs between economic and non-economic landowners. The final part of the chapter examines the response to these programs in more depth by considering the data set in aggregate. A correlation matrix consisting of previously examined variables is prepared to determine the effect of each on those groups of cases which are favorable or unfavorable toward each of the two land use programs investigated.

General Land Use Attitudes

Attitudes toward two general issues were investigated: (1) community growth and (2) the role of government

in regulating community growth. Respondents were asked what they would like to see happen to the population of their community over the next five years--increase, stay about the same, or decrease--and whether they thought the government should take some definite action to achieve this end. The results of these questions are shown in Table 1.

In regard to the first issue of community growth, it was hypothesized that non-economic landowners would more strongly favor limiting future growth in order to protect the values of privacy and spaciousness which they seek. It can be seen from the table that the data bear out this hypothesis using Kendall Rank-Order Correlation as the test statistic. A larger percentage of non-economic owners favor a constant population level or even decreasing population levels in the future, while a smaller percentage favor an increasing population level.

It is interesting to note the desire for limited community growth on the part of the sample as a whole. Over 85 percent of all respondents did not wish to see the population of their community increase over the next five years.

Response to the second question of government role in regulating community population growth is also shown in Table 1. It was hypothesized that in keeping with their stronger desire for limiting community growth, non-economic landowners would more strongly favor government action in this regard. The data show that a larger percentage of

Table 1.--Attitudes Toward General Land Use Controls by Ownership Objective.

	Desire for Community Population Growth				Favor Government Action		
	Increase	Stay the Same	Decrease	N	Yes	No	N
	Percentage				Percentage		
Ada							
Economic	12.5	87.5	0.0	8	33.3	50.0	6
Non-economic	9.5	61.9	28.6	21	31.6	68.4	19
Algoma							
Economic	7.7	76.9	15.4	13	30.8	69.2	13
Non-economic	5.9	82.4	11.8	17	53.3	46.7	15
Gaines							
Economic	53.8	46.2	0.0	13	15.4	84.6	13
Non-economic	21.4	78.6	0.0	14	28.6	71.4	14
Sparta							
Economic	8.7	73.9	17.4	23	17.4	82.6	23
Non-economic	10.0	90.0	0.0	10	0.0	100.0	10
Oakfield							
Economic	5.9	82.4	11.8	17	12.5	87.5	16
Non-economic	13.3	80.0	6.7	15	37.5	62.5	16
Bowne							
Economic	12.5	87.5	0.0	16	60.0	4.0	15
Non-economic	0.0	90.9	9.1	11	36.4	63.6	11
ALL LANDOWNERS							
Economic	15.6	75.6	8.9	90	27.1	72.9	85
Non-economic	10.2	78.4	11.4	88	32.9	67.1	85
	Kendall Rank-Order Correlation: τ = .0796 significance = .058 N = 178				Chi Square = .448 DF = 1 significance = .503 N = 170		

non-economic landowners do favor definite governmental action in this area, but the difference between the two groups is not statistically significant as measured by the chi square test. Thus, the hypothesis is not supported.

Again, it is interesting to note the response to this question for the sample as a whole, especially in light of the results of the previous question. The overwhelming majority of respondents (70%) did not favor governmental action to regulate community growth, while an even larger majority did desire limiting future community growth. This seems paradoxical when one considers that historical growth trends are not likely to be abated without some form of collective action. The amenities provided by relatively sparsely populated areas are a form of commons, entry into which must eventually be regulated to avoid over-exploitation and degredation. This does not necessarily mean immediate limitation on population growth, but implies some needed control or direction to this growth process.

These seemingly contradictory attitudes might be best explained by an overall disenchantment with and distrust of government in general. This was the subjective impression gained by most of the interviewers, including the writer. For many of the respondents, contact with government agencies has been of a largely negative character--taxation, licensing, and so on. However, when attitudes are directed away from government in general and toward specific program proposals (as is done in the next

section), this heavily negative response pattern appears to mellow.

Hypothesis No. 8: Non-economic landowners more strongly favor regulating future community growth than do economic owners.

Results: Supported.

Hypothesis No. 9: Non-economic landowners more strongly favor government action in regulating future community growth than do economic owners.

Results: Not supported.

Attitudes Toward Specific Land Use Programs

In the next analysis attitudes were examined toward the two land use programs of preferential taxation and separation of development rights. After briefly outlining the principles involved in each of these programs, the interviewers asked the respondents if they would favor entering into such agreements. It was hypothesized that there would be no difference between economic and non-economic landowners with respect to the preferential taxation program, but that non-economic owners would be more likely to favor the development rights program. This was based on the reasoning that the limited time period involved in the preferential taxation program allowed equal benefit to both groups of landowners in the form of reduced holding costs and posed no unequal hardships in that land could still eventually be sold and/or developed for higher uses. However, the permanency of the separation of development rights precludes the possibility of higher

economic development in the future, thus posing a greater disadvantage to those persons whose interests in land are primarily of an economic nature.

The results shown in Table 2 support the first hypothesis in regard to the preferential taxation program. An average of 43 percent of the sample as a whole would favor this type of program with these being divided almost equally between economic and non-economic groups. However, the data do not support the second hypothesis regarding the development rights program. Here 33.7 percent of economic owners favor entry compared to 22.7 percent of non-economic owners, this difference being statistically significant at the .05 level as measured by the Spearman Rank-Order Correlation test.

The most plausible explanation of this result stems from the fact that the majority of economic landowners are farmers. The rising holding costs of land in the form of increasing taxes has been traditionally recognized as a major problem to this group of landowners, and thus they may more readily recognize and accept the necessity of the seemingly drastic and unconventional nature of the public purchase and holding of development rights.

Hypothesis No. 10: There is no difference between economic and non-economic owners as to the favorableness of placing their land under a preferential taxation program.

Results: Supported.

Table 2.--Attitudes Toward Specific Land Use Programs by Ownership Objective.

	Favor Preferential Taxation Program				Favor Development Rights Program			
	Yes	Don't Know	No	N	Yes	Don't Know	No	N
Ada								
Economic	7.50	0.0	25.0	8	37.5	12.5	50.0	8
Non-economic	55.0	0.0	45.0	20	20.0	10.0	70.0	20
Algoma								
Economic	15.4	010	84.6	13	50.0	7.7	61.5	13
Non-economic	58.8	0.0	41.2	17	23.5	0.0	76.5	17
Gaines								
Economic	33.3	25.0	41.7	12	33.3	16.7	50.0	12
Non-economic	28.6	0.0	71.4	14	21.4	0.0	78.6	14
Sparta								
Economic	43.5	4.3	52.2	23	21.7	8.7	69.6	23
Non-economic	30.0	0.0	70.0	10	20.0	10.0	70.0	10
Oakfield								
Economic	41.2	5.9	52.9	17	29.4	5.9	64.7	17
Non-economic	31.3	25.0	43.8	16	18.8	25.0	56.3	16
Bowne								
Economic	62.5	0.0	37.5	16	56.3	0.0	43.8	16
Non-economic	36.4	9.1	54.5	11	36.4	0.0	63.6	11
ALL LANDOWNERS								
Economic	43.8	5.6	50.6	89	33.7	7.9	58.4	89
Non-economic	42.0	5.7	52.3	88	22.7	8.0	69.3	88
	Spearman Rank-Order Correlation:				Spearman Rank-Order Correlation:			
	r = .0180				r = .1205			
	significance = .407				significance = .055			
	N = 177				N = 177			

Hypothesis No. 11: Non-economic landowners more often favor placing their land under a development rights program than do economic owners.

Results: Not supported.

Examining the Response to Land Use Programs

The final part of this chapter is devoted to examining in more detail the response to the two hypothetical land policy programs just discussed. All of the variables previously considered in the study were examined in an effort to determine their relationship or influence on those groups of respondents who were favorable or unfavorable toward each of the proposed programs. The purpose of the analysis was to determine what types of landowners and land might be expected to enter into these programs if they were conducted on a voluntary basis.

