UNIVERSITY OF ALBERTA

A COMPARISON OF RURAL AND URBAN ENVIRONMENTAL ATTITUDES AND THEIR INFLUENCE ON OUTDOOR RECREATION PARTICIPATION

by
Caroline M. Coburn

A Thesis
Submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements
for the degree of
MASTER OF ARTS

Department of Geography
Edmonton, Alberta
Spring, 1994

ISBN 0-612-11179-2

UNIVERSITY OF ALBERTA

RELEASE FORM

NAME OF AUTHOR: Caroline M. Coburn

TITLE OF THESIS: A Comparison of Rural and Urban Environmental Attitudes and Their Influence on Outdoor Recreation Participation

DEGREE: Master of Arts

YEAR THIS DEGREE GRANTED: 1994

Caroline M. Coburn

Caroline M. Coburn
201 10434 77 Avenue
Edmonton, Alberta
T6E 1M8

January 31, 1994

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled A COMPARISON OF RURAL AND URBAN ENVIRONMENTAL ATTITUDES AND THEIR INFLUENCE ON OUTDOOR RECREATION PARTICIPATION submitted by CAROLINE M. COBURN in partial fulfillment of the requirements for the degree of MASTER OF ARTS.

Dr. E. L. Jackson

Dr. J. R. Eyton

Dr. T. L. Burton

January 25, 1994

Abstract

Previous studies of the influence of environmental attitudes on recreation participation have reported divergent results. Early studies found, at best, weak support for an association between appreciative forms of recreation and pro-environmental attitudes, and between mechanized or abusive and consumptive forms of recreation and anti-environmental attitudes. Recent improvements in the measurement of these two sets of variables have revealed a positive relationship between appreciative recreation and pro-environmental attitudes and between mechanized recreation and anti-environmental attitudes. The majority of these studies, however, used only urban samples. Some research suggests that there is a difference between rural and urban residents in both their recreation participation choices and environmental attitudes. This study attempts to extend this body of knowledge to incorporate improved measures of environmental attitudes and recreation participation, and to examine differences between rural and urban environmental attitudes and recreation participation. If relationships exist between recreation participation and environmental attitudes, between rural-urban residence and recreation participation, and between rural-urban residence and environmental attitudes, then rural and urban differences in environmental attitudes may ultimately explain why there are rural and urban differences in recreation participation. Alternatively, differences in rural-urban residence may account for why there is an apparent relationship between environmental attitudes and recreation participation.

In June 1992, 200 rural, 200 semi-rural and 200 urban adult residents of Alberta were sampled using a stratified random technique. Each individual was mailed a self-administered questionnaire. The questionnaire asked about levels of participation in 54 recreation activities, favourite activities and activities most frequently participated in. Motivations for participating in favourite recreation activities were also determined. An environmental attitudes scale, developed by Jackson (1986), was used to assess the

environmental attitudes of respondents, while the final section of the questionnaire asked about several demographic characteristics, including current residence, childhood residence, and occupation. Of the original 600 questionnaire packages sent, 189 were returned, for a total response rate of 31.5%.

In the univariate analysis and description of the three variables of interest in this thesis, cluster analysis was used to aggregate recreation participation rates into three clusters: appreciatives, mechanized and inactives. The frequency distribution of total environmental attitudes scores on the environmental attitudes scale was subdivided into three groups: ecocentrics, moderates, and technocentrics. Current and childhood residence were classified so that places under 2,500 persons were coded as "rural", and places over 2,500 persons were coded as "urban."

Chi-square tests revealed that there were no significant relationships between recreation participation and environmental attitudes, childhood residence and recreation participation, and both current and childhood residence and environmental attitudes. There was, however, a significant relationship between current rural-urban residence and recreation in the hypothesized direction. Since significant relationships did not exist between all possible pairs of the the three variables, the proposed multivariate analysis to test the alternative relationships among all three variables was not conducted.

These results indicate that rural and urban Albertans are, for the most part, "culturally homogenized." The relationship between current residence and recreation participation can be partially explained by the "opportunity" and "compensation" theories, which attribute this relationship to the effects of size and density of population on behaviour, rather than the effects of environmental attitudes on behaviour.

Acknowledgments

I would like to thank Ed Jackson for his guidance, without which this project would not have been possible. I would also like to thank Tim Burton and Ron Eyton for their comments and suggestions. I greatly appreciated Chip Ross at Alberta Tourism, Parks and Recreation for providing data and comments. Many thanks go to my parents for providing personal and financial support, and to the friends I met in the Geography department for making my graduate experience memorable. Finally, a special thanks to Dave for his love and patience.

Table of Contents

CHAPTER 1 INTRODUCTION 1

Attitudes and Behaviour 1

Rationale for the Study 1

The Geographic Context 2

Rural and urban environmental attitudes 3

Rural and urban recreation participation 4

Implications for the present study 5

Organization of the Thesis 5

CHAPTER 2 BACKGROUND TO THE STUDY 7

Environmental Paradigms 8

Environmental Attitudes and Recreation Behaviour 13

The Rural-Urban Dimension 19

Rural-urban differences in environmental attitudes 19

Rural-urban differences in recreation participation 24

Objectives and Hypotheses 28

CHAPTER 3 METHODS 31

Questionnaire 31

Recreation participation 32

Environmental attitudes 33

Rural and urban residence 33

Demographic variables 33

Survey Administration and Response Rates 37

Sample Methodology 38

Data Analysis 40

CHAPTER 4 DESCRIPTION AND AGGREGATION OF DATA 41
Description and Aggregation of Recreation Participation Variables 41
Frequencies of recreation participation variables 41
Aggregation of recreation participation variables 46
The 12-activity analysis 49
The eight-activity analysis 52
The six-activity analysis 53
The "best" solution 54
Environmental Attitude Data 55
Description of environmental attitudes 55
Environmental attitude total and frequency distribution 60
Development of "ecocentric" and "technocentric" groups 62
Verification of ecocentric, moderate and technocentric aggregation 64
Residence Variables 69
CHAPTER 5 RELATIONSHIPS BETWEEN RECREATION PARTICIPATION, ENVIRONMENTAL ATTITUDES AND RURAL-URBAN RESIDENCE: RESULTS OF THE BIVARIATE ANALYSIS 70
The Relationship Between Recreation Participation and Environmental Attitudes 71
The Relationship Between Rural-Urban Residence and Recreation Participation 72
Childhood residence and recreation participation 73
Current residence and recreation participation 74
Summary 75
The Relationship Between Environmental Attitudes and Rural-Urban Residence 75
Implications for the Multivariate Analysis 76
CHAPTER 6 CONCLUSIONS AND FUTURE RESEARCH 79
Summary and Implications of the Findings 79
The univariate analysis findings and their implications 80

The bivariate analysis findings and their implications 81
Environmental attitudes and recreation participation findings 81
Rural-urban residence and environmental attitudes findings 81
Rural-urban residence and recreation participation findings 82
Research Problems 85
Possible causes of low response rate 85
Design of the questionnaire package 85
Subject matter 86
Timing of the questionnaire administration 87
Effects of the low response rate 88
Future Research 88
A Final Comment 90
References
Appendices

List of Tables

Table		Page
Table 2.1	The New Environmental Paradigm Items	9
Table 2.2	Rural and Urban Differences in 20 Selected Recreation Activities	25
Table 3.1	Environmental Attitude Statements	34
Table 4.1	Recreation Activities: Participation Rates and Frequent Participation	43
Table 4.2	Distances Between Cluster Solutions for Selected Recreation Activities	50
Table 4.3	Mean Scores and Frequencies of Ecocentric, Moderate Ecocentric, Neutral, Moderate Technocentric and Technocentric Respondents on Environmental Attitude Statements	56
Table 4.4	Environmental Attitude Scale Scores	61
Table 4.5	Frequencies of Ecocentrists to Technocentrists in Frequency Distribution Aggregations	65
Table 5.1	Variations in Recreation Participation by Environmental Attitudes	72
Table 5.2	Variations in Recreation Participation by Childhood Rural-Urban Residence	73
Table 5.3	Variations in Recreation Participation by Current Rural-Urban Residence	74
Table 5.4	Variations in Environmental Attitudes by Childhood Rural-Urban Residence	76
Table 5.5	Variations in Environmental Attitudes by Current Rural-Urban Residence	77

List of Figures

Figure		Page
Figure 3.1	Response Rates	39
Figure 4.1	Participation Rate and Frequent Participation for Six Recreation Activities	45
Figure 4.2	Clusters Based on Twelve Activities	51
Figure 4.3	Clusters Based on Eight Activities	53
Figure 4.4	Clusters Based on Six Activities	54
Figure 4.5	Distribution of Total Scores for Environmental Attitudes Scale	63
Figure 4.6	Mean Scores of Ecocentric, Moderate, and Technocentric Groups on 24 Environmental Attitude Statements	67
Figure 4.7	Mean Scores of Ecocentric, Moderate, and Technocentric Groups on Jackson's (1986) Four Environmental Attitude Dimensions	68

CHAPTER 1

INTRODUCTION

Attitudes and Behaviour

Previous research has involved debate about whether or not a relationship exists between behaviour and attitudes (Bem, 1970; Wicker, 1969, 1971), but more recent research incorporating theoretical and methodological improvements has supported such a relationship (Bikales & Manning, 1992; Dunlap & Van Leire, 1978, 1984; Jackson, 1986; 1987). Since the 1960s, studies examining environmental attitudes and behaviours have drawn considerable interest because of increased awareness of environmental degradation. These studies have focused on two issues: the measurement of environmental attitudes (Cotgrove, 1982; Dunlap & Van Liere, 1978, 1984); and the relationship between environmental attitudes and their associated behaviours, including energy perceptions and energy conservation behaviour (Farbrother, 1985; Kuhn, 1988; Rodgers, 1987), and recreation participation (Asfeldt, 1992; Bikales & Manning, 1990; Dunlap & Heffernan, 1975; Geisler, Martinson, & Wilkening, 1977; Jackson, 1986, 1987; Knopp & Tyger, 1973; Pinhey & Grimes, 1979; Van Liere & Noe, 1981).

Rationale for the Study

The underlying logic for studying attitudes in general and environmental attitudes specifically is for the social control and information functions these studies can provide (Heberlein, 1973). The social control function is useful because, if we can understand what factors encourage humans to behave in certain ways toward the environment, then changing these factors ought to produce desirable changes in corresponding behaviour. For example, if a study finds that a person with an anti-environmental

attitude participates in a recreation activity that is harmful to the environment more often than a person with a pro-environmental attitude, and the attitude and behaviour (recreation participation) are found to be related, then changing that person's attitude from an anti-environmental to a pro-environmental attitude should produce a decrease in his or her participation in the environmentally-detrimental activity.

The information function is useful since, if we can understand public environmental attitudes and associated behaviours, then practitioners are better able to provide services (facilities/opportunities) for desirable behaviours that reflect those attitudes, and discontinue or not provide services for behaviours that are not associated with the attitude norm. If practitioners know what these attitude norms and associated behaviours are, they may become more efficient in the provision of appropriate facilities or opportunities. For example, if the norm for Albertans is to hold pro-environmental attitudes, and attitudes and behaviours are related, then practitioners are able to provide the opportunity for participation in pro-environmental recreation activities to suit public needs, and discontinue or reduce facilities or opportunities that reflect environmentally detrimental recreation activities that do not suit public needs.

There has been continued interest in these subjects because attitudes towards the environment are a necessary, but little understood, component in policy debates over levels of environmental protection in Canada and the United States (Bikales & Manning, 1990). Further, the more specific study of recreation participation and its relationship to environmental attitudes may provide insights into the effect that recreation behaviour has on changing and enforcing levels of public concern for the environment (Bikales & Manning, 1990).

The Geographic Context

Some attitude-behaviour studies have shown only a weak relationship between environmental attitudes and recreation participation behaviours, thus, there has been a

shift in inquiry from asking if attitudes predict behaviour or not, to when attitudes predict behaviour (Manfredo et al., 1992), and further, why attitudes affect behaviour. This thesis not only presents an examination of relationships between these two variables, but further expands our understanding of this relationship by adding a geographical third variable, rural and urban residence. This study works toward an understanding of why the attitude-behaviour relationship may exist.