The analysis was done through preparation of the correlation matrix appearing as Table 3. The values appearing in the matrix are correlation coefficients for the appropriate row and column variables.[87] The problem of categorical variables was overcome by means of indexing procedures. For example, the three nominally scaled variables of income, education, and occupation were combined to form the single socio-economic index represented by SES. The five indexing procedures utilized are detailed in Appendix C. The variables included in the matrix are

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[87] An α value of .15 was used as the minimum level of statistical significance throughout this discussion.

Table 3.--Correlation Matrix.

	PREFTAX	DEVRGHTS	SES	AGE	DISTWORK	ENVORNT	CROPS	WOODS	OPENFLD	YRSOWNED	NOACRES	VALUACRE	LNDALTER	WLDLIFE	PRIVREC
DEVRGHTS	.41799														
SES	-.06149	-.11658													
AGE	-.09281	.02215	-.33406												
DISTWORK	-.13403	-.06062	.11442	-.14381											
ENVORNT	.11354	.14748	.28248	-.18996	.21264										
CROPS	.08928	.08869	-.20502	.07560	-.11309	-.25124									
WOODS	-.01263	-.00056	.18758	-.11163	.15940	.22764	-.47794								
OPENFLD	-.14438	-.12337	-.03994	-.02251	.05750	.12030	-.52351	-.09840							
YRSOWNED	.00108	.05442	-.40389	.62063	-.10501	-.17657	.05617	-.10385	-.06648						
NOACRES	-.00403	.05000	-.05343	.10853	-.02514	-.10510	.21586	-.14085	-.14085	.06398					
VALUACRE	-.00729	-.03764	.35057	-.15526	.23725	.23321	-.19894	.12426	.01705	-.12639	-.25090				
LNDALTER	-.02510	-.01754	.36615	-.12627	.23553	.30503	-.13602	.27355	.00626	-.24876	-.01196	.18821			
WLDLIFE	.05817	-.05529	.36078	-.01445	.12362	.27968	-.21933	.10491	.02871	-.08694	.00727	.32989	.33935		
PRIVREC	.07447	.05772	.10475	-.23085	.09944	.14177	-.02846	-.02515	-.02815	-.12637	-.07499	.05400	.04085	.13363	
PUBREC	.03563	.05730	-.11023	-.07471	-.30716	-.06701	.15179	-.20242	-.03803	.02445	.03973	-.20561	-.14972	-.28833	.07932

representative of each of the major areas of concern in the study as outlined previously in the research model (see Figure 5).

In reference to Table 3, the concern here is primarily with the first two columns which display correlation coefficients between all variables and the two proposed land policy programs. The first row variable, DEVRGHTS, is not especially relevant and simply indicates a very high correlation between those groups of respondents favoring the development rights program and those who favor the preferential taxation program. This is not surprising and in absolute terms of the fifty respondents who favor the development rights programs, only seven do not also favor the preferential taxation program.

The next three row variables refer to selected social characteristics of landowners, all of which are significantly related to at least one of the two programs. As previously noted, SES is a socio-economic status scale composed of the three variables of income, education, and occupation. This new variable shows a strong inverse correlation with favorableness toward the development rights program, meaning that this program tends to be more appealing to those of a lower socio-economic status. Perhaps this is best explained by the suggestion that this is the group in greatest need of a reduction in the costs of holding land, and therefore, the most willing to take advantage of this aspect of the program. Socio-economic

status shows a similar relationship with the preferential taxation program, but does not meet the level of statistical significance. The stronger relationship between lower socio-economic status and favorableness toward the development rights program may be due to the additional payment to the landowner involved in this program.

The final two social characteristics of respondents are AGE and DISTWORK, representing age of the landowner and distance traveled to work. Both show a relatively strong inverse relationship with favorableness to the preferential taxation program. The greater acceptance of this program by younger persons has two possible explanations. First, younger persons are generally thought to be more tolerant to such relatively new ideas or concepts as represented by this program. Second, and more importantly, older persons often may be hesitant to tie up their property for a period of ten years or more while facing the uncertainties of the future associated with older age. This may be especially true considering the average age of the sample as a whole of 53.8 years with 34 percent being sixty years of age or older.

The next variable, ENVORNT, is environmental orientation of respondents as measured by the Likert-type scale discussed in Chapter VI. Strong positive relationships exist between this variable and both of the proposed programs, meaning that respondents who are more supportive of environmental protection policies are more inclined to

favor entry into each of the programs. These results are consistent with the notion that persons who are more concerned about environmental protection see these programs as a means of regulating future growth and possibly limiting the environmental degradation often associated with it.

The next six variables deal with three aspects of land use and were included in the analysis to provide an indication of the type of land which could be expected to be entered into the two proposed programs. The first three of these variables concern land cover type and represent the percentage of land in crops, woods, and open fields. Together these three land cover types account for over 80 percent of all surveyed land. As indicated in the table, the percentage of land in crops is directly related to favorableness toward both of the land policy programs, while the percentage of land in open fields is inversely related. These results offer some encouragement in regard to the effectiveness of these programs as both are often designed largely for purposes of preserving productive agricultural land. The data indicate that there is a strong tendency for this type of land to be attracted into both of the programs. The correlation coefficients for woodland are very weak and therefore not definitive.

The final three land use variables were included in an effort to discern some information on length of ownership (YRSOWNED), parcel size (NOACRES), and assessed value

per acre (VALUACRE) of land which might be entered into each of the programs. While the signs of the coefficients may provide some indication of the direction of the relationships involved, the values do not approach levels of statistical significance, thereby precluding any definitive discussion. The same situation exists for the last four variables, each of which is an index in regard to previously discussed land management practices.

In summary, the data indicate that if the two land use policy programs of preferential taxation and separation of development rights by public purchase are administered on a voluntary basis and as outlined in the survey instrument, the following may be expected: Both programs will attract landowners of lower than average socio-economic status, with this being particularly true of the development rights program. In addition, the preferential taxation program will attract younger than average landowners. Both programs will be found to be more favorable to persons who travel shorter distances to work and to landowners who are considerably more supportive of environmental protection policies in general. Finally, land entered into both programs is more often likely to be land planted to crops and less likely to be in the less intensive cover type of open fields.

CHAPTER VIII

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This study was designed to investigate the relationship between changing lifestyles related to creation and leisure and land use in the urban fringe. The first chapter of the report provided the reader with a general introduction to this problem area and set forth a three-fold set of objectives for the study. These objectives dealt with determining the extent to which recreational and amenity values influence the purchase and holding of land and how these ownership objectives affect both the use and management of this property and landowner attitudes toward public land policy.

The second chapter reviewed a body of pertinent literature, including a number of studies of various landowner types. Based on this review, a series of hypothesss was made in Chapter III in regard to each of the study objectives. A research model was presented which outlined the conceptual development of the study and indicated the way in which the objectives, hypotheses, and research variables interact.

The fourth chapter described the research methods used in the study. A field survey was conducted of 195 landowners in an urbanizing Michigan county. The personal interview technique was employed in gathering the data. Chapters V through VII presented the study findings, including the testing of hypotheses. One chapter was devoted to each of the three study objectives. Of the eleven hypotheses tested, seven were supported, one was partially supported, and three were not supported. Conclusions based upon these findings are presented in the following section.

Conclusions

The findings indicate that substantial land use changes are occurring in regard to recreational and amenity values. These values were found to account for nearly half of all primary landownership objectives in the study area with this pattern being particularly prevalent in the most heavily urbanizing areas.

Land held for recreational and amenity purposes was found to differ substantially in several important ways from land held for other, more traditional purposes such as farming, investment, and other business and commercial uses. First, this land tended to be in less intensive cover types such as woods, brush, and marsh. It typically was held in smaller parcels and for a shorter period of time and was valued at a much higher level as reflected in official assessed values.

In addition, recreational and amenity-oriented landowners tended to undertake a distinctive set of management practices. Alterations to the landscape, such as planting of trees and construction of fences, roads, and trails were frequently made with the intention of improving the attractiveness of the land on an individual scale, but which also result in reducing the open or rural character of the land from the public point of view. This group of landowners was more inclined toward attraction of certain species of wildlife and used their property to a much lesser extent for the production of economic goods.

Finally, owners of land held for recreational and amenity purposes tended to be more oriented to the natural environment, being more supportive of environmental protection policies. They were also more strongly in favor of limiting future community population growth and more agreeable toward possible entry into development rights agreements with the state.

Additional study conclusions of a research nature are developed in the following section.

Research Recommendations

The Need for an Organizational Framework

Due to the complexity of land use and natural resources problems in general, conclusions regarding their study are best made within some organizational framework or model. In the broadest sense, the use of land and other

natural resources encompasses virtually all aspects of man's activity. In the study at hand variables were investigated of an environmental, economic, and social nature. A structured framework in which to view this widely ranging set of variables is essential to insure a thorough analysis. Such an analytical framework or model is presented below; the study findings are then considered within this model.

Building the Model

In this section a generalized model is constructed for the purpose of analyzing land use or natural resources problems. The basis for this work is to be found in the environmental impact assessment literature which has evolved since the enactment of the National Environmental Policy Act of 1969. After the model has been constructed, it is then used in the following section to analyze the study findings presented in this paper.

The model consists of two analytical frameworks which are displayed along perpendicular corrdinates to form a matrix (Figure 7). The vertical axis consists of actions involved in a natural resources or land use problem or program which may cause environmental impacts. These are termed "Problem Actions." The horizontal axis is made up of existing environmental conditions which may be impacted and are called "Evaluative Factors." (The term "environmental" is used broadly here, comprising social and

PROBLEM ACTIONS	EVALUATIVE FACTORS																
	ENVIRONMENTAL					ECONOMIC			INSTITUTIONAL								
	PHYSICAL			BIOLOGICAL		EFFICIENCY		EQUITY	CULTURAL						POLITICAL		
	Land	Water	Air	Flora	Fauna	Production	Consumption	Equity	Population	Community	Education	Recreation	Aesthetics	Religion	Government	Legal
LAND ALTERATION																	
Landscaping																	
Surfacing or Paving																	
Water Empoundments																	
Planting																	
Resource Extraction																	
Boundaries or Barriers																	
PROCESSING																	
Agriculture																	
Business and Commercial																	
Forestry																	
CONSTRUCTION																	
Housing																	
Industrial Sites and Building																	
POPULATION																	
Numbers																	
Social Characteristics																	
Mobility																	
Attitudes and Values																	
UTILITIES AND SERVICES																	
Electricity																	
Water																	
Education																	
Transportation																	
Communication																	
Health and Sanitary																	
ACTIVITY PATTERNS																	
Work																	
Leisure																	
LAND VALUES																	
OTHER																	

Figure 7.--Matrix Model.

economic factors as well as physical and biological.) The matrix thus produced provides a convenient means to determine where important impacts are occurring and thus areas to which research and administrative attention should be directed.

The frameworks are developed as a set of "checklists" and are designed to include a full range of factors which are considered relevant to the general land use situation. The purpose of the checklists is to provide a "systems view" so that important variables involved in a problem area may not be unintentionally overlooked.

In regard to the evaluative factors, the checklist framework is developed along the lines of the classifical threefold framework of land resource use as suggested by Barlowe and others.[88] The checklist of program actions is based on the writer's examination of a number of land use and environmental impact assessment reports and upon intuitive judgment. In both cases the checklists must strike a balance between comprehensiveness and manageability; they must be complete enough to remind one of all important considerations and yet they must not be so long as to bog one down in needless detail. It is probable that the ideal length of the checklists will be a function of the experience of the individual analyst and the scope of the problem under consideration.

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[88]Barlowe, Land Resource Economics.

In this case the number of evaluative factors has been set at sixteen and problem actions at twenty-four. This results in 384 possible interactions. The nature of matrix mathematics is such that if the coordinate entries are doubled, the number of cells in the matrix is increased by a factor of four. Thus it is wise to be parismonious in setting up the matrix in order to keep the analysis to manageable proportions. In any case, the checklists may be easily expanded or contracted to suit the individual situation.

Through the row-column intersections, the matrix mechanism forces the analyst to give explicit consideration to interactions which may result in specific conflicts or problems. The problems thus identified make up the focus of needed research studies.

It should be noted that the concept of matrix analysis has been suggested quite recently for purposes of environmental impact assessment. This principle was first developed by Leopold et al. for the U.S. Geological Survey in 1971.[89] Further work of a preliminary nature has been done by Sorensen using a "stepped matrix" approach[90] and

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[89]Luna B. Leopold, Frank E. Clark, Bruce B. Hanshaw, and James R. Balsley, A Procedure for Evaluating Environmental Impact, Geological Survey Circular 645 (Washington, D.C.: U.S. Geological Surcey, 1971).

[90]Jens C. Sorensen, "A Framework for Identification and Control of Resource Degradation and Conflict in the Multiple Use of the Coastal Zone" (M.S. thesis, University of California Press, 1971).

Wirth using "cross-impact" matrices.[91] The model developed in this paper differs from these efforts in three important ways. First, it expands upon these models to give equal weight to impact considerations of an economic and social nature as well as environmental considerations. Secondly, it is problem rather than project oriented, making it more generalizable. And thirdly, the model is used in a step-wise analysis procedure (which is developed below) specifying a logical sequence to the analytic process.

The need for a sequenced approach to using the model results from the recognition that the process of problem analysis should be done in a step-wise procedure.[92] The generalized planning program model has been selected as a logical and useful means of providing this order. Problems analyzed within this model start at the very beginning of problem analysis, the explicit recognition of goals and objectives, and work through the final step of implementation of a chosen alternative or course of action.

Many authors have written on the planning process, identifying various numbers of steps or stages. The general consensus is that the sequence of steps goes something as follows:

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[91]Theodore J. Worth and Association, Report and Draft Environmental Impact Statement for the Lake Tahoe Plan and Effectuating Ordinances (South Lake Tahoe, Calif.: Tahoe Regional Planning Commission, 1972.

[92]Daniel E. Chappell, "Lecture Notes: Resource Planning--Problem Definition, Problem Selection, Problem Analysis, Study Plans" (Michigan State University, 1974).

1. Establish goals and objectives
2. Determine the situation
3. Identify and analyze the problems
4. Identify and analyze the alternative courses of action
5. Decide on a course of action and implement it

Thus the problem should be analyzed within the matrix model in accordance with the above five steps. This procedure is briefly described in the following paragraphs.

Step 1: Establish goals and objectives

In most cases a general set of goals will already exist, and these should then be translated into more specific objectives in regard to each of the evluative factors. Probably little research is involved in this step, the objectives being determined through consultation between client and researcher. The objectives are then entered into the first specially designated row of the matrix under the respective evaluative factor (see Figure 8).