Rural and urban environmental attitudes

Evidence has been found for rural-urban differences in environmental attitudes. Many researchers have reported that rural residence has a negative relationship with environmental concern, and urban residence has a positive relationship with environmental concern, but only when certain measures of environmental attitudes were used (Fortmann & Kusel, 1990; Glenn & Hill, 1977; Harry, Gale, & Hendee, 1969; Hendee, Gale, & Harry, 1969; Lowe & Peek, 1974; Lowe & Pinhey, 1982; Trembley & Dunlap, 1978; Williams & Moore, 1991). Samdahl & Robertson (1989), however, found that there were no significant differences in three different measures of environmental concern between rural and urban residents. In their examination of several residence and attitude studies, Trembley & Dunlap (1978) found the strength of differences in rural-urban attitudes towards the environment was dependent upon the level of reference used in a particular study. The differences between rural-urban residents in the United States were more pronounced at the local, rather than state or national levels. Lowe & Pinhey (1982) showed that the size of community of socialization (the rural or urban environment where the respondent was raised) was positively associated with levels of environmental concern.

Some researchers believe that differences in rural-urban environmental attitudes are a result of rural and urban occupation differences (Hendee, Gale & Harry, 1969; Harry, Gale & Hendee, 1969), while others believe that differences can be attributed

to different levels of exposure to environmental degradation (Fortmann & Kusel, 1990; Glenn & Hill, 1977; Lowe & Peek, 1974; Trembley & Dunlap, 1978). Other researchers believe that there are no differences in rural and urban environmental attitudes because of cultural homogenization (Derksen & Gartrell, 1991; Samdahl & Robertson, 1989; Williams & Moore, 1991).

Rural and urban recreation participation

Several social scientists have found and have attempted to explain differences in rural-urban recreation participation choices (Burch & Wenger, 1967; Burdge, 1961; Green, 1964; Hendee, 1969). Their theories can divided into two categories: 1. those that base rural-urban recreation participation differences on size and density-of-population influences on behaviour; and 2. those that base these differences on cultural influences on behaviour. Theories belonging to the first category include the "opportunity" theory, which states that activities more available in the city will be participated in more frequently by urban residents than rural residents and vice versa. The "get away from it all" theory (also belonging to the first category) assumes that rural residents' daily lives are different from those of urban residents, and thus they seek recreation activities that are different from those desired by urban residents and vice versa (Hendee, 1969). Theories contained in the second, or "cultural factors," category include the "work ethic" theory (Burdge, 1961), which holds that rural residents are more work-oriented and, therefore, do not participate in recreation activities as often as urban residents. An alternative theory states that urban residents participate in outdoor recreation activities to recapture values of harmony with nature, in contrast to rural residents, who may already hold these values from living close to nature (Green, 1964). A third theory states that rural-urban recreation activity differences result from different environmental attitudes caused by occupational differences (Hendee, 1969).

An examination of recent data collected by Alberta Tourism, Parks and Recreation (1992) showed that significant differences exist in the rural-urban recreation participation choices of Albertans. The few empirical studies that have examined rural and urban differences, however, have shown no significant differences (Spencer et al., 1992; Yu, 1985).

Implications for the present study

This brief review of the literature concerning the relationships between environmental attitudes, recreation participation, and rural-urban residence shows that more research is needed to clarify and improve our understanding of these relationships. Thus, the present study will pursue three objectives: to re-examine the relationship between environmental attitudes and outdoor recreation participation among rural and urban residents of Alberta; to compare rural and urban recreation participation in Alberta; and to compare rural and urban environmental attitudes in Alberta. To reach these objectives, four hypotheses will be tested: 1. that there is a relationship between recreation participation and environmental attitudes; 2. that rural residents will have higher participation rates in mechanized and consumptive recreation activities than urban residents, while urban residents will have higher participation rates in appreciative recreation activities than rural residents; 3. that urban residents hold stronger pro-environmental attitudes than rural residents in Alberta, especially those respondents who were socialized in rural or urban areas; and 4. that differences in rural-urban outdoor recreation participation may ultimately be explained by differences in environmental attitudes between these two groups.

Organization of the Thesis

This thesis continues with a review of three main areas of research: 1. trends in social environmental paradigms; 2. environmental attitudes and behaviour; and 3.

rural-urban residence and its relation to environmental attitudes and recreation participation (Chapter 2). Chapter 3 outlines how the data about the three main variables were collected from Albertans. Information about survey administration, response rates, sample methodology, data analyses, and an analytical strategy is described. The ensuing univariate analysis chapter (Chapters 4) provides a thorough description of the frequencies for each variable, and a description of the techniques used to aggregate these data for subsequent bivariate analyses. A second and final analysis chapter (Chapter 5) examines bivariate relationships among all combinations of the three main variables. Since these analyses show that there were no significant relationships among the variables (with one exception), the planned multivariate analysis was not pursued. Discussion and implications of the findings, together with future research directions, appear in the final chapter (Chapter 6).

CHAPTER 2

BACKGROUND TO THE STUDY

In the past three decades or so, Canadians have become increasingly aware of the importance of a healthy environment. This trend is seen in the emergence of new Canadian environmental interest groups. The Alberta Environmental Network, for example, listed 166 environmental interest groups in their 1987 directory; by 1992, this number had increased to 438 environmental agencies in Canada's western provinces (Alberta Environmental Network, 1987; 1992). Further Canadian support for environmental preservation is evident in Canada's "Green Plan," which is "the most important environmental action plan ever produced in Canada" (R. R. Cotret, Minister of the Environment, 1990). Local support is evident in the rise in numbers of recycling depots in Canadian cities, and public action to stop the clear cutting of Clayoquot Sound in British Columbia (Globe and Mail, July 6 and 7, 1993).

In response to this concern, the majority of environmental research has concentrated on scientific and technological methods to decrease the negative effects of pollution, over-use of natural resources, and other potentially harmful activities on the environment (Newhouse, 1990). Newhouse states, however, that "technology alone cannot solve environmental problems . . . [and that] attitude and behavioural research [should] be applied in the design of educational programs" (Newhouse, 1990, p.26). In addition to scientific and technological efforts, it may be equally important, for the long-term health of the planet, to identify the behavourial causes of environmental problems. Once these behavourial causes are identified, they may be reversed to avoid further environmental degradation. Durning (1992) states that:

> If the life-supporting ecosystems of the planet are to survive for future generations, the consumer society will have to dramatically curtail its use of resources - partly by shifting to high-quality, low-input durable goods and partly by seeking fufillment through leisure, human

> relationships, and other nonmaterial avenues. . . . [S]ustaining the environment that sustains humanity will require that we change our values" (Durning, 1992, p. 25).

A review of the literature that deals with relevant social scientific research on environmental attitudes and behaviours is contained in this chapter. The first section reviews research on environmental "world views" or "paradigms," and the second section reviews research on the relationship between environmental attitudes and behaviours, specifically recreation participation. In the final section, literature devoted to rural and urban differences in both environmental attitudes and recreation participation is discussed.

Environmental Paradigms

Social scientists have realized the utility of attitude and behavioural research in helping to understand human influences on the environment. Heberlein (1973) outlined the social control and information functions of this type of research, as described in the first chapter. In addition to attitude-behaviour studies that focus on influences of environmental attitudes, there is some concern about the methods used to measure these attitudes. Recent research by Samdahl and Robertson (1989) revealed that when questions addressing different environmental issues are used to measure levels of environmental concern, they can produce different results in attitude-behaviour relationships between and within studies. Some social scientists have recognized this problem and have began employing more general orientations towards the environment rather than specific environmental issues, such as air and water pollution, to measure environmental attitudes. Literature on the development of measures of environmental attitudes is dominated by studies that have tested and refined the New Environmental Paradigm (Dunlap & Van Liere, 1978).

The New Environmental Paradigm (NEP) scale for measuring levels of environmental concern among the public was first administered by Dunlap and Van

Liere (1978). The scale uses 12 statements to assess public acceptance of the NEP (Table 2.1).

Table 2.1
The New Environmental Paradigm Items

Item Number	Statement
1	The balance of nature is very delicate and easily upset
2	When humans interfere with nature, it often produces disastrous consequences
3	Humans must live in harmony with nature in order to survive
4	Mankind is severley abusing the environment
5	Humans have the right to modify the natural environment to suit their needs
6	Mankind was created to rule over the rest of nature
7	Plants and animals exist primarily to be used by humans
8	We are approaching the limit of the number of people the earth can support
9	To maintain a healthy economy, we will have to develop a steady-state economy where industrial growth is controlled
10	The earth is like a spaceship with only limited room and resources
11	Humans need not adapt to the natural environment because they can remake it to suit their needs
12	There are limits to growth beyond which our industrialized society cannot expand

People who subscribe to the NEP believe in limits to the biosphere, and that technology and economic growth are undesirable because of their impacts on the environment (Jackson, 1989a). These characteristics are also common to a "conserver society" (Science Council of Canada, 1977). To test the ability of the NEP scale to measure environmental attitudes, Dunlap and Van Liere (1978) surveyed two samples of Washington state residents: 1. the general public sample (GPS); and 2. an environmental organization sample (EOS). The two groups were asked about perceived quality of life, problems facing the state and local community, and support for funding state programs. In addition, a second set of questions focused on the degree of acceptance of the 12 NEP scale items. The results showed a high degree of NEP acceptance among both samples; however, the EOS exhibited stronger acceptance of these items than did the GPS, thus providing initial validation of the scale for measuring environmental attitudes.

People who hold the tenets of the NEP are opposite to people who subscribe to the Dominant Social Paradigm (DSP), held, in the past, by the majority of Western society. People who subscribe to the DSP believe that the Earth has unlimited capacity to manage impacts and absorb wastes, that technological innovation has the endless ability to exploit nature, that sustained economic growth is always possible, and that quality of life is expressed by material success (Dunlap & Van Liere, 1984; Jackson, 1989a). These characteristics are also common to a "consumer society" (Durning, 1992; Science Council of Canada, 1977).

Dunlap and Van Liere (1984) extended their research of environmental paradigms by examining the linkage between commitment to the DSP and concern for environmental quality. Their study had three objectives: 1. to report on the measurement of dimensions of the DSP; 2. to examine the relationship between DSP dimensions and several measures of environmental concern; and 3. to examine the importance of various dimensions of the DSP in influencing environmental concern.

The data were collected in 1976 from 806 Washington state residents. They found eight dimensions in the DSP scale: support for laissez-faire government, support for the status quo, support for private property rights, faith in science and technology, support for individual rights, support for economic growth, faith in material abundance, and faith in future prosperity. The results showed that commitment to the DSP is negatively related to environmental concern and that level of commitment to the DSP appeared to be a factor in influencing different levels of the environmental concern.

Since the initial development of the NEP scale, several studies have questioned its underlying structure. Recent studies have found that the NEP scale is multidimensional, not unidimensional as originally thought by Dunlap and Van Liere (1978) (Albrecht, Bultena, Hoiberg & Nowak, 1982; Geller & Lasley, 1985; Jackson, 1986; Noe & Snow, 1990). Geller and Lasley (1985) examined the dimensionality issue, in part to help clarify how best to interpret the NEP scale, since:

> if the NEP scale is truly unidimensional, then low scale scores can be interpreted as a rejection of the NEP . . . if the scale is multidimensional, then it is possible to interpret low scale scores as either a total or partial rejection of a single dimension (Geller & Lasley, 1985, p.10).

Data from a 1979-1980 study of rural and urban residents by Albrecht et al.(1982) and from a sample of Missouri state farmers by Lasley and Nolan (1980) were used to meet four objectives: 1. to examine the factor structure of the scale in three separate samples, 2. to assess the minimum number of factors needed to adequately fit the data for three samples, 3. to test for equality of the factor structures if stable factor structure is found, and 4. to interpret the factors. Confirmatory factor analysis did not result in an equal number of minimum factors for the three samples. Exploratory factor analysis, however, found a stable, nine-item, three-factor model that fit all three samples and thus verified the multidimensionality of the scale. Although factor

structures were not equal between samples, similar factor patterns emerged. Lasley and Nolan cautioned future researchers not to assume that different populations will interpret the NEP items similarly. Different interpretations by rural and urban samples may have contributed to these unequal factor structures.