Step 2: Determine the situation

This step involves determining the nature and extent of the general problem area and what actions are inherent in the overall problem under study. Each of the problem actions included in the vertical axis checklist should be considered in this step. In regard to general problem areas or programs on which little previous

PROBLEM ACTIONS	OBJECTIVES / SITUATION	EVALUATIVE FACTORS: ENVIRONMENTAL — PHYSICAL: Land	PHYSICAL: Water	PHYSICAL: Air	BIOLOGICAL: Flora	BIOLOGICAL: Fauna	ECONOMIC — EFFICIENCY: Production	EFFICIENCY: Consumption	EQUITY: Equity	INSTITUTIONAL — CULTURAL: Population	CULTURAL: Community	CULTURAL: Education	CULTURAL: Recreation	CULTURAL: Aesthetics	CULTURAL: Religion	POLITICAL: Government	POLITICAL: Legal
		maintain or enhance productivity	maintain or enhance quality	maintain or enhance quality	maintain diversity	protection of habitat	maintain or enhance productivity	high standard of living	wide spread distribution of opportunities	growth not to exceed carrying capacity	provide for variety and harmony	improved opportunities	increased opportunities	maintain or increase quality	maintain freedom	serve citizen's needs	provide needed framework
LAND ALTERATION	substantially more ornamental				introduction of exotic species									improved			
Landscaping																	
Surfacing or Paving	not significant																
Water Empoundments	not significant																
Planting	substantial reforestation & afforestation	improved	improved	improved	more trees	generally increased							better conditions	improved for landowner--increased for public			
Resource Extraction	not significant																
Boundaries or Barriers	more fencing					fragmented movement											evaluate problems
	smaller holdings						potential decrease					less rural	less public access				
PROCESSING																	
Agriculture	substantially less	improved fertility	improved		return to natural vegetation	increased	substantially decreased							improved for landowner--decreased for public			
Business and Commercial	not significant																
Forestry	less cutting	improved	improved	improved	more trees	increased	decreased						better conditions	improved			
CONSTRUCTION																	
Housing	more low density					decreased habitat		increased						decreased			
Industrial Sites and Building	not significant																
POPULATION																	
Numbers	small increase							small increase		small increase	less rural						
Social Characteristics	not significant																
Mobility	substantially increased							increased			less community-oriented						
Attitudes and Values	environmentally oriented	potential improvement	potential improvement	potential improvement		potential improvement	decreased						improved for landowner--decreased for public	improved for landowner--decreased for public			
UTILITIES AND SERVICES																	
Electricity	small increase							small increase									
Water	small increase		small increase													increased expenditures	
Education	small increase															increased expenditures	
Transportation	substantial increase	some decrease									less rural			decreased		substantially increased expenditures	
Communication	small increase							small increase									
Health and Sanitary	small increase															increased expenditures	
ACTIVITY PATTERNS																	
Work	outside the community						decreased				less community-oriented						
Leisure	focused on property	potential improvement	potential improvement	potential improvement	potential improvement	potential improvement							improved for landowner--decreased for public	improved for landowner--decreased for public			
LAND VALUES	substantial increase						decreased agricultural		unfair to long-term residents							increased tax revenues	
OTHER																	

Figure 8.--Completed Matrix Model.

research has been done, this will usually require a "baseline" study to determine the present situation with respect to each of the problem actions. The results of this study are then entered into the matrix in the first specially designated column beside the respective problem action (see Figure 8).

Step 3: Identify and analyze the problem(s)

Problems are identified through consideration of each row-column intersection within the matrix. This is done by starting with the first problem action column and considering the possible or probable effect of the identified action on each of the evaluative factors in light of established goals and objectives. Where substantial effects are encountered, an appropriate notation is entered in the respective cell. If no effect is seen to occur, the cell is left blank. This process is continued for each problem action row until all cells in the matrix have been given explicit consideration. By then examining the completed matrix, problem areas to which research and administrative action should be directed can be readily identified.

Step 4: Identify and analyze the alternative courses of action

In the case of land use policy, government has five basic options or powers to direct land use: taxation, spending, proprietary, policy, and eminent domain. These

five powers may be added as bottom rows to the matrix and considered as to their possible impacts on each of the problems. It is important to also consider their impact on all other evaluative factors to recognize potential unintended side effects.

Step 5: Decide on a course of action and implement it

The decision process is the proper function of the client for whom the problem exists. This process is facilitated by the information made available in the preceding steps and does not require any further research. Likewise, implementation is aided by the simplified display of impacts in the matrix format. This allows for more easily including all relevant groups in the decision making and implementation process.

Using the Model: Research Recommendations

In this section the analytical process described above is applied to the research study findings in order to draw appropriate conclusions. In this context the present research effort is seen as fulfilling the role of a baseline study in determining the present situation with respect to the nature and extent of land use shifts in the urban fringe to recreational and amenity purposes. This constitutes step two in the process outlined above. Based on these findings the problems inherent in this land use situation are identified and analyzed within the matrix format in accordance with step three.

Step 1: Establish goals and objectives

As noted earlier, in most cases a set of goals can be assumed as given. These will usually be directly related to the goals of a particular agency or client. In this case a general set of public interest oriented goals has been adopted and these translated into specific objectives regarding each of the evaluative factors. These objectives have been entered into the matrix accordingly (see Figure 8).

Step 2: Determine the situation

As noted in the literature review in Chapter II, there has existed some recognition of the shifting of land into recreation and amenity uses over time. However, this recognition is usually rather vague with little precise knowledge as to the extent of such use and the kinds of actions involved. The major findings of this research study, as presented in the previous three chapters, provide additional information upon which to base this analysis. These findings are briefly outlined below.

It was found, for example, that the primary use of land for recreational and amenity purposes was very extensive in the study area, accounting for nearly one-half of all surveyed parcels. Moreover, these objectives were found to be becoming increasingly important in the purchase and holding of study land. This land use

situation appears to be resulting in a small increase in population due to the smaller average parcel size associated with this type of use. Population in the study area also seems to be changing in character. This was not found to be true in regard to socio-economic status as was expected, but was found in the area of environmental orientation. Recreational and amenity motivated landowners typically were much more concerned with and supportive of environmental protection policies. These persons were also found to travel substantially further distances to work, meaning that they more often worked outside of the community in which they lived.

Important differences were also found to be occurring in land use and management practices. Land held for recreational and amenity purposes was typically used on a less intensive basis for the production of economic goods such as agricultural and timber products. These landowners were also more inclined to undertake management practices designed to improve property on a micro rather than a macro scale, with a resultant decrease in the rural character of the area as a whole. Such practices include reforestation and afforestation, building of more fences, trails, and roads, and the simple reduction in average land parcel size.

Further changes in land use patterns which may be associated with recreational and amenity ownership include a small increase in demand for public services and

utilities in relation to the increase in population. A substantial increase in transportation services may be expected due to the significantly greater distances traveled to work. Finally, recreational and amenity land use appears to be resulting in substantially higher property values as reflected in the increased assessed values per acre associated with such land.

To complete step two of the problem analysis procedure, these results have been entered into the first specially designated column of the matrix as shown in Figure 8.

Step 3: Identify and analyze the problem

With all row and column headings thus recorded, each matrix cell is examined for significant interactions or impacts. These are recorded where appropriate or the cell is left blank where no impacts exist. The result of this process is shown in Figure 8. At the conclusion of this process the entire matrix is examined to identify important problem or impact areas. In this case six areas of substantial impacts become rather dramatically apparent and are pointed out in Figure 9. These impact or problem areas become the focus of the following research recommendations.

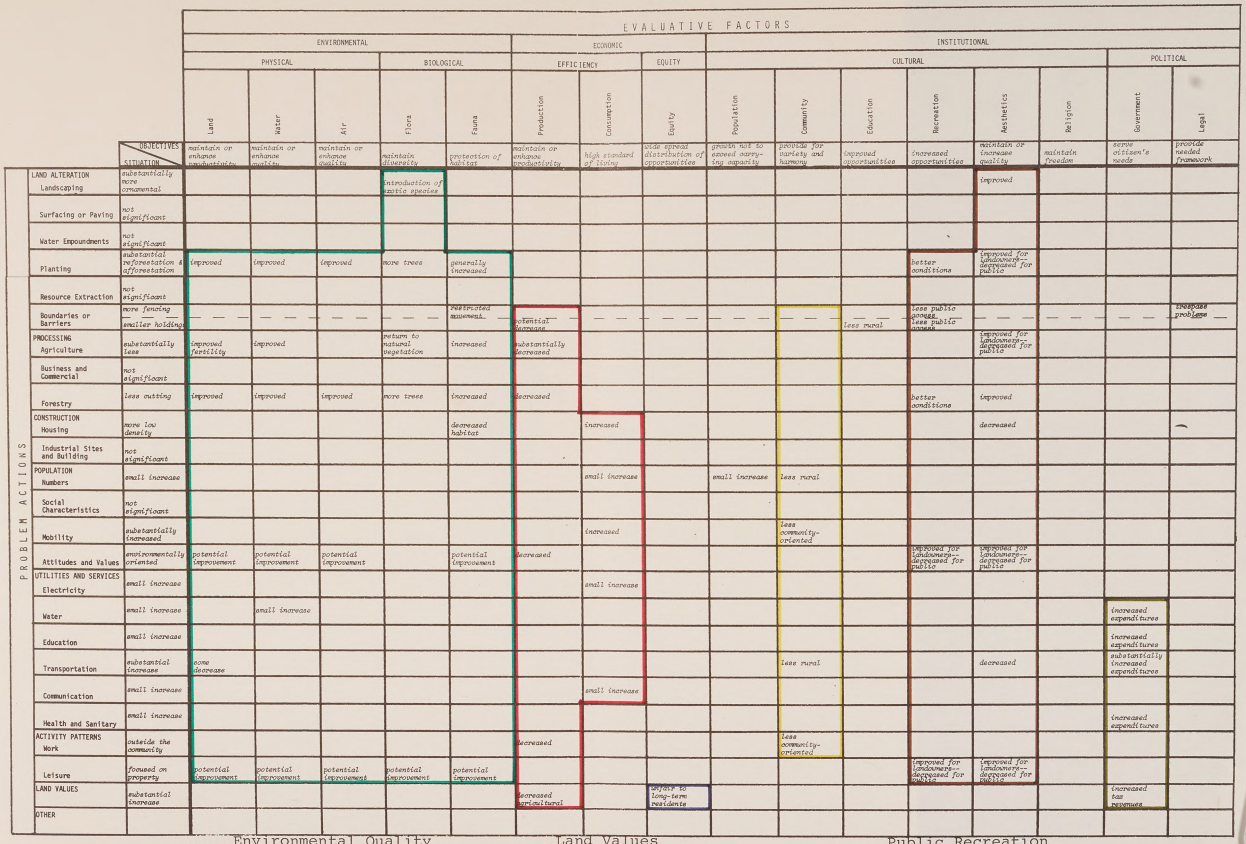

Figure 9.--Completed Matrix Model with Identified Problem Areas.

1. Environmental quality.--The attitudes and values held by amenity-oriented landowners seem to point to substantial potential for increased environmental quality. However, study needs to be undertaken to determine if this potential is being realized. Selected management practices investigated in the present research effort indicate that this is not the case. This may be due in large part to a lack of knowledge on the part of these persons and an absence of public assistance programs directed at providing needed educational services for this group of landowners.

2. Public recreation and aesthetics.--More intensive investigation needs to be undertaken into the impact of of recreational and amenity land use on opportunities for public recreation and the visual quality of the landscape. The study findings indicate that amenity oriented landowners tend to focus much of their leisure time activity on their own property and are possibly somewhat more possessive of its recreational benefits. Likewise, these persons are more apt to make improvements to their property designed to increase its attractiveness from a personal standpoint, but which may have a negative overall effect on a larger scale. Additional information on the nature and extent of this problem would be helpful for the formulation of appropriate public policy.

3.--Land values.--The study findings indicate that substantially higher land values are associated with land

owned for recreational and amenity purposes. This in turn is likely to have an effect on most land values throughout the general area. The result may be an inequitable situation for long-term local residents, especially the farming population, as higher property values mean increased land holding costs. Research should be undertaken to determine the extra burden placed upon this segment of the community. Care should be taken, however, to balance this burden with the additional profit which may be expected in the sale of this higher valued land.

4. Effect on government revenues.--Recreational and amenity land use results in increasing demands for government services, especially in the area of transportation. At the same time higher property values associated with such use provide additional local tax revenue. The net effect on government reveneus needs to be determined. Recent research in this area, such as that done by the Real Estate Research Corporation, indicates that the establishment of additional low density housing results in a net revenue loss to local government.[93]

5. Community conflict.--The influx of population with differing attitudes and values and community orientation which is inherent in the shift of land to recreational and amenity uses, is likely to result in some

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[93]The Costs of Sprawl, Real Estate Research Corporation for the Council on Environmental Quality (Washington, D.C.: U.S. Government Printing Office, 1974).

additional internal conflict within the community. This problem is exacerbated by the changing physical appearance of the community to that of a less rural character and the above-mentioned land value problem. The effect of changing lifestyles on the character and harmony of the community should be investigated.

6. Production-consumption.--The analysis indicates that in several instances shifts to recreational and amenity land uses result in decreased economic production of the local area. This is primarily in terms of agricultural production. At the same time, consumption of the local area is likely to increase due to the rise in population. While this situation may not be significant at the local level, such a trend may become quite important for the region or nation as a whole. Research should be undertaken to determine the extent of this potential problem.

Research into the above six areas is recommended to cover the major problems which seem to be associated with the shifting of land into recreational and amenity uses. Study into each area need not necessarily be of equal proportion or like approach. Some problems may be appropriately attacked through examination of existing literature or analysis of secondary data sources. This seems particularly applicable to areas three, four, and six. Other problem areas will likely require gathering additional field or survey data.

The final research step needed in the planning process is the identification and evaluation of alternative courses of action. This refers to the study of appropriate policy and administrative action in response to the problem issues delineated. The major point to be cautioned in this final step is to consider each alternative in regard to its impacts on all aspects of the overall problem area. In this way unintentional side effects are hopefully avoided.

Policy Implications

Specific policy recommendations in regard to the above six problem areas must await further, more detailed research as suggested in the previous section. However, discussion of several implications of a policy nature is warranted. The major implication of the study stems from the finding that land use patterns are changing in reference to growing recreational and amenity values. These objectives accounted for nearly half of all survey parcels and affected the way in which this land was used and managed. Clearly, the result is a rather dramatic change in traditional land use patterns.

If the public is to have any influence over the way in which these changes occur, some attention must be directed at this new and growing group of landowners. Traditional public service programs have been directed almost exclusively at the agricultural landowner. In many areas such programs as those of the Agricultural

Stabilization and Conservation Service, the Soil Conservation Service, and the Cooperative Extension Service have been quite successful in providing educational and other types of assistance to private landowners. The scope of these programs should be broadened to insure a more equitable distribution of these public services. This might be accomplished through either expanding the mandate of existing public agencies or creation of new institutional structures. Finally, with respect to this topic, it is interesting to note that of those landowners who were willing to enter into the two land policy programs investigated, most had had some contact with public service organizations. In this manner substantially more public influence is likely to result from such increased public/private contact. This may be particularly true in regard to reducing the distrust and anxiety of private landowners toward public land use directional measures.

The increased concern with and support for environmental protection on the part of recreational and amenity-oriented landowners is another area which is likely to need additional policy attention. The desire of these landowners to maintain an attractive and high quality living environment may logically be expected to extend beyond their own property to the community as a whole. The demand for public policy to protect such amenity values may have ramifications for all sectors of the community, including commercial and residential

development and agricultural production. The emphasis of such policy formulation should be equitable consideration and treatment of all groups concerned. For example, imposition of no growth policies is likely to place unequal hardships upon certain groups or sectors within the community. Yet continued haphazard and unchecked growth will surely lead to debasement of the environmental values sought by many members of the community. The apparent need is for regulatory measures designed to control and channel residential and commercial development to insure the protection of environmental values.

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APPENDICES

APPENDIX A

INTERVIEW SCHEDULE

APPENDIX A

INTERVIEW SCHEDULE

MICHIGAN RURAL LAND USE STUDY INTERVIEW SCHEDULE

INSTRUCTIONS TO THE INTERVIEWERS:

The following information should be recorded prior to administering the questionnaire.

1. Interview number _____
2. Interviewer number _____
3. Township _____
4. Number of acres (official) _____
5. Assessed value (official) _____
6. Land use code _____

Please read the following three paragraphs before beginning the interview.

As we explained in our letter, this interview deals primarily with questions about your property. There aren't any "right" or "wrong" answers to any of the questions; we're simply interested in some facts about your particular piece of property and how you feel about certain issues which may involve your land. In order for the interview to be useful, you will have to be as candid as possible. All of your answers will be held strictly confidential and neither your name nor your property will be associated with your answers.