A further examination of the dimensionality of NEP items was conducted by Noe and Snow (1990) among five samples of national park visitors in the United States. They felt that if the NEP was unidimensional, then the diverse cultural, educational and generational composition of their samples, collected over an 11 year range (1978-1989), would especially show this trend. The data from three of the samples (full data were available only for Biscayne, Blue Ridge, and Chattahoochee national parks) were factor analyzed to test for internal consistency of the items and unidimensionality of the scale. The results of Kendall's W, which measures the level of agreement between the items in different surveys, showed that all five samples exhibited strong concern for the fate of nature and the environment (NEP items one through four), and ideas of a steady-state economy and "spaceship earth" (NEP items 8, 9, 10 and12). The NEP scale items that prescribed living in harmony with nature within an ecologically attuned economy (items 5, 6, 7 and 11), however, were poorly interrelated across the five samples. On the latter items, some respondents felt that mankind and nature are compatible, while others felt that they are incompatible because mankind dominates the environment and therefore disrupts natural processes. Unlike Geller & Lasley (1985), the factor analysis of the three samples resulted in a 12-item, two-factor model (NEP items one through four loaded onto Factor 1, and all other items on Factor 2), which reinforces the notion of the multidimensional NEP scale and unique interpretations of the scale by different sub-populations.

A Canadian study by Shetzer, Stackman and Moore (1991) found three NEP dimensions when they examined levels of acceptance of the scale by 237 University of British Columbia business students. They found that business students were pro-

environmental on all dimensions of the scale, and concluded that their study lends further support to the three-factor multidimensional NEP model.

The NEP and DSP scales developed by Dunlap and Van Liere (1978, 1984) appear to be sufficient measures of environmental world views; however, recent research has indicated that the NEP scale is multidimensional. Further, some studies have found that the underlying factor structure of the NEP is neither similar among studies nor among samples within the same study. Thus, it would seem that, although there is overall public acceptance of the NEP, different populations have unique interpretations of the scale items. Given that certain individuals hold different environmental attitudes, do these attitudes affect their behaviours? More specifically, which recreation behaviours are associated with pro-environmental attitudes and which are associalted with anti-environmental attitudes? The following section presents an overview of those studies that have examined the relationship between environmental attitudes and recreation participation behaviour.

Environmental Attitudes and Recreation Behaviour

The extent to which environmental attitudes influence behaviours related to environmental quality, such as energy conservation and resource preservation, has intrigued researchers since the mid-1980s (Farbrother, 1985; Jackson, 1987; Kuhn, 1988; Rodgers, 1987). Although there is a reflexive relationship between recreation activities and the environment in which they take place (Wilkinson, 1992), several studies of environmental attitudes have focused on their effects upon recreation participation (Ashfeldt, 1991; Bikales & Manning, 1990; Dunlap & Heffernan, 1975; Geisler et al., 1977; Jackson, 1987, 1986; Knopp & Tyger, 1973; Pinhey & Grimes, 1979; Van Liere & Noe, 1981). The following is a chronological review of these studies.

Knopp and Tyger (1973) found evidence that self-propelled recreationists (cross-country skiers) had stronger pro-environmental attitudes than motorized recreationists (snowmobilers). They argued that these attitudinal differences were largely the result of occupational differences.

In 1969, Hendee differentiated between recreation activities on the basis of environmental concern: "appreciative" activities are those that have relatively low environmental impact and involve enjoyment of the natural environment without changing it such as canoeing, hiking, walking, photography, and cross-country skiing, while "mechanized" or "abusive" activities are those that are relatively harmful to the environment. The latter two types of recreation activities either rely on burning fossil fuels for energy, thus contributing to pollution of the environment (mechnanized activities such as motor boating) or take from the environment, thus reflecting a utilitarian view of the environment (consumptive activities such as hunting) (Hendee, 1969).

Dunlap and Heffernan (1975) used these recreation activity types to hypothesize that: 1. there is a positive association between outdoor recreation participation and environmental concern; 2. this association is stronger between appreciative recreation activities and environmental concern than between consumptive recreation activities and environmental concern; and 3. there is a stronger association between outdoor recreation and concern with protecting aspects of the environment necessary for pursuing such activities than between outdoor recreation and other more general environmental issues such as water/air pollution. Dunlap and Heffernan used eight questions to measure environmental concern and correlated them with five recreation activities. Their results revealed weak positive relationships in the hypothesized directions for the second and third hypotheses, but no support for the first. They attributed the lack of association between environmental attitudes and recreation participation to inadequate measurement of environmental attitudes.

Geisler, Martinson and Wilkening (1977) tested the first two Dunlap and Heffernan hypotheses using 15 measures of environmental concern which stressed environmental problem awareness and support for public action. Their results showed that, while there was a first-order relationship between environmental concern and recreation participation, environmental concern was affected more by the demographic characteristics of the respondent (especially age) than by recreation participation. They concluded that time and place may have significant effects of the relationship between environmental attitudes and recreation participation, and that these factors may account for divergence in results between their study and the Dunlap and Heffernan (1975) study.

Pinhey and Grimes (1979) found equally disappointing results when they re-examined the first two Dunlap and Heffernan hypotheses in Louisiana. However, locationally specific environmental attitude measures, the different region in which the study was conducted, and different statistical tests used to detect relationships between environmental concern and recreation participation may be probable causes for the weak environmental attitude/recreation participation relationship reported (Jackson, 1989a).

Using the 12-item NEP scale, Van Liere and Noe (1981) examined the first two Dunlap and Heffernan (1975) hypotheses. They felt that by improving measurement of both environmental attitudes by using the NEP scale, and recreation participation by using hourly and daily accounts of recreation participation, they would reveal a stronger association between these two variables than had previously been found. Although the zero-order and partial coefficients were in the hypothesized directions, they were low in magnitude. These improved measures, they concluded, did not increase the strength of environmental attitude/recreation participation linkage. They discussed three possible explanations for the continued low associations between these variables: first, that the Dunlap and Heffernan (1975) hypotheses are true, but higher

levels of association will be found only with further improvements in measurement and/or study design; second, that there is no association between the two variables; and finally, that environmental attitudes and recreation participation are linked, but the linkage is more complex than originally thought. Van Liere and Noe recommended further investigation using improved study designs and environmental attitude measures.

Jackson (1986) refined the measurement of environmental attitudes by using a selection of 24 items from both the NEP and DSP scales which, when factor analyzed, resulted in four dimensions: limits to the biosphere, relationship between man and nature, negative consequences of growth and technology, and quality of life. This environmental attitudes scale (Jackson, 1986) revealed a positive relationship between recreation participation and environmental concern among adult residents of Calgary and Edmonton, Alberta. Jackson's results suggest that environmental attitudes measurement improvements may enhance detection of positive associations between pro-environmental attitudes and appreciative recreation activity participation and between anti-environmental attitudes and mechanized and consumptive activity participation.

Jackson (1987) extended his investigation of environmental attitudes and recreation behaviours by testing how views about the preservation versus the development of natural resources are reflected by participants in appreciative, mechanized, and consumptive recreation activities. Respondents who favoured preservation of resources were assumed to be more pro-environmental than those who favoured development of resources. The results showed the preservationist view was supported by the majority of urban Albertans. As hypothesized, participants in appreciative activities were more preservationist than participants in mechanized and consumptive activities with the exception of hunters. The environmental attitude measurement improvements made by Jackson lent support to the second Dunlap and

Heffernan (1975) hypothesis and provided the standard for further examinations of recreation participation and environmental attitudes.

Bikales and Manning (1990) continued to refine measurements of recreation participation to complement Jackson's (1986) environmental attitude measures. Their investigation implemented three new analytic techniques. First, they used relative assessments of the frequency of participation in a recreation activity, that is, the respondent was left to assess his or her relative levels of participation. This reflects a shift from a behavioural, quantitative approach to a cognitive, qualitative approach to this measure. Second, they formulated the Recreation Participation Index, which adds the responses across all seven recreation activities to measure the cumulative effect of recreation participation in forming environmental concern. Third, following Jackson's methodological suggestion, they compared pairs of recreation activities; however, unlike Jackson's pairs, recreation activities that use similar equipment, in similar conditions such as cross-country skiing (representing an appreciative activity) and downhill skiing (representing a "depreciative" or environmentally detrimental activity) were compared. Further, they used a more complex coding scheme of frequency of participation, and surveyed both rural and urban residents of Vermont. Their findings showed a weak positive relationship between environmental concern and outdoor recreation participation generally, and a stronger positive association between the Recreation Participation Index and environmental concern compared with individual activity associations. This suggests that increased participation in any of the seven selected activities leads to increased environmental concern. Moreover, Bikales and Manning found strong positive associations between appreciative activities and environmental concern compared with depreciative activities, and that cross-country skiers were more pro-environmental than participants in downhill skiing.

Asfeldt (1991) explored the impact of guided wilderness canoe trips on the Nahanni River, North West Territories on 71 participants' attitudes to, concern for,

and behaviour towards the natural environment. To assess environmental attitudes, Asfeldt used Jackson's (1986) 24-item environmental attitude scale. To assess environmental concern and behaviour he asked two open-ended questions about what it means to be environmentally concerned and what three key behaviours reflect an environmentally concerned individual. Results of the analysis of variance revealed that there were no significant differences in environmental attitudes from before to after the canoe trip experience; there was a change, however, in what the respondents felt was an environmentally aware individual, and in behaviours that reflect an environmentally concerned individual. The latter showed a change in behaviour focus from being personally active to educating oneself. Asfeldt concluded that ecotourism is an effective tool in changing concern for and behaviour towards the natural environment, but that environmental attitudes, which were already relatively pro-environmental among his sample, were not affected.

In summary, the nature of the relationship between environmental attitudes and recreation participation is still unclear. The research conducted by Dunlap and Heffernan (1975), Geisler, Martinson and Wilkening (1977), Pinhey and Grimes (1979), and Van Liere and Noe (1981) has resulted in, at best, weak support for the linkage between recreation participation and environmental attitudes. In contrast, the results of Jackson (1986, 1987), Bikales and Manning (1990) and Asfeldt (1991) has illustrated that improved measurements of both variables enhance the detection of a positive relationship between pro-environmental attitudes and appreciative recreation activities and anti-environmental environmental attitudes and mechanized and consumptive recreation activities. Further research employing these measures is needed to validate their ability to uncover the possible linkage of environmental attitudes and recreation behaviours.

The Rural-Urban Dimension

In addition to studies that have examined behavioural effects on attitudes, some studies have investigated the effects of socio-demographic variables such as size of residential community, education, income, age, and political affiliation on environmental attitudes and recreation participation. The following sections will review the literature that has specifically examined rural-urban residence effects on environmental attitudes and recreation participation.

Rural-urban differences in environmental attitudes

In the past decade, studies of rural-urban residence have shown its influence on attitudes about cultural tolerance (Smith & Peterson, 1980), energy crises (Swanson & Maurer, 1983), and energy developments (Thompson & Blevins, 1983). Other studies have examined the influence of rural-urban residence on environmental attitudes (Fortmann & Kusel, 1990; Glenn & Hill, 1977; Harry, Gale & Hendee, 1969; Hendee, Gale & Harry, 1969; Lowe & Peek, 1974; Lowe & Pinhey, 1982; Samdahl & Robertson, 1989; Trembley & Dunlap, 1978; van Es & Brown, 1974; Williams & Moore, 1991).

Several propositions exist about differences in rural-urban environmental attitudes. First, the "cultural homogenization" proposition states that standardization of education, mass communication, increased travel/geographic mobility, and mechanization of agriculture leads to a convergence of rural and urban attitudes (Spencer, Kelly & van Es, 1992; van Es & Brown, 1974). A second proposition states that rural-urban residence is as powerful a predictor of environmental attitudes as income and occupation (Fortmann & Kusel, 1990; Glenn & Hill, 1977; Lowe & Peek, 1974; Trembley & Dunlap, 1978). Urban residents, it is proposed, are exposed to pollution more than rural residents, making urban residents relatively more concerned with the environment (Trembley & Dunlap, 1978). Another proposition states that

rural-urban occupation differences, theoretically, lead to differences in rural-urban environmental attitudes (Hendee, Gale & Harry, 1969; Harry, Gale & Hendee, 1969). Hendee et al. (1969), and Harry et al. (1969), hypothesized that a positive relationship exists between "nature-exploitative" occupations and the utilitarian view of the environment. Occupations such as farming, mining, logging, and trapping are extractive occupations which lead to the development of utilitarian attitudes. Further, rural residents engage in these occupations more often than urban residents. In contrast, urban occupations are removed from the natural environment and are less dependent on natural resources; therefore, these occupations do not lead to a utilitarian attitude.