At the outset I should say that these questions refer specifically to your _____ acre tract of land which is located in Section _____ of _____ Township. If you have any questions at any time during the interview, feel free to stop me and ask them.

The interview consists of eight parts, the first of which deals directly with this parcel of land--such as how much you own, how you use it and so on. Do you have any questions before we begin?

O.K., the first question is...

I. GENERAL

1. Do you live on this property?
   yes _____ (Go to question 4.) no _____

2. Is there a house or cabin on the property?
   yes _____ no _____
   (Go to question 4.)

3. How often do you stay at this property?
   _____ all summer and some weekends
   _____ weekends or overnight only
   _____ very seldom
   _____ never
   _____ Other (Specify) _____

4. Now I'd like to know what percentage of your property (or how many acres) is in various types of uses. For example, how many acres are in ... (Make sure total equals 100%)
   a) crops (including hay) _____
   b) woods _____
      1) natural _____
      2) plantation _____
   c) open fields (including pasture) _____
   d) marsh _____
   e) brush _____
   f) buildings and yard _____
   g) other types of land that I have not mentioned _____
      (Specify) _____ _____
      _____ _____

5. In what year did you acquire the property? _____

6. Could you tell me how you acquired the property?
   purchase _____
   inheritance _____
   gift _____
   Other (Specify)
   _____ _____

7. Do you rent or lease any of this land (survey parcel only) to other persons?
   yes _____ no _____ (Go to question 9.)

8. How much land do you rent to other persons and for what purpose?

Number of acres	Purpose
_____	_____
_____	_____
_____	_____

9. Do you rent or lease any property from neighboring landowners?

yes _____ no _____ (Go to question 11.)

10. How much land do you rent and for what purpose?

Number of acres	Purpose
_____	_____
_____	_____
_____	_____

11. Do you own any other parcels of land in Kent County?

yes _____ no _____ (Go to question 13.)

12. How much land do you own in Kent County and in which townships? (Record each parcel separately.)

Number of acres	Township
_____	_____
_____	_____
_____	_____

13. Can you tell me the current assessed value of your property? _____

II. OWNERSHIP OBJECTIVES AND INTENTIONS

O.K., that completes the first section. Now I'd like to ask you a few questions about the reasons you own your land and what you intend to do with it in the future.

14. I think that it's probably safe to say that people own land for many different reasons. Some of the most common reasons include farming or simply as an affordable place to live. Other people own land in order to live in a certain location or a certain kind of surroundings; and some people own land for recreational purposes or because it brings them pleasure or enjoyment or perhaps they own land primarily as an investment. If you had to choose the single most important reason for owning <u>your</u> land, what would you say that reason is? (PROBE) (Record in Column 1.)

	Column 1	Column 2
farming	_____	_____
rural environment	_____	_____
enjoy nature	_____	_____
privacy	_____	_____
recreation	_____	_____
inexpensive residence	_____	_____
investment	_____	_____
other (Specify)		
_____	_____	_____
_____		

15. Are there any other important reasons why you own this property? (PROBE) (Record in Column 2.)

16. [Hand respondent Sheet number 1 and a pencil.]
This sheet contains ten pairs of adjectives of opposite meaning. Please read each set of adjectives and consider how you think they apply in describing your property. Then check the blank which best describes your feelings.

Let's take the first set of adjectives as an example. If you feel that your property is very big, then you would check blank number 1. If you feel it is very small, you would check blank number 7. Blanks number 2 through 6 represent choices between these two extremes. Blank number 4 means that you are neutral or have no opinion regarding that particular pair of adjectives.

Be sure you consider these adjectives in regard to your own <u>personal</u> feelings about your property.

(Make sure the respondent understands the instructions. Record the responses below at the completion of the interview.)

1.	_____	6.	_____
2.	_____	7.	_____
3.	_____	8.	_____
4.	_____	9.	_____
5.	_____	10.	_____

17. Is your land currently for sale?
yes _____ no _____

18. Do you think that you will sell your land within the next ten years?
    yes _____ no _____

19. If you were to sell your property this year, what do you think would be a fair price? _____

20. Have you sold or purchased any land (other than the survey parcel) in the past five years?
    yes _____ no _____ (Go to question 22.)

21. Approximately how many transactions has this involved?
    _____

22. Do you think that land is a good investment?
    yes _____ no _____

23. Why do you think that land is (is not) a good investment?

    _____

    _____

III. LAND USE

O.K., now I'd like to ask you about some of the things you do with your property.

24. Have you or your family done any of the following things on this property?
    a) planted a vegetable garden _____
    b) built any fences _____
    c) built any roads _____
    d) constructed any walking or hiking trails _____
    e) maintained a bird feeder _____
    f) put up bird houses or next boxes _____
    g) attempted to attract or retain wildlife by providing a good habitat (e.g. planted special crops or shrubs) _____

25. Do you have any books in your household for identifying trees, wildflowers, birds, or other types of wildlife?
    yes _____ no _____

26. Do you post any portion of your land?
    yes _____ no _____ (Go to question 28)

27. How much of your land do you post and why?

Number of acres	Reason
_____	_____
_____	_____

28. Can you tell me anything that you have done, or that you would like to do in the future, to improve your property?

Done	Plans
a) _____	a) _____
b) _____	b) _____
c) _____	c) _____

29. Do you hunt on your land?
yes _____ no _____

30. Do you hike (walk for pleasure) on your land?
yes _____ no _____

31. Do you snowmobile on your land?
yes _____ no _____

32. Do you have a pond on your property?
yes _____ no _____ (Go to question 38.)

33. Approximately how big is it? _____

34. What is its greatest depth? _____

35. Does the pond have any fish in it?
yes _____ no _____

36. Was the pond built while you owned the land?
yes _____ no _____ (Go to question 38.)

37. What was the main reason for building it?
_____

38. Have you planted any trees on your property?
yes _____ no _____ (Go to question 41.)

39. Were these primarily ornamental trees for landscaping purposes or were you interested in promoting the growth of forests or woodlots?
ornamental ____ (Go to question 41.) woodlot _____

40. Do you intend to cut portions of this woodlot for sale of commercial timber products?
yes _____ no _____

41. Do you intend to plant any (more) trees in the future?
yes _____ no _____ (Go to question 44.)

42. Will these be primarily ornamental trees for landscaping purposes or are you interested in promoting the growth of forests or woodlots?
ornamental ____ (Go to question 44.) woodlot _____

43. Do you intend to cut portions of this woodlot for sale of commercial timber products?
yes _____ no _____

44. Have you ever sold any commercial timber products from this property?
yes _____ no _____ (Go to question 46.)

45. In what year did you make your last sale? _____

IV. COMMUNITY

O.K., now I'd like to get back to some more general topics. Let's talk about your community for a minute.

46. What would you like to see happen to the population of your community over the next five years--increase, decrease, or stay about the same?
increase _____ decrease _____ stay about the same _____

47. Do you think government should take any definite action to encourage or discourage population growth in your community?
yes _____ no _____

48. What is the property tax rate in this area? _____

49. All things considered, would you say that the property tax rate is too high, too low, or probably about right?
too high _____ too low _____ about right _____

50. Do you know if _____ Township has a township planning commission?
yes _____ no _____ don't know _____

51. Does Kent County have a planning commission?
yes no _____ don't know _____

V. ENVIRONMENT

O.K., we've finished four sections of the interview and we have four to go...

52. Do you belong to any outdoor sports organizations such as Michigan United Conservation Clubs, National Rifle Association, etc.?
MUCC _____
NRA _____
others (Specify) _____
_____
None _____

53. Do you belong to any conservation organizations such as the Sierra Club, the West Michigan Environmental Action Council, etc.?

Sierra Club	_____
WMEAC	_____
others (Specify)	_____
	_____
None	_____

54. Do you belong to any farming organizations such as the Farm Bureau, National Farmers Organization, Soil Conservation Society, etc.?

Farm Bureau	_____
NFO	_____
SCS	_____
others (Specify)	_____
	_____
None	_____

55. Do you ever have any contact with any of the public agencies which provide assistance to private landowners such as your County Cooperative Extension Agent, the Soil Conservation Service, the Agricultural Stabilization and Conservation Service, etc.?

Extension Service	_____
SCS	_____
ASCS	_____
others (Specify)	_____
	_____
None	_____

56. [Hand Respondent Sheet 2 and a pencil.]
Here is a list of seven statements. Please take a moment to read and consider each of them. After reading each one, please circle how you feel about it--whether you strongly agree, agree, are neutral, disagree, or strongly disagree. (Make sure the respondent understands the instructions. Record the responses below at the completion of the interview.)

statement no. 1	SA	A	N	D	SD
statement no. 2	SA	A	N	D	SD
statement no. 3	SA	A	N	D	SD
statement no. 4	SA	A	N	D	SD
statement no. 5	SA	A	N	D	SD
statement no. 6	SA	A	N	D	SD
statement no. 7	SA	A	N	D	SD

57. Did you buy a hunting license last year?
yes _____ no _____

58. Did you buy a fishing license last year?
yes _____ no _____

VI. LAND USE POLICY

O.K., now I'm going to ask you a few hypothetical questions about your property.

59. As you probably know, many people today are concerned about cities expanding too fast into rural areas. Because of this, it has been suggested that some rural landowners, such as yourself, be granted a lower property tax rate to help you continue to afford to own your land. In return for this reduced tax rate, you would not be allowed to sell or develop your land for the next ten years. Do you think you would favor placing your property under this type of agreement?
    yes _____ (Go to question 61.) no _____ don't know _____

60. Why would you not favor this type of program?

    _____

61. It has also been proposed that in some cases the government should pay certain landowners for not developing their land. This would be similar to the type of program I just described, except that your land could never be developed more than it now is. In return for this restriction you would be given an agreed upon payment by the government and you would probably be given a property tax reduction. Under this type of agreement you could sell your land any time you wished, but it would have to remain in its present level of development. Do you think you would favor placing your property under this type of agreement?
    yes _____ (Go to question 63.) no _____ don't know _____

62. Why would you not favor this type of program?

    _____

VII. RECREATION

The next few questions deal with how you feel about the public using your land for recreation. Three separate types of recreational activities the public participates in will be discussed. These activities are:

1) hunting (pheasant, deer, etc.)
2) hiking (recreational walking for such reasons as photography, bird watching, etc.)
3) snowmobiling

63. Do you allow the public, excluding family or friends, to hunt on your land?
    yes _____ (Go to question 66.)
    no _____ (Go to question 65.)
    no requests/never occurred_____ (Go to question 64.)

64. Would you allow the public to hunt on your land?
yes _____ (Go to question 67.)
no _____ (Go to question 65.)

65. Why don't you allow hunting?

control _____
damages _____
liability _____
number of users _____
safety _____
moral reasons _____
other (Specify) _____
_____

(Go to question 67.)

66. About how many hunters do you allow on your land for an average week during hunting season?
_____ (Specify)

67. Do you allow the public to hike on your land?
yes _____ (Go to question 70.)
no _____ (Go to question 69.)
no requests/never occurred _____ (Go to question 68.)

68. Would you allow the public to hike on your land?
yes _____ (Go to question 71.)
no _____ (Go to question 69.)

69. Why don't you allow hiking?
control _____
damages _____
liability _____
number of users _____
safety _____
moral reasons _____
other (Specify) _____
_____

(Go to question 71.)

70. About how many hikers do you allow on your land for an average week in the summer?
_____ (Specify)

71. Do you allow the public to snowmobile on your land?
yes _____ (Go to question 74.)
no _____ (Go to question 73.)
no requests/never occurred _____ (Go to question 72.)

72. Would you allow the public to snowmobile on your land?
yes _____ (Go to question 75.)
no _____ (Go to question 73.)

73. Why don't you allow snowmobiling?
control _____
damages _____
liability _____
number of users _____
noise _____
other (Specify) _____
_____
(Go to question 75.)

74. About how many snowmobilers do you allow on your land for an average week during the winter?
_____ (Specify)

75. Some landowners have indicated several reasons why they are hesitant to allow the public to use their land for recreation. One of these reasons is the possibility of damage to property, including littering. How important is the possibility of damages to you?
very important ___ somewhat important ___ not at all important ___

76. Another reason is the problem of controlling the public. How important is controlling the public to you?
very important ___ somewhat important ___ not at all important ___

77. Another reason is the possibility of being sued for an injury occurring on private land. How important is this to you?
very important ___ somewhat important ___ not at all important ___

78. A last reason is the possible large number of people that would use private land for recreation. How important is this to you?
very important ___ somewhat important ___ not at all important ___

79. Presently the government is offering several programs to private landowners whereby the landowner receives a financial payment for allowing the public to use their land for certain recreational activities. Do you think you would favor placing your land under this type of program for hunting?
yes _____ (Go to question 80.)
no _____ (Go to question 81.)

80. About how much payment per acre would you require?
up to 2.00 _____ 4.00 to 6.00 _____
2.00 to 4.00 _____ over 6.00 _____

81. Do you think you would favor such a program for public hiking on your land?
yes _____ (Go to question 82.)
no _____ (Go to question 83.)

82. About how much payment per acre would you require?
up to 2.00 _____ 4.00 to 6.00 _____
2.00 to 4.00 _____ over 6.00 _____

83. Do you think you would favor placing your land under this type of program for snowmobiling?
yes _____ (Go to question 84.)
no _____ (Go to question 85.)

84. About how much payment per acre would you require?
up to 2.00 _____ 4.00 to 6.00 _____
2.00 to 4.00 _____ over 6.00 _____

[If respondent has answered "Yes" to question 79 or 81 or 83, then ask question 85.]

85. Of the following two methods of payment, which would you prefer?
payment on a year-to-year basis _____
a five year contract with full payment immediately _____

86.-88. [Hand respondent Sheet 3 and a pencil.]
Here is a list of 3 statements concerning public recreation on your land. Please take a moment to read each of the statements and then circle the response that describes how you feel about the statement in relation to the three recreational activities of hunting, hiking and snowmobiling. (Make sure the respondent understands the question.)

VIII. PERSONAL

O.K., this is the last section. Here I'd like to get some more personal information about you such as your occupation, how far you travel to work, and so on.

89. What is your occupation? _____

90. How far do you travel to work? (round trip) _____

91. Where were you born?
in Kent County _____
outside Kent County but in Michigan _____
outside Michigan _____

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

93. Where did you live immediately prior to your present residence?
in Kent County _____
outside Kent County but in Michigan _____
outside Michigan _____

94.-95. [Hand respondent Sheet 4 and a pencil.]
Would you please circle the number of years of school you have completed and the figure which comes closest to your total family income during 1974. _____School
_____Income

96. How old are you? _____

97. Do you own your land free and clear?
yes _____ no _____

98. Approximately what percentage of the purchase price of the land is currently outstanding? _____

THANK YOU FOR YOUR COOPERATION.