Finally, the diffusion theory holds that the attitudinal norms of rural residents are diffused to rural non-farm and small town residents since they are generally more economically dependent upon the success of the farmer than urban residents. Therefore, small town residents are less environmentally concerned than urban residents, but not to the extent that rural farm residents are (Williams & Moore, 1991).

Empirical studies conducted before 1978 show varied results regarding whether there is a difference between rural and urban environmental attitudes (Trembley & Dunlap, 1978). The majority of these studies hypothesized that rural residents would show less environmental concern than their urban counterparts. Trembley and Dunlap (1978) summarized the results of rural-urban attitude studies from 1965-1972, in which questions about environmental concern were asked at community, state, and national levels of reference. An example of a question at the national level is: "how serious is pollution in the nation?" and at the local level: "how serious is pollution in this area?" They found that divergence in results was a function of the levels of reference used in a particular study; rural-urban differences in the hypothesized direction were more pronounced at the community or local level of reference (Trembley & Dunlap, 1978).

Trembley and Dunlap tested these findings on data collected in 1970 from 866 Oregon state residents. They hypothesized that 1. rural-urban residence will be related to environmental concern, with urban residents having higher levels of concern, 2. rural-urban residence will be more strongly related to environmental concern at the local community level than at the state level and 3. rural farmers will rank lower in environmental concern than will rural non-farmers, but both will rank lower than urban residents. Their results showed that rural and small town residents had similar attitudes to pollution control, which differed significantly from those of urban and urban fringe residents. As hypothesized, rural and urban residence related more strongly towards environmental concern at the local than at the state level. Further, Trembley and Dunlap's study showed that total variance in rural-urban differences of environmental attitudes could not be accounted for by age, income or occupation. They concluded that different rural-urban environmental attitudes are more likely to be a major factor in determining environmental concern than other demographic variables, and that divergence in results from previous studies could be accounted for, in part, by the level of reference used in the study (Trembley & Dunlap, 1978, p. 487).

Lowe and Pinhey (1982) tested theories that, if supported, would show that rural residents were less environmentally concerned than urban residents. The results did not support the first six hypotheses concerning current occupation, their parents' occupations, and size of current place of residence. Their results did show, however, that size of community of socialization (the rural or urban place where the respondent was raised) was positively associated with level of support for environmental protection, and was a stronger predictor of environmental concern than size of the current place of residence of the respondent (Lowe & Pinhey, 1982, pp. 118-119).

Samdahl and Robertson (1989) tested a causal model of six independent variables: size of residential community, education, income, age, and two political affiliations, against three measures of environmental concern: perceptions of environmental

problems, support for environmental regulations, and ecological behaviour. The data were collected from a sample of 2,131 Illinois residents in 1978. The results showed that, although age was positively associated with ecological behaviours, in general these six socio-demographic variables were poor predictors of environmental concern. Further, they found that the three measures of environmental concern were not associated with each other, providing support for the contention that it does matter how environmental attitudes are measured.

In their study of 507 Nebraska adults in 1987, Williams and Moore (1991) tested levels of environmental concern across a continuum of rural farm, small town and urban residents. They tested the "multidimensional proposition," which states that:

> If environmental concerns have somewhat different publics, then residential categories should differ from one another whenever, but only when, an issue has particular saliency for the individuals (or a large proportion of individuals) in a particular residence category (Williams & Moore, 1991, p. 199).

To measure environmental concern, eight questions were posed about common environmental issues; five pertained to farming, the remaining three did not. The respondents were asked to make a choice between preservation of natural habitat and designated nature-exploitative use. The results showed that there were no significant differences in attitudes towards the three non-farm issues between residential groups; however, significant differences did exist on four of the five farming-related issues. In all four cases, rural residents were more likely to endorse nature-exploitative land uses, but attitudes differed within the rural residence category. Absentee owner and tenant farmers were more than twice as likely to advocate pesticide use than owner-operator farmers, while owner-operator farmers were more likely to advocate conservation plans for using erodible grasslands than absentee owner and tenant farmers. The reason for these differences may be that owner-operator farmers are more concerned with preserving their land for the use of future generations. Although Williams and

Moore (1991) found that urban residents were more preservationist that rural residents, differences in levels of environmental concern also lie *within* the rural residential category. Further, these differences are apparent only when measures addressing issues that have saliency to a particular residential group are used.

The results of the research examining rural-urban environmental attitude differences is inconsistent. Trembley and Dunlap (1978) found differences exist between rural and urban residents, but these differences are more pronounced at a local community level than at the state or national levels. Unlike Harry et al. (1969), and Hendee et al. (1969), Trembley and Dunlap found that differences in environmental concern could not be accounted for by age, income and educational differences. Lowe and Pinhey (1982) tested theoretically generated hypotheses concerning rural-urban attitude differences and found that the most important factor in these differences was size of community of socialization rather than size of place of current residence, occupation, and the occupations of the respondents' parents. Samdahl and Robertson (1989) found that size of place of residence was not a good predictor of three different measures of environmental concern. Williams and Moore (1991) found that while rural residents were less preservationist than urban residents, within the rural residential category, there were significant differences between owner-operator farmers, and absentee owner/tenant farmers.

Apparently, divergence in results is partly a function either of different levels of reference used in the questions that assess environmental concern, or different measures of environmental concern. It is interesting to note that none of the previous studies used measures of general environmental orientations (such as Jackson's environmental attitudes scale) to assess levels of rural-urban environmental concern. Examining rural and urban orientations toward the NEP and/or DSP may be more useful in detecting an association between residence and environmental attitudes than their orientations toward specific environmental issues such as pollution. Different

levels of rural-urban environmental concern will be examined using the environmental attitude scale (Jackson, 1986) in this thesis.

Rural-urban differences in recreation participation

A recent study of the congruence of outdoor recreation participation among rural, urban, and suburban populations concluded that there were no differences in participation (Yu, 1985). In their study of 200 urban, 200 small town and 200 rural residents of the greater Champaign-Urbana, Illinois area, Spencer, Kelly and van Es (1992) examined different residential preferences for solitude in recreation activities. Spencer et al. (1992) found that preferences for solitude in different recreation activities were not significantly different for three residential groups, and concluded that cultural homogenization was the norm in this area.

Although Yu (1985) and Spencer et al. (1992) provide initial evidence about the lack of rural and urban recreation participation differences, data collected by Alberta Tourism, Parks and Recreation (1992) show contrasting results. A chi-square test administered on a selection of 20 recreation activities showed that rural-urban recreation participation differences exist in some recreation activities. The results revealed significant rural and urban differences in walking for pleasure, bicycling, fishing, snowmobiling, hunting, ATV/Off road, dayhiking/ backpacking, dancing, golfing, jogging, aerobics, curling, tennis and downhill skiing. No significant differences were found for boating, cross-country skiing, canoeing, playing video games, basketball and soccer (Table 2.2). These results raise some questions about the nature of these differences: Why are there differences in these particular activities? Are there patterns or types of activities that are significantly different in rural and urban populations? Are rural-urban recreation differences unique to Alberta?

Several theories attempt to explain rural-urban recreation participation differences. These theories are divided into two categories: 1. those that base rural-urban

Table 2.2
Rural and Urban Differences in 20 Selected Recreation Activities*

Activities	Rural		Urban		Chi-square Scores 0.05	Significant at
	(%)	(n)	(%)	(n)		
Walking for pleasure	78.5	665	86.1	3843	31.5	yes
Bicycling	40.4	342	49.1	2193	21.7	yes
Fishing	37.2	315	29.6	1320	19.5	yes
Snowmobiling	20.9	177	6.9	308	168.2	yes
Boating	23.7	201	21.3	952	2.4	no
Hunting	16.5	140	8.3	370	55.8	yes
ATV/Off Road	20.1	170	9.6	429	78.0	yes
Dayhiking/Backpacking	25.7	218	35.3	1578	29.3	yes
Cross-Country Skiing	13.8	117	15.3	684	1.3	no
Canoeing	10.7	91	10.8	482	1.8	no
Dancing	41.3	350	33.0	1474	21.8	yes

Playing video games	25.4	215	25.2	1127	0.0	no
Golfing	28.8	244	33.6	1502	7.5	yes
Jogging	15.9	135	19.2	857	5.0	yes
Aerobics	16.2	137	22.2	989	15.2	yes
Curling	15.9	135	11.7	521	12.0	yes
Basketball	7.0	59	7.6	339	0.4	no
Soccer	4.1	35	5.6	252	3.2	no
Tennis	6.7	57	12.3	550	22.0	yes
Downhill Skiing	17.5	148	22.8	1017	11.7	yes

* Source: Alberta Tourism, Parks and Recreation (1992).

recreation participation differences on size and density of population influences on behaviour; and 2. those that base these differences on cultural influences on behaviour (Hendee, 1969). The "opportunity theory" is included in the first category, and holds that activities readily available in the city will have an over-representation of urban participants, and an under-representation of rural residents and vice versa (Hendee, 1969, p. 335). The "compensation" theory involves people's desire to "get away from it all." Individuals participate in recreation activities that are less hectic than their experiences in daily life, and that allow them to reduce social contact with others. Assuming that the daily lives of rural residents are different from those of urban residents, they seek recreation activities and experiences that are different from those desired by urban residents and vice versa (Hendee, 1969, p. 336; Spencer et al., 1992).

Theories that argue that differences in rural-urban recreation behaviour result from cultural factors include the "work-ethic" theory (Burdge, 1961), which holds that rural residents are more work-oriented and, therefore, do not participate as often as urban residents in recreation activities. A second theory states that urban residents participate in outdoor recreation activities to recapture values of harmony with nature, rather than dominance over nature (Green, 1964). According to this theory, rural residents are under-represented in outdoor recreation activities since they already hold these values from living closer to nature than urban residents. This is contradictory to the theories that were discussed in the previous section. The "nature-exploitative occupation" theory states that rural-urban recreation participation differences result from different environmental attitudes due to occupational differences. Rural residents involved in occupations that extract resources from the land, such as farming, mining, and logging, hold a more utilitarian view of the environment. In contrast, urban residents, who are generally employed in manufacturing or service industries, which are far removed from the natural environment, hold more pro-environmental views (Hendee, 1969). Different environmental attitudes may be reflected in recreational choices. Rural

utilitarian environmental attitudes lead to participation in extractive activities such as hunting and fishing. Appreciative attitudes lead to recreation activities focused on "aesthetic and social values in outdoor recreation" (Hendee, 1969, p. 337).

In their study of Oregon campers, Burch and Wenger (1967) found that the "pleasant childhood memory" theory provided a better indication of rural and urban recreation activity choices than did familiar recreation activities (those similar to every day experiences) or new recreation activities (those different from everyday experiences). The theory holds that childhood recreation activities were similar to adult recreation activities (Burch & Wenger, 1967).

To date, there are few empirical examinations of rural-urban differences in recreation participation. The few studies that have examined this relationship found no significant differences; however, an investigation of recreation participation data from Alberta Tourism, Parks and Recreation show that differences do exist for certain activities among Albertans. Various theoretical arguments for rural and urban differences, including the nature of occupations, work-ethic, exposure to poilution, and a need for recreation experiences that are different from every day experiences have not been used to explain why these differences exist in Alberta for those particular activities. The theory of cultural homogenization is supported by those empirical studies finding no significant differences. Clearly, further research is need to assess whether or not there are differences in rural and urban recreation participation and why these differences exist.

Objectives and Hypotheses

The literature discussed in this chapter raises certain questions: Does the relationship between environmental attitudes and recreation participation remain true in a more recent, and geographically diverse sample of Albertans? Are there differences in rural and urban recreation participation choices and environmental

attitudes within this sample? If rural-urban differences exist in recreation participation choices, are they a function of simultaneous rural-urban differences in environmental attitudes? This thesis has three main objectives that will examine these questions:

1. to re-examine the relationship between environmental attitudes and outdoor recreation participation among rural and urban resident of Alberta using Jackson's (1986) measurement improvements;
2. to compare rural and urban recreation participation in Alberta; and
3. to compare rural and urban environmental attitudes in Alberta using Jackson's (1986) measurement improvements.

These objectives were formulated to first, reaffirm the results of previous research by Jackson (1986, 1987) and Bikales and Manning (1990) and, second, extend our knowledge of this subject by incorporating the rural-urban variable. Since much insight has already been provided by previous research into the relationships between environmental attitudes, recreation participation and rural-urban residence, four hypotheses are tested in this thesis:

1. There is a relationship between recreation participation and environmental attitudes. Appreciative recreationists will have stonger pro-environmental attitudes than mechanized recreationists.
2. There are differences in rural and urban outdoor recreation activities. Rural residents will have higher participation rates in mechanized and consumptive recreation activities than urban residents. In contrast, urban residents will have higher participation rates in appreciative recreation activities than rural residents.
3. Urban residents hold stronger pro-environmental attitudes than rural residents in Alberta. Those respondents who were socialized in rural or urban areas will show these relationships more strongly than those respondents currently living in a rural or urban area.

4. Differences in rural-urban outdoor recreation participation may ultimately be explained by differences in environmental attitudes between these two groups.

CHAPTER 3

METHODS

The data for this study were collected from June 15 to July 30, 1992, by self-administered, mailed questionnaire. The questionnaire was designed to collect information about four main themes: recreation participation, environmental attitudes, rural-urban residence, and demographic variables. Survey packages were mailed to 600 adult Albertans from an equal number of rural, semi-rural and urban places, and included a cover letter, the questionnaire, and a self-addressed return envelope. Of the 600 questionnaire packages mailed, 189 were returned, for a total response rate of 31.5%. The implications of the low response rate will be addressed in the concluding chapter (Chapter 6). This chapter discusses the development and administration of the questionnaire survey, sampling methodology, and data analysis.

Questionnaire

The questionnaire contained fourteen questions and was designed in booklet form (Appendix A). According to Babbie (1989) and Dillman (1978), the first questions must capture and maintain the interest of the respondent, while the less interesting, demographic questions should be placed at the end. In light of these recommendations, the first question asked the respondent to indicate how frequently he or she had participated in 54 recreation activities selected from previous Alberta Recreation and Parks (ARP) surveys (Alberta Recreation and Parks 1988; 1984) and Jackson's Recreation, Energy and Environment Survey (Jackson, 1985). Questions about favourite recreation activities and motivations for participation followed. Respondents' opinions about the importance of 24 environmental statements were asked, and finally, questions about place of residence, age, sex, income and occupation were asked. Wherever possible, the format of the questions followed Dillman's "Total Design

Method" (Dillman, 1978).

Recreation participation

Recreation participation was measured in terms of frequency of participation, favourite activities, and the three activities most frequently participated in. Motivations for participation, while not a direct measure of recreation participation, were examined because they may add useful insight about reasons for participation. To determine frequency of participation in a wide range of recreation and leisure activities, the first question contained a list of 54 recreation activities selected from the Public Opinion Survey on Recreation (Alberta Recreation and Parks, 1984), the General Recreation Survey (Alberta Recreation and Parks, 1988), and the Recreation, Energy and Environment Survey (Jackson, 1986). All recreation activities used in these surveys were retained, except that "rollerblading" replaced "rollerskating," since the former has recently become popular. A four-point scale determined frequency of participation for each activity: 1 = "at least once a week", 2 = "at least once a month", 3 = "less than once a month", and 4 = "never in the last year."

In the second and third questions, respondents indicated their three most frequent and three most preferred recreation activities. In the fourth question, respondents indicated the degree of importance of 24 motivations for participation based on their favourite recreation activity. This was measured on a four-point scale: 1 = "not important", 2 = "somewhat important", 3 = "important", and 4 = "very important." The statements were developed by combining those used in the ARP 1984 and 1988 and Jackson (1986) surveys. From the original list of 29 statements, 24 were used to reduce redundancy and irrelevance.

Environmental attitudes

Environmental attitudes were examined using the environmental attitudes scale (Jackson, 1986) which was based on previous work by Dunlap and Van Leire (1978, 1984). This scale consisted of 24 statements and included all 12 statements in Dunlap & Van Leire's NEP scale (Dunlap and Van Liere, 1978), several statements from Dunlap and Van Liere's DSP scale (Dunlap & Van Liere, 1984), statements researched by Jackson (1986) from the resources and environmental literature, and one statement from Kuhn's Ph.D. thesis (Kuhn, 1988). Four themes were focused on: consequences of science and technology, quality of life, relationships between man and nature, and limits to the biosphere (Table 3.1). Degree of acceptance of each statement was measured by a five-point scale: 1 = "strongly disagree", 2 = "disagree", 3 = "neutral", 4 = "agree", 5 = "strongly agree."

Rural and urban residence

Rural and urban residence was determined by both current and childhood residence. Current residence was determined from the return envelope postmark. Childhood residence was determined, in question 11, by asking the respondent which category, "farm/acreage", "village/small town (up to 2,500 people)", "town/small city (2,500 to 25,000 people)", or "city (25,000 people or over)", best described where they grew up. These categories were developed by stratifying place-size categories on the Official 1992 Alberta Road Map.

Demographic variables

The demographic variable section included questions about sex, age, education, income, and occupation. Questions 6 through 10 dealt with sex, age, highest level of education attained, number of people receiving an income in the household, and total annual household income respectively. Question 10 implemented the same range of

Table 3.1
Environmental Attitude Statements

Statement	Original Source	Theme*
1. In the long run, there are no limits to the extent to which we can raise our standard of living	Jackson, 1986	Quality of life
2. The earth is like a spaceship with only limited room and resources	Dunlap and Van Liere, 1978	Limits to the biosphere
3. Plant and animals exist primarily to be used by humans	Dunlap and Van Liere, 1984	Relationship between man and nature
4. There are no limits to growth beyond which our industrialized society cannot expand	Dunlap and Van Liere, 1978	Consequences of science and technology
5. We can continue to raise our standard of living through the application of science and technology	Dunlap and Van Liere, 1984	Quality of life
6. We attach too much importance to economic measures of the level of well-being in our society	Dunlap and Van Liere, 1984	Quality of life
7. Humans must live in harmony with nature in order to survive	Dunlap and Van Liere, 1978	Relationship between man and nature

8. Economic growth improves the quality of life for all Canadians	Dunlap and Van Liere, 1984	Quality of life
9. The balance of nature is very delicate and easily upset	Dunlap and Van Liere, 1978	Limits to the biosphere
10. The positive benefits of economic growth far outweigh any consequences	Dunlap and Van Liere, 1984	Consequences of science and technology
11. Humans have the right to modify the environment to suit their needs	Dunlap and Van Liere, 1978	Relationship between man and nature
12. Canadians are going to have to drastically reduce their consumption of material goods over the next few years	Dunlap and Van Liere, 1984	Limits to the biosphere
13. Science and technology often do as much harm as good	Dunlap and Van Liere, 1984	Consequences of science and technology
14. When humans interfere with nature, it often produces disastrous consequences	Dunlap and Van Liere, 1978	Relationship between man and nature
15. More emphasis should be placed on teaching children about nature than on teaching them about science and technology	Kuhn, 1988	Relationship between man and nature
16. We cannot keep counting on science and technology to solve mankind's problems	Dunlap and Van Liere, 1984	Consequences of science and technology
17. In general, the Canadian people would be better off if	Dunlap and Van Liere, 1984	Consequences of science

the nation's economy stopped growing		and technology
18. Mankind was created to rule over the rest of nature	Dunlap and Van Liere, 1978	Relationship between man and nature
19. To maintain a healthy economy, we will have to develop a "steady state" economy where industrial growth is controlled	Dunlap and Van Liere, 1984	Consequences of science and technology
20. Humans need not adapt to the environment because they can remake it to suit their needs	Dunlap and Van Liere, 1978	Relationship between man and nature
21. Most problems can be solved by applying more and better technology	Dunlap and Van Liere, 1984	Consequences of science and technology
22. We are approaching the limit to the number of people the earth can support	Dunlap and Van Liere, 1978	Limits to the biosphere
23. Mankind is severely abusing the environment	Dunlap and Van Liere, 1978	Relationship between man and nature
24. Rapid economic growth often creates more problems than benefits	Dunlap and Van Liere, 1984	Consequences of science and technology

* Theme based on four environmental attitude dimensions identified by Jackson (1986).

income categories used in the ARP 1988 and 1992 surveys. Question 12 asked: "If you work outside the home, what is your occupation?" Question 13 asked the length of time the respondent worked at the job specified in question 12, and question 14 asked the occupations of both the mother and father of the respondent.

Survey Administration and Response Rates

In May, 1992, the questionnaire was pretested on 20 residents of Edmonton from both rural and urban backgrounds. Problems were corrected and the revised version was approved by the Faculty of Science Ethics Committee. All questionnaire packages were mailed on June 15, 1992.

The cover letter followed, for the most part, the format and recommendations of Dillman's "Total Design Method" (Dillman, 1978). The first paragraph introduced the researcher and topic of research. Respondents were then informed that they were important to the overall success of the project. Further, the importance of sending the questionnaire back quickly was stressed. To get an equal number of male and female respondents, the next adult in the household to have a birthday was asked to complete the questionnaire. In the third paragraph, respondents were told that their questionnaire was confidential and outlined who would have access to the results. Information about how they could receive the results was also included. Finally, my telephone number was given in case problems arose.

The questionnaire package was given a professional appearance, by producing the cover letter on University of Alberta letterhead (Appendix B). A reminder postcard stressing the importance of their contribution to the study and urging a quick return was sent two weeks after the questionnaires were mailed (Appendix C).

Of the 600 questionnaire packages mailed, 189 were returned for a response rate of 31.5 %. None of the packages was returned as "undeliverable." The reminder postcards did not have the expected "second wave" effect on the frequencies of

responses which would have been clearly shown by an increase in responses around mid-July (Figure 3.1). This, perhaps, was due to respondents taking summer holidays, or having no interest in the subject matter.

Sample Methodology

The sample was intended to equally represent both the rural and urban populations of Alberta. Questionnaire packages were sent to a stratified, random sample of 600 adult Albertans from rural, semi-rural, and urban areas. Randomly selected addresses, excluding Edmonton, were obtained from Alberta Government Telephones (AGT). AGT provides service to 336 places in Alberta, which were stratified into three categories. The first category, "farm/small town", included 264 places with 2,500 or less persons. The second category, "town/small city", included 59 places with between 2,500 and 25,000 persons. The third category, "city", included nine places with 25,000 or more persons. These categories were stratified following the classifications used for the Official 1992 Alberta Road Map. Five places were serviced by AGT, but were not found on the map; these places are assumed to have small populations, and were therefore added to the "farm/small town" category.

In an attempt to obtain an even distribution of rural, semi-rural and urban respondents, 200 people were sampled from each category. Twenty places were selected using computer-generated random numbers. Places in the first category, for example, were numbered from one to 264; those places corresponding to the 20 randomly generated numbers were sampled. Since there were only nine places in the "city" category, all were sampled. Ten addresses from each of the 20 places in both the first and second categories, and 22 addresses from each of the eight places (excluding Edmonton) in the third category, were sent questionnaire packages. Since AGT does not list Edmonton telephone numbers, Edmonton Telephone Directory addresses corresponding to 24 computer generated random numbers between one and 614 665

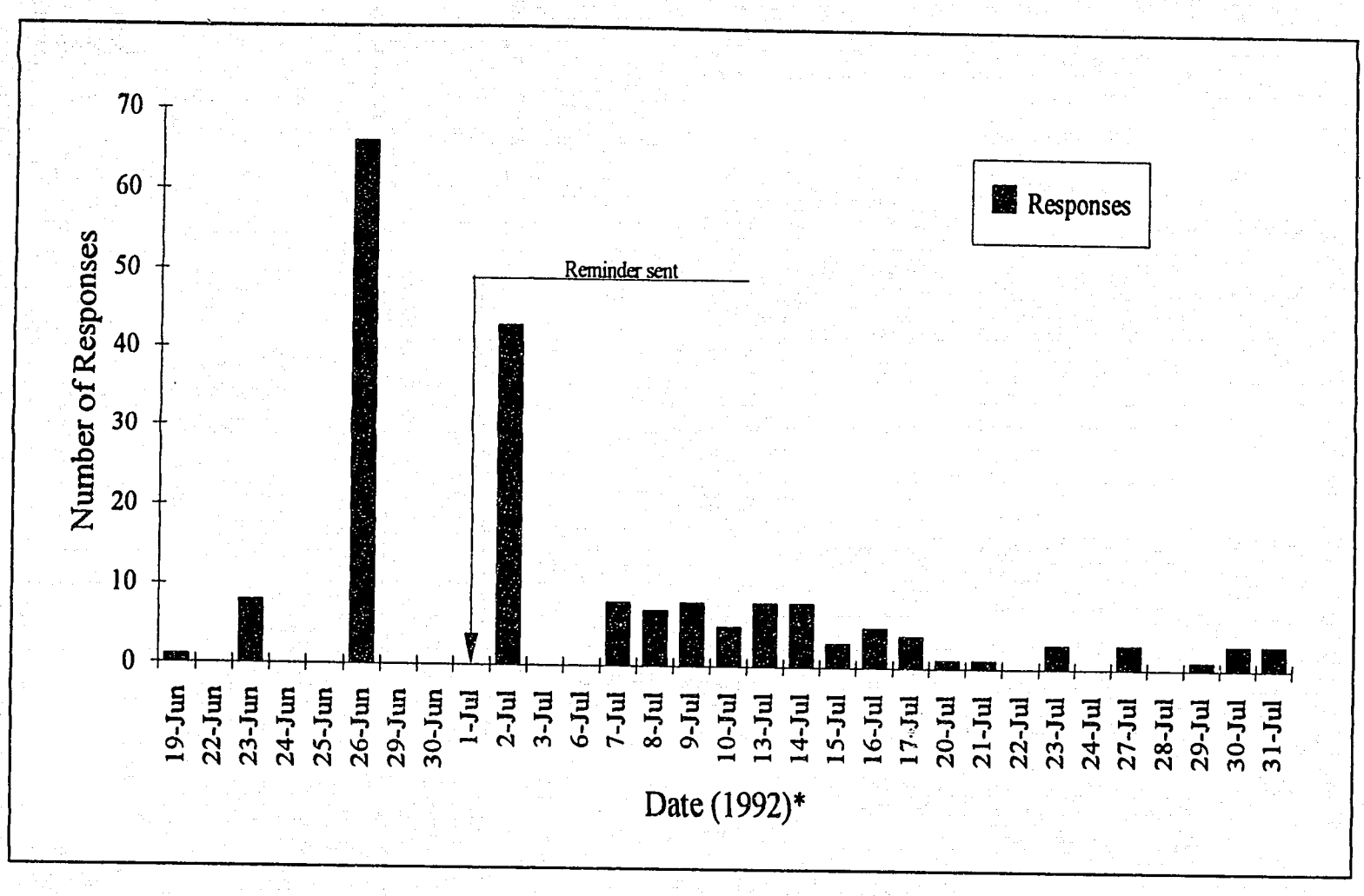

Figure 3.1 Response Rates
* Weekend dates not shown.

(the population of Edmonton) were mailed questionnaire packages. Any business addresses corresponding to a random number were skipped, and the next personal address appearing on the page of the directory was selected.

Data Analysis

Throughout July and August, 1992, data were recorded on coding sheets. The questionnaire was, in part, designed so that response categories and response codes were the same. Additional codes for recreation activities (Appendix D) and occupation categories (Appendix E) were added when appropriate. Origins of returned questionnaires were coded in alphabetical order (Appendix F). The data were transferred from the coding sheets onto a computer spreadsheet file (Excel). When the spreadsheet and the SPSSx command file were complete, both were transferred onto the MTS mainframe computer system at the University of Alberta. Frequencies were generated for the disaggregated raw data to form a basis for aggregating data in subsequent analyses. Cluster analysis and analysis of variance assisted in data aggregation, and chi-square tests were used to examine relationships between variables.

CHAPTER 4

DESCRIPTION AND AGGREGATION OF DATA

The purposes of this chapter are, first, to describe the recreation participation, environmental attitude and residence variables in their disaggregated form and second, to describe several methods whereby each of these variables was aggregated, such as cluster analysis of recreation variables, and arithmetic divisions for environmental attitudes. Various aggregations employed to find an optimal grouping of recreation participation and environmental attitude variables are investigated and interpreted. To aggregate residence variables, conventional map-influenced divisions between rural and urban residents were employed. These optimal aggregations will then be used in the analysis of relationships among the variables in Chapter 5.

Description and Aggregation of Recreation Participation Variables

Frequencies of recreation participation variables

Recreation participation was measured by asking respondents how frequently they had participated during the previous year in each of 54 recreation and leisure activities, using an ordinal scale consisting of the following responses: 1 = "at least once a week", 2 = "at least once a month", 3 = "less than once a month", and 4 = "never in the last year." The data from the responses were then treated in two ways, participation rate and frequent participation. Participation rate describes the percentage of the sample that participated in a particular activity at least once in the last year. For this measure, those respondents who indicated that they participated in an activity "at least once a week", "at least once a month", or "less than once a month" were considered participants in that activity. Those respondents who indicated that

they had not participated in an activity in the last year were considered non-participants. Frequent participation was measured by the percentage of respondents indicating that they participated in an activity "at least once a week." Examining both participation rate and frequent participation simultaneously gives an indication not only about how many people in the sample participated in an activity (participation rate), but how often they did so (frequent participation).

Table 4.1 shows both participation rate and frequent participation for each of the 54 recreation activities listed in the questionnaire. The table shows both high participation rates and frequent participation in passive, home-based activities such as reading, watching television, and gardening. For example, almost everyone in the sample watched television in the last year, and just over three quarters of the sample read at least once a week. In contrast, activities requiring relatively more skills, such as mountain climbing, sailing/yachting, ringette, and judo/karate, had both relatively low participation rates and frequent participation. For example, only 1.2% of the sample participated in judo/karate in the last year, and less than 1.0% of the sample participated in this sport as frequently as once a week.

Within this sample, there were also examples of recreation activities which had relatively high participation rates but low frequent participation percentages, such as dancing and tent camping. For example, 44.6% of the sample went tent camping, but less than 2.0% did so at least once a week. In addition to these types of activities, there are examples of activities which have low participation rates yet relatively high frequent participation percentages, such as curling and hunting. For example, almost 16.0% of the sample hunted, and more than half of them did so at least once a week.

The majority of the 54 recreation activities exhibited average participation rates and average frequent participation percentages. Baseball/softball and jogging/running, for example, displayed average characteristics in terms of participation rate and

Table 4.1
Recreation Activities: Participation Rates and Frequent Participation

Recreation Activities	Participation Rate* (%)	Frequent Participation** (%)
Reading	98.9	76.2
Watching T.V.	97.8	88.2
Walking for pleasure	94.5	58.6
Gardening	82.5	53.1
Picnicking	80.9	8.7
Driving for pleasure	80.2	34.3
Bicycling	73.4	30.6
Dancing	71.3	6.6
Swimming (in pools)	65.5	12.5
Photography	59.9	10.5
Swimming (in lakes)	49.7	5.5
Basketball	45.4	16.0
Fishing	44.9	9.0
Tent camping	44.6	1.8
Golf	43.5	18.2
Playing video games	43.4	12.7
Bowling	39.6	4.7
Hiking/Backpacking	38.2	7.9
Jogging/Running	38.0	11.7
Ice skating	38.0	6.7
Trailer/RV camping	34.3	7.8
Tobagganing/Sledding	33.1	3.7
Playing bingo/casinos	30.5	5.4
Downhill skiing	28.7	4.8
Aerobics/Gymnastics	28.4	11.7
Motorboating	27.4	4.3
Curling	25.3	10.8
Cross-country skiing	23.5	4.2
Squash/Raquetball/Badminton	22.8	3.7
Volleyball	22.1	3.7
Ice hockey	19.0	8.0
Baseball/Slowpitch	18.8	2.5
Water skiing	18.5	0.6
Tennis	18.1	2.5

Table tennis	18.0	0.6
Snowmobiling	17.6	2.4
ATV/Motocross	16.0	5.6
Hunting	15.9	8.5
Shooting	14.7	2.5
Football	14.7	0.6
Canoeing	14.2	1.2
Horseback riding	12.9	2.5
Soccer	11.1	2.5
Mountain climbing	8.0	0.0
Archery	5.5	0.0
Orienteering	5.0	0.0
Sailing/Yachting	3.7	0.6
Rollerblading/skateboarding	3.7	0.6
Lawn bowling	3.7	0.0
Windsurfing	3.1	0.0
Kayaking	1.2	0.6
Judo/Karate	1.2	0.6
Rugby	0.6	0.0
Ringette	0.6	0.0

* % of respondents who had participated at least once in the activity in the year prior to the survey.
** % of respondents who reported participating in the activity at least once a week.

frequent participation. Figure 4.1 shows the relative positions of six examples of recreation activities (judo/karate, hunting, tent camping, baseball/softball, jogging/running, and watching television) that showed differences in participation rate and frequent participation. Judo/karate exemplifies those activities with low participation and frequent participation rates, while watching television exemplifies activities with high participation and frequent participation rates. Hunting exemplifies activities with low participation rates, but which are participated in frequently; and tent camping exemplifies activities with high participation rates, but have relatively lower frequent participation. Finally, baseball/softball and jogging/running are examples of the types of activities that have average frequent participation and participation rates.

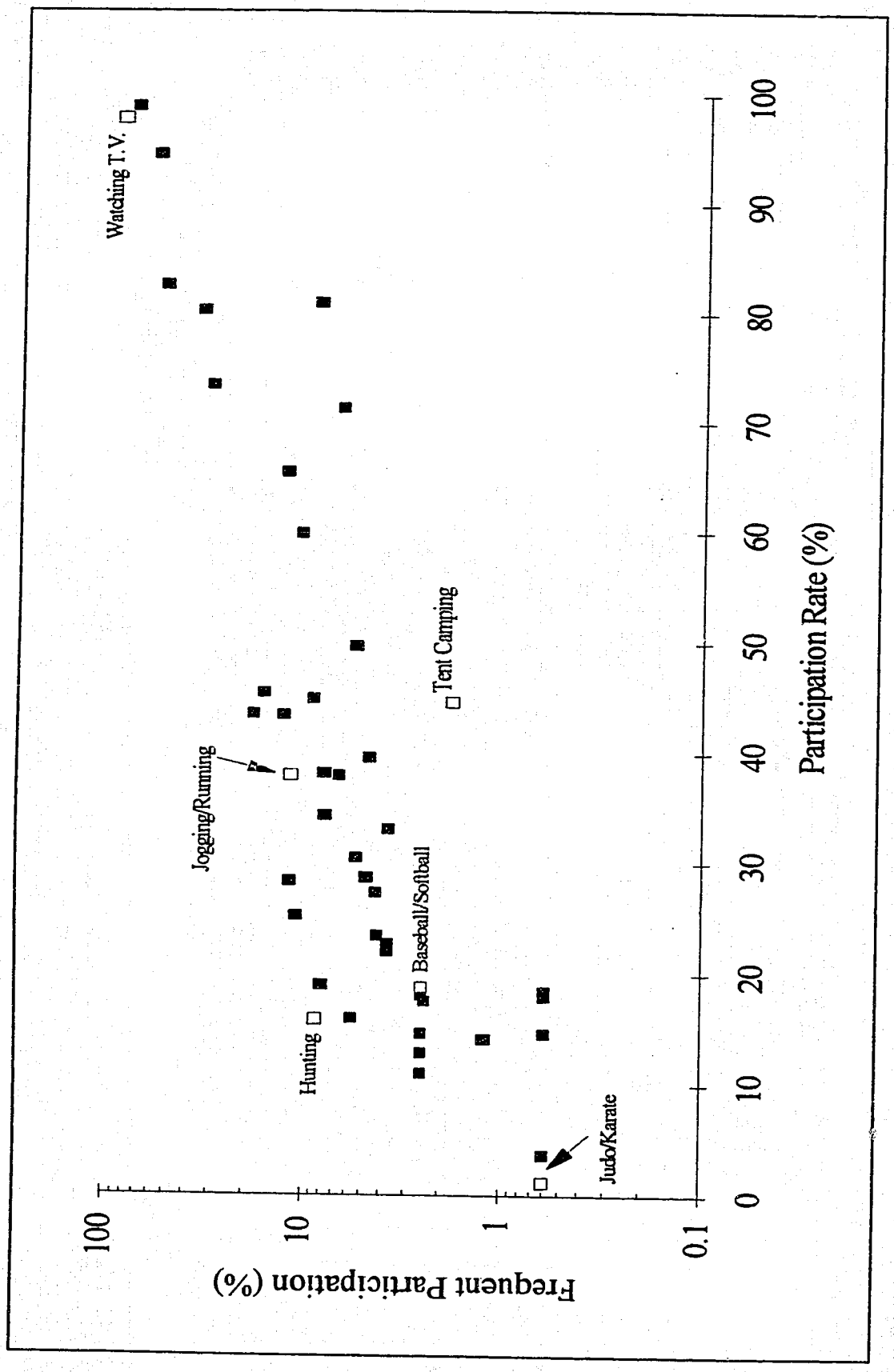

Figure 4.1 Participation Rate and Frequent Participation for Six Recreation Activities.

It is useful to apply participation rate and frequent participation simultaneously to describe different types of activities in terms of how many people participate and how often they do so because this is one way of detecting patterns within the data and may offer a potential means of classifying activities. However, it is more advantageous to use an alternative technique, such as cluster analysis, to aggregate activities into smaller sets that are, in some way, similar. The recreation activities that are of interest in this thesis are outdoor recreation activities, and in the following section, only sets of 12, eight and six outdoor recreation activities are examined. Thus, to distinguish groups of individuals with similar recreation styles in smaller sets of recreation activities than the 54 activities discussed in this section, a more complex method of aggregation (cluster analysis) will be employed.

Aggregation of recreation participation variables

Although a description of the 54 recreation activities is interesting since some general patterns are discovered, for the purpose of bivariate and multivariate statistical analysis of relationships with the "explanatory" variables that are of interest in this thesis, it is useful to aggregate the data in a different way. There are two reasons for doing so. First, grouping can reveal patterns that were either expected, thus confirming previous research, or unexpected, thus providing new insight into the underlying structure of a phenomenon. For recreation participation, three groups were expected to emerge through aggregating methods: people who prefer appreciative activities, those who prefer mechanized activities, and those who prefer consumptive activities. If these groups were to emerge, the process would confirm research conducted on these groups of recreationists by Jackson (1986) and others, such as Van Liere and Noe (1981), Pinhey and Grimes (1979), Geisler et al. (1977) and Dunlap and Heffernan (1975).

The second reason for aggregating raw data is to allow bivariate and multivariate analyses to be conducted on a smaller set of variables while still retaining some of the richness of information included in the raw data. In this study there were 189 respondents with 54 attributes (recreation activities) for each; the product of these components is 10,206 individual pieces of information. If each piece of information was examined separately, the process would be both tedious and ineffective in revealing patterns that may exist within the data. If the data are aggregated to create meaningful variables, these variables can then be used in more complex statistical analyses to reveal and explain patterns.

At least two methods have been used in past research to identify, interpret and explain patterns of recreation at a higher level of aggregation than activity-by-activity analysis: factor analysis (Jackson, 1986), and cluster analysis (Collins & Hodge, 1984). Cluster analysis has also been used in other branches of recreation research, such as aggregating recreation constraints (Jackson, 1993). Factor analysis (R-mode) classifies attributes of variables, in this case recreation activities, into groups. While this method identifies similar types of recreation activities, it is impossible to detect combinations of different types of recreation activities since each activity is assigned to one factor exclusively. Cluster analysis groups individuals who participate in similar combinations of recreation activities (Jackson, 1993) and therefore identifies recreation activity styles. Moreover, while factor analysis revealed three dimensions of outdoor recreation activities in Jackson's (1986) study (appreciative, mechanized, and consumptive), the data used for the present study are nominal and dichotomous (participate, or not participate) which is a limitation for factor analysis. Cluster analysis is more appropriate than factor analysis for this type of data since knowledge about the distribution of the data is not necessary, and the data may be non-parametric.

Disjoint cluster analysis was performed on three sets of recreation activities: first on 12 activities (ATV, canoeing, cross-country skiing, downhill skiing, fishing, hiking,

hunting, motor boating, snowmobiling, tent camping, trailer/RV camping, and waterskiing); second, on eight activities (ATV, canoeing, cross-country skiing, fishing, hiking, hunting, motor boating and snowmobiling); and finally on six activities (ATV, canoeing, cross-country skiing, hiking, motor boating, and snowmobiling). Different sets of recreation activities were used to examine their relative patterns resulting from cluster analysis. The first set was chosen because they represent a wide range of outdoor activities presented in the questionnaire. The second set was identical to those used in Jackson's (1986) study; and the third set was the same as the second, except that the "consumptive" activities (fishing and hunting) were dropped because initial analyses showed that mechanized and consumptive activities tended to combine. Thus, the two activities were dropped to determine if a clearer distinction could be made between mechanized and appreciative recreation groups.

The cluster analysis was conducted using the SPSSx *Quick Cluster* program (SPSS Inc., 1986, pp. 791-798). The procedure was initially carried out for two through 10 clusters for each of the three sets of recreation activities, because less than two clusters would represent too high a level of generality, while more than 10 would defeat the purpose of the exercise.

Selecting the optimal number of clusters was achieved by applying two criteria. First, each set of recreation activities was analyzed in a K-means statistics program (supplied by Department of Geography at the University of Alberta) which calculated the sum of the distances between clusters for each cluster solution. The second criterion was used by Jackson (1993), namely that "the attributes of each cluster should make intuitive sense in terms of the combination of items it contained" (Jackson, 1993, p. 135). These criteria were used to determine the optimal cluster solution as follows: first, the statistics program determined the optimal cluster solutions for each of the three sets of recreation activities. Then, the second criterion determined which one of the three sets of recreation activity clusters made the most

intuitive sense. The set of clusters that made the most intuitive sense was used in subsequent analyses. The process of selecting the optimal recreation activity cluster solution using these two criteria is described in the following paragraphs.

The cluster solution that shows the greatest distance measure difference from the previous solution is the optimal cluster solution for that set of recreation activities. For example, for the set of 12 recreation activities, the sum of the distances between clusters (distance measures) for the two-, three-, and four-cluster solutions was 272.1, 241.7, and 218.8 respectively (Table 4.2). The difference in distances from cluster two to three solution is 272.1 - 241.7 = 30.4; and the difference in distances from cluster three to four solutions is 241.7 - 218.8 = 22.8. Since the distance between cluster two and three is greater than that between three and four (and all other cluster solutions examined), the three-cluster solution is the optimal number of clusters for the set of 12 recreation activities. The optimal number of clusters was determined by this method for all three sets of recreation activities. For the sets of eight and six activities, the three-cluster solutions were also optimal (Table 4.2).

To determine the "best" set of activities using the second criterion noted above, the optimal cluster solutions for all sets of activities were graphed and examined (Figure 4.2 through Figure 4.4). Three sets of graphs were produced using Z-scores derived from the cluster means which assigned activities to each cluster. Each graph represents one of the three clusters for each of the 12, eight, and six activity sets. Relative levels of participation in each activity for each cluster of individuals were determined by the Z-score; those activities with higher Z-scores had higher mean participation rates than the activities with low Z-scores.

The 12-activity analysis

Figure 4.2 shows combinations formed by the set of 12 recreation activities. The first cluster is characterized by individuals who have higher than average participation

Table 4.2
Distances Between Cluster Solutions for Selected Recreation Activities

Cluster Solution	Distance					
	Six Activities	d*	Eight Actvities	d	Twelve Activities	d
2	121.5		170.0		272.1	
3	91.8	29.7	141.8	28.2	241.7	30.4
4	81.7	10.1	124.2	17.6	218.8	22.9
5	73.2	8.5	107.2	17.0	213.4	5.4
6	57.6	15.6	92.5	14.7	204.0	9.4
7	56.0	1.6	97.9	-5.4	186.8	17.2
8	41.9	14.1	81.0	16.9	177.1	9.7
9	41.6	0.3	69.8	11.2	162.8	14.3
10	34.8	6.8	68.7	1.1	152.1	10.7

* d refers to the difference between the distance measures.

rates in activities which are mechanized, such as motor boating, trailer/RV camping, water skiing and downhill skiing. They have lower than average participation rates in the appreciative activities (cross-country skiing, hiking) and the other mechanized activities (ATVing and snowmobiling). The individuals in this cluster have average participation rates in canoeing and tent camping and they participate in some fishing, but not as much hunting.

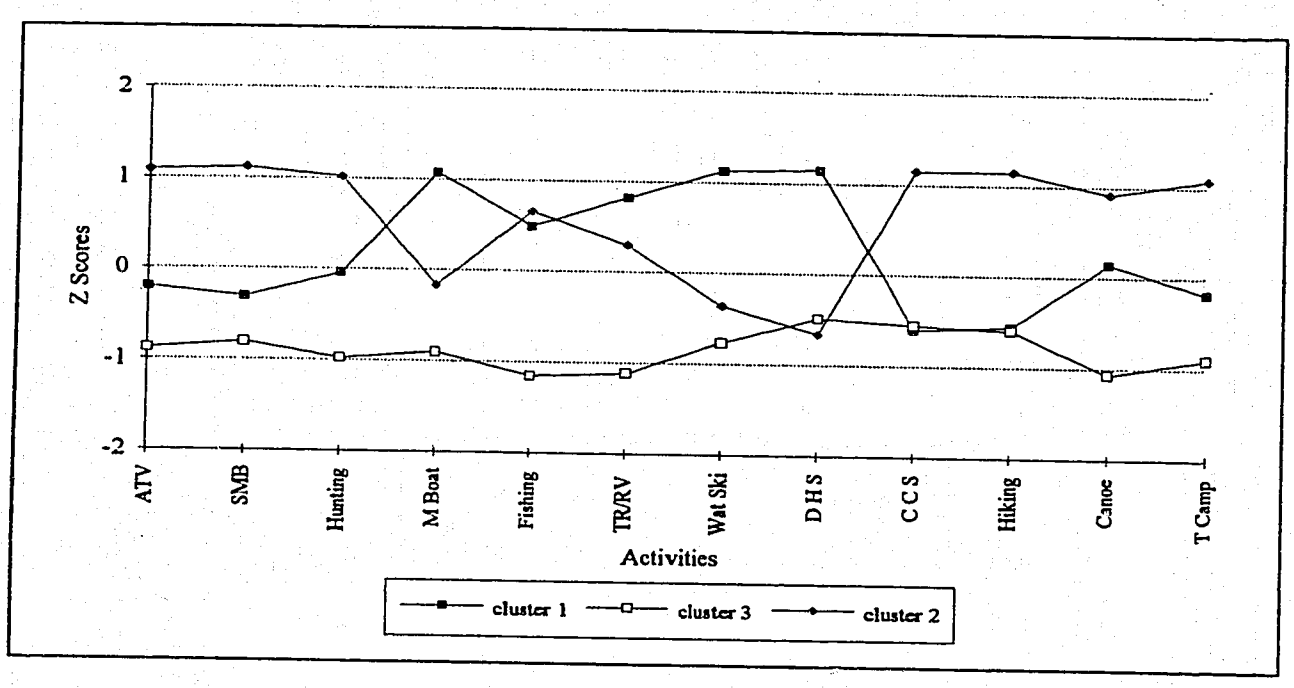

Figure 4.2 Clusters Based on Twelve Activities.

This cluster is difficult to characterize according to recreation styles. These individuals seem to enjoy the comforts of trailer rather than tent camping, and motor boating over canoeing, which would indicate that they participate in mechanized recreation activities. This is not entirely true, however, due to their lower than average participation in ATVing and snowmobiling. The cluster exhibits a higher than average participation rate in fishing than hunting, indicating that they do not "fit" into consumptive patterns of recreation. Moreover, they do not represent the traditional notion of appreciative recreation patterns.

The second cluster of individuals are opposite from the first cluster. These respondents have higher than average participation rates in hunting, ATVing, snowmobiling, cross-country skiing, hiking, canoeing and tent camping, but not in the others (with the possible exception of fishing).

Like the first cluster, this cluster is difficult to characterize in terms of recreation styles since both mechanized and appreciative types of activities are represented. It is possible, however, to characterize this cluster by the relative simplicity of their recreation equipment (i.e. tents rather than trailers, canoes rather than motor boats) which is characteristic of recreationists who frequent backcountry or remote wilderness areas compared with people in the first cluster, who may frequent forecountry, or more developed (in terms of facilities) recreation areas. The third cluster represents those respondents who have lower than average participation rates in the 12 outdoor recreation activities, however, they may be active in many of the other activities listed in the questionnaire.

The eight-activity analysis

Figure 4.3 shows the combinations formed by the set of eight recreation activities. The first cluster is characterized by relatively low participation rates in ATVing, snowmobiling and hunting, in contrast with motor boating, fishing, cross-country skiing, hiking, and canoeing. Individuals in this cluster have higher than average participation rates in a combination of appreciative, consumptive and mechanized activities, which makes finding a common recreation style difficult. Fishing and motor boating, however, could be described as "water-based" activities compared with the other mechanized and consumptive activities which are "land-based." Thus, this cluster could be described as water-based, and appreciative recreationists.

The second cluster of individuals have higher than average participation rates in mechanized (ATVing, snowmobiling) and consumptive (hunting) activities which were

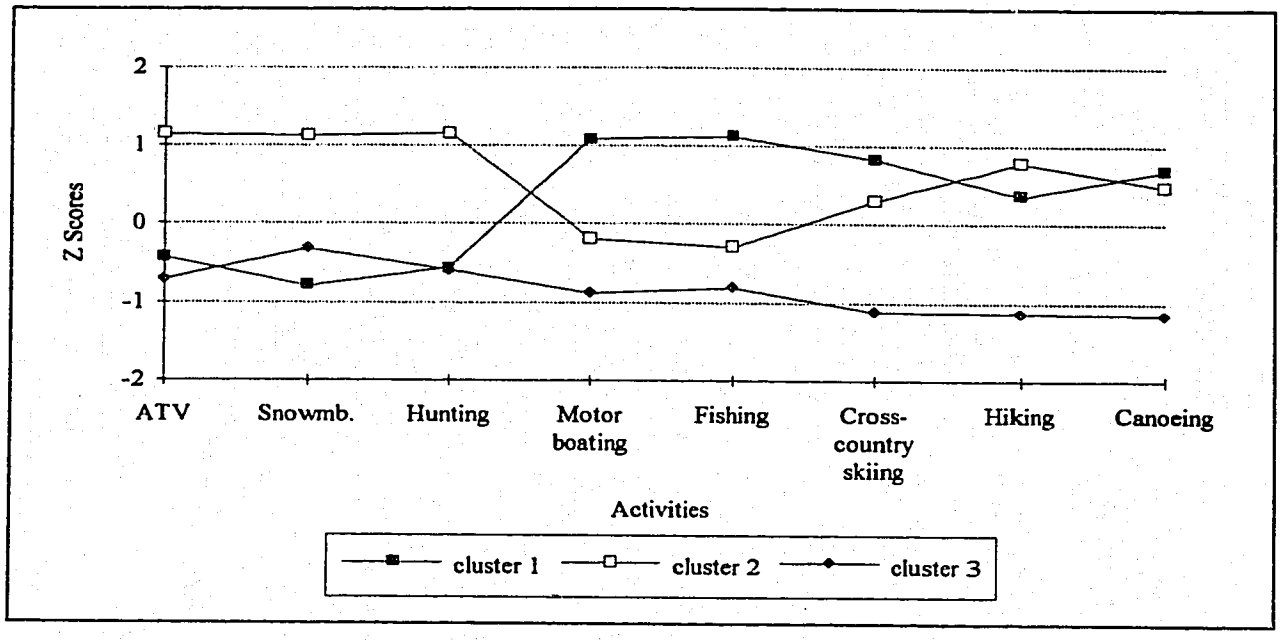

Figure 4.3 Clusters Based on Eight Activities.

lower than average for those individuals in the first cluster. This group is similar to the first cluster since they participate as often in the appreciative activities. Following the "land-water" characterization introduced earlier, this cluster, in contrast with the first cluster, can be described as land-based, and appreciative recreationists. The third cluster represents those who have lower than average participation rates in these eight recreation activities. This cluster, like the one third cluster in Figure 4.2 represents the majority of the sample.

The six-activity analysis

Figure 4.4 shows the combinations formed by the set of six recreation activities, where the first cluster is characterized by higher than average participation rates in mechanized activities (motor boating, snowmobiling, and ATV) and lower than average participation rates in appreciative activities (canoeing, cross-country skiing, and hiking). Thus, this is the first cluster of individuals that clearly distinguishes between mechanized and appreciative recreation styles (since the consumptive activities were left out) and will

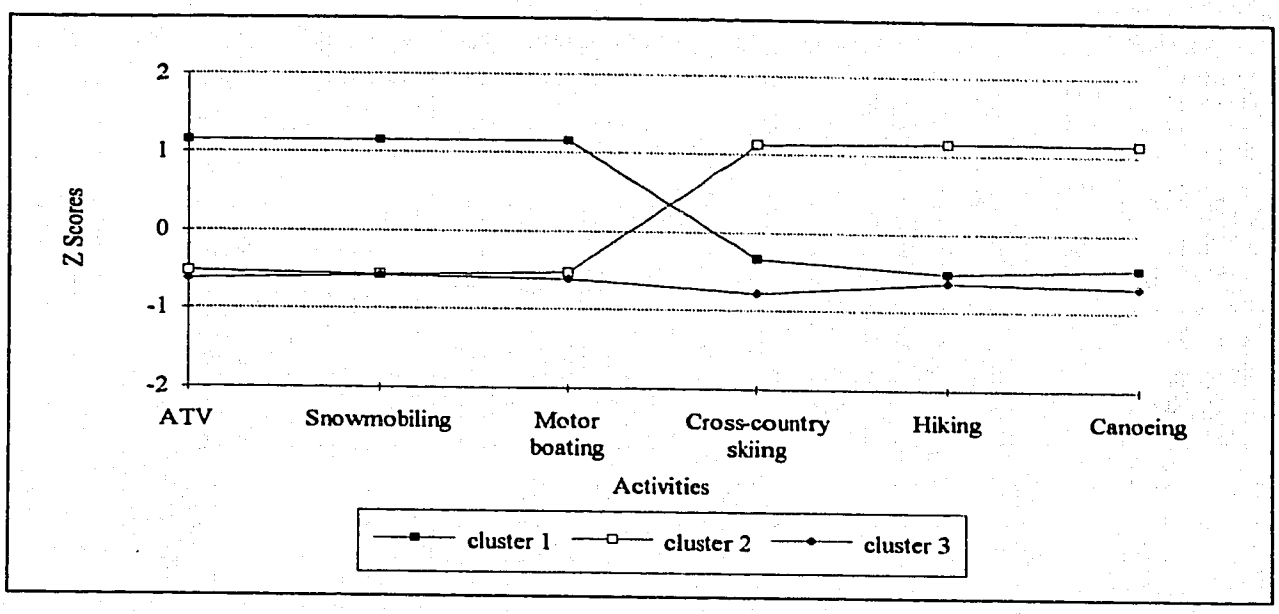

Figure 4.4 Clusters Based on Six Activities.

appreciative recreation styles (since the consumptive activities were left out) and will hereafter be called "mechanized." The second cluster is characterized by higher than average participation rates in appreciative activities (canoeing, cross-country skiing, and hiking), but not in mechanized activities. This cluster will be called "appreciative." The third cluster is characterized by lower than average participation rates in all of the six activities and will be named "inactives." Again, this cluster of individuals may only be inactive in these six activities.

The "best" solution

Given that the three-cluster solutions for the sets of 12 and eight activities failed to differentiate adequately among mechanized, appreciative and consumptive recreationists, and that one of the objectives of this study was to examine differences between groups of recreationists defined, in part, by environmental orientation (rather than forecountry-backcountry, or land-water orientations), then the set of six recreation activities generates an optimal pattern. This set of activities not only converges in a statistically valid number of clusters, and thus meets the first criterion, but makes the most intuitive sense in terms

of defining clearly demarcated recreational styles, and thus, unlike the other two sets of recreation activities, meets the second criterion.

Environmental Attitude Data

Description of environmental attitudes

The environmental attitudes of each respondent were measured by their responses to 24 statements about the natural environment and associated issues, as described in Chapter 3. Each respondent was asked to circle the number corresponding with his or her strength of agreement or disagreement with each statement. Precoded response categories were used: 1 = "strongly agree", 2 = "agree", 3 = "neutral", 4 = "disagree", and 5 = "strongly disagree." At the analysis stage, statement scores were reversed for those statements to which a person with an "ecocentric" orientation would respond with a high-scored response (statements 2, 4, 6, 7, 9, 12 through 17, 19, 22, 23, and 24). Consequently, a low score uniformly reflected an "ecocentric" perspective on the issue covered by the statement. This recoding procedure allowed for the calculation of a respondent's mean score on the entire set of items, as well as on dimensions of items.

Table 4.3 shows the mean scores, and percentage frequency of ecocentric, moderate ecocentric, neutral, moderate technocentric and technocentric responses for the 24 environmental attitude statements in the questionnaire. The table is arranged in descending order of mean score for each statement, so that those statements evoking technocentric responses are listed first, and those evoking ecocentric responses are listed last. This arrangement of the statements can be used to describe general trends within these data.

The first set of eight statements, with the highest mean scores, endorse continued growth of the Canadian economy and the use of science and technology to increase the standard of living in Canada. For example, over half of the respondents disagreed with the statement, "In general, the Canadian people would be better off if the nation's economy

Table 4.3
Mean Scores and Frequencies of Ecocentric, Moderate Ecocentric, Neutral, Moderate Technocentric and Technocentric Respondents on Environmental Attitude Statements

Statements*	Mean Score	Ecocentric (%)	Moderate Ecocentric (%)	Neutral (%)	Moderate Technocentric (%)	Technocentric (%)
17. In general, the Canadian people would be better off if the nation's economy stopped growing	3.67	2.2	4.9	26.4	57.1	9.3
5. We can continue to raise our standard of living through the application of science and technology	3.62	2.1	11.7	18.6	56.9	10.6
8. Economic growth improves the quality of life for all Canadians	3.19	2.2	29.0	24.2	37.1	7.5
1. In the long run, there are no limits to the extent to which we can raise our standard of living	2.99	10.6	30.3	17.6	32.4	9.0
15. More emphasis should be placed on teaching children about ecology than on teaching them about science and technology	2.87	7.5	32.6	30.5	24.1	5.3
21. Most problems can be solved by applying more and better technology	2.81	7.7	36.1	26.8	26.8	2.7

19. To maintain a healthy economy, we will have to develop a "steady-state" economy where industrial growth is controlled	2.53	8.2	46.4	31.1	13.1	1.1
4. There are limits to economic growth beyond which our industrialized society cannot expand	2.47	16.0	44.7	20.2	14.9	4.3
16. We cannot keep counting on science and technology to solve mankind's problems	2.39	13.9	50.8	18.7	15.5	1.1
13. Science and technology often do as much harm as good	2.36	9.2	58.7	21.2	8.2	2.7
22. We are approaching the limit to the number of people the earth can support	2.35	15.6	52.2	17.2	11.8	3.2
12. Canadians are going to have to drastically reduce their consumption of material goods over the next few years	2.34	16.0	47.6	25.1	9.1	2.1
18. Mankind was created to rule over the rest of nature	2.27	25.9	47.6	9.2	8.6	8.6
6. We attach too much importance to economic measures of the level of well-being in our society	2.25	16.9	55.2	16.9	8.2	2.7
24. Rapid economic growth often creates more problems than benefits	2.24	16.6	52.4	23.5	5.3	2.1

14. When humans interfere with nature