The following questions should be filled out by the interviewer:

99. What is the location of the interviewee's residence?
a) on the survey parcel _____
b) adjacent to the survey parcel _____
c) in the neighborhood _____
d) in a nearby city _____
e) other (Specify) _____

100. What sex is the respondent?
male _____ female _____

101. What race is the respondent?
Caucasian _____ Negro _____ Chicano _____
Oriental _____ Other (Specify) _____

102. How honest do you feel the respondent was in answering the questions?
as honest as possible _____
mostly honest _____
honesty was somewhat doubtful _____
dishonest _____

SHEET I

		1	2	3	4	5	6	7	
1)	Big	___	___	___	___	___	___	___	Little
2)	Dull	___	___	___	___	___	___	___	Exciting
3)	Wild	___	___	___	___	___	___	___	Civilized
4)	Work	___	___	___	___	___	___	___	Leisure
5)	Productive	___	___	___	___	___	___	___	Unproductive
6)	Wooded	___	___	___	___	___	___	___	Open
7)	Valuable	___	___	___	___	___	___	___	Worthless
8)	Attractive	___	___	___	___	___	___	___	Unattractive
9)	Flat	___	___	___	___	___	___	___	Hilly
10)	Secure	___	___	___	___	___	___	___	Insecure

SHEET 2

1. Protection of the environment is one of our country's most important problems.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
2. The needs and wants of future generations should always be taken into account when making decisions about how land is to be used.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3. Environmental quality standards are fine as long as they do not slow down economic growth.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
4. It is often desirable for government to adopt policies which are designed to help direct the way in which land is used.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5. Private landowners have a responsibility to the members of their community to maintain their property in an attractive manner.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
6. The primary emphasis of our country's natural resources policy should be the promotion of economic growth as opposed to protection of environmental quality.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7. It is important that the government execcise greater control over the ways individuals and companies use our natural resoures.	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

SHEET 3

1. The public should ask permission before using your land for recreation.

HUNTING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
HIKING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
SNOWMOBILING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

2. When a recreational user damages your property the government should pay for all damages over $25.

HUNTING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
HIKING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
SNOWMOBILING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

3. A large number of recreational users has the same environmental effect on your land as a small group of users.

HUNTING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
HIKING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
SNOWMOBILING:	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

SHEET 4

1. Number of years of school completed:

	Elementary school								High school				College				
none	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	more than 16

2. Total family income during 1974:

less than $1,000

$1,000 - $1,999

$2,000 - $2,999

$3,000 - $3,999

$4,000 - $4,999

$5,000 - $5,999

$6,000 - $6,999

$7,000 - $7,999

$8,000 - $9,999

$10,000 - $14,999

$15,000 - $24,999

$25,000 or more

APPENDIX B

LETTER SENT TO POTENTIAL RESPONDENTS

APPENDIX B

LETTER SENT TO POTENTIAL RESPONDENTS

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF RESOURCE DEVELOPMENT
NATURAL RESOURCES BUILDING

EAST LANSING • MICHIGAN • 48824

May 28, 1975

Maurice Rector
2640 Rector St. N.E.
Rockford, Michigan 49341

Dear Mr. Rector:

As you may know Michigan State University, through its Cooperative Extension Service and Agricultural Experiment Station, has a long history of research activity which is designed to help meet the needs of the State's citizens. This work covers a wide variety of topics including agriculture, home economics, management of recreational enterprises, and so on. Right now we are engaged in a study of rural land use and the focus of our study is Kent County.

The reason we are writing to you is to ask your cooperation in this project. All that is required is a short interview session with one of the members of our staff. The interview usually takes about 30-45 minutes to complete, and the questions are concerned primarily with how you use your property. Most people seem to enjoy the session.

We should add that your name was selected at random as an owner of more than ten acres of land in certain designated areas of Kent County. We have purposely selected a very small number of landowners to interview in an effort to keep down the costs of the project. For this reason it is especially important that we have your help if at all possible.

One of our interviewers will be calling you within the next few days to arrange an appointment with you at your convenience. The interview may be conducted in your home or any other place that you wish. All interviewers are graduate students at Michigan State University.

If you have any questions about the study or your role in it, please feel free to call us collect at (517) 353-0823. In addition, you will be provided with a sample of reports from recently completed research projects showing the types of information which result from studies such as this and which may be of interest to you. You may also request a copy of the final results of this study if you wish.

We thank you for your help.

Sincerely yours,

Robert E. Manning
Project Coordinator

Lewis W. Moncrief
Project Director

REM:lk

APPENDIX C

VARIABLE INDICES

APPENDIX C

VARIABLES INDICES

SES INDEX

(Socio-economic Status of Landowner)

The SES index was comprises of the three variables of occupation, education, and family income. These variables were recoded from the raw data as follows:

Occupation:

sales, clerical and kindred workers operatives and laborers	= 1
craftsmen and kindred workers farmers and farm managers service workers retired and unemployed	= 2
professiona. technical and kindred workers managers and administrators	= 3

Education:

1 - 11	= 1
12 - 15	= 2
16 or more	= 3

Family Income:

less than $10,000	= 1
$10,000 - $14,999	= 2
$15,000 or more	= 3

SES was computed through the following operation:

SES = Occupation + Education + Family Income

Possible scores ranged from 3 to 9, but were recoded to take the values 0 to 6. The distribution is shown below:

Score	Number of Respondents	% of Respondents
0	4	2.6
1	36	23.1
2	21	13.5
3	36	23.1
4	25	16.0
5	23	14.7
6	11	7.1

N = 156

LNDALTER INDEX

(Land Alteration Activities of Landowner)

The LNDALTER index was comprised of four variables dealing with land alteration activities of the landowner. These variables were recoded from the raw data as follows:

Tree Planting:

If the landowner had planted trees on his property or intended to plant trees in the future, a value of 1 was assigned. All other responses were coded as 0.

Fences:

If the landowner had built any fences on his property, a value of 1 was assigned. All other responses were coded as 0.

Roads:

If the landowner had built any roads on his property, a value of 1 was assigned. All other responses were coded as 0.

Trails:

If the landowner had built any trails on his property, a value of 1 was assigned. All other responses were coded as 0.

The LNDALTER index was computed through the following operation:

LNDALTER = Trees + Fences + Roads + Trails

Possible scores ranged from 0 to 4, with the actual distribution shown below:

Score	Number of Respondents	% of Respondents
0	0	0
1	44	38.6
2	54	47.4
3	13	11.4
4	3	2.6

N = 114

WLDLIFE INDEX

(Wildlife Activities of Landowner)

The WLDLIFE index was comprised of three variables dealing with activities of the landowner in relation to attracting or retaining wildlife on his property. These variables were recoded from the raw data as follows:

Birdfeeding:

If the landowner mantained bird feeders on the property, a value of 1 was assigned. All other responses were coded as 0.

Birdboxes:

If the landowner maintained birdboxes or nest boxes on the property, a value of 1 was assigned. All other responses were coded as 0.

Other wildlife:

If the landowner had undertaken any other activities to attract or retain various wildlife species to the property, a value of 1 was assigned. All other responses were coded as 0.

The WLDLIFE index was computed through the following operation.

WLDLIFE = Birdfeeding + Birdboxes + Other Wildlife

Possible scores ranged from 0 to 3, with the actual distribution shown below:

Score	Number of Respondents	% of Respondents
0	75	42.1
1	41	23.0
2	32	18.0
3	30	16.9

N = 178

PRIVREC INDEX

(Private Recreational Activities of Landowner)

The PRIVREC index was comprised of three variables dealing with the recreational activities of the landowner on his own property. These variables were recoded from the raw data as follows:

Hunting:

If the landowner hunted on his own property, a value of 1 was assigned. All other responses were coded as 0.

Hiking:

If the landowner hiked on his own property, a value of 1 was assigned. All other responses were coded as 0.

Snowmobiling:

If the landowner snowmobiled on his own property, a value of 1 was assigned. All other responses were coded as 0.

PRIVREC was computed through the following operation:

PRIVREC = Hunting + Hiking + Snowmobiling

Possible scores ranged from 0 to 3, with the actual distribution shown below:

Score	Number of Respondents	% of Respondents
0	32	18.0
1	65	36.5
2	58	32.6
3	23	12.9

N = 178

PUBREC INDEX

(Public Recreational Activities of Landowner)

The PUBREC index was comprised of three variables dealing with public recreational activities allowed by the landowner. These variables were recoded from the raw data as follows:

Hunting:

If the landowner allowed public hunting on his property, a value of 1 was assigned. All other responses were coded as 0.

Hiking:

If the landowner allowed public hiking on his property, a value of 1 was assigned. All other responses were coded as 0.

Snowmobiling:

If the landowner allowed public snowmobiling on his property, a value of 1 was assigned. All other responses were coded as 0.

The PUBREC index was computed through the following operation:

PUBREC = Hunting + Hiking + Snowmobiling

Possible scores ranged from 0 to 3, with the actual distribution shown below:

Score	Number of Respondents	% of Respondents
0	24	13.7
1	30	17.1
2	50	28.6
3	71	40.6

N = 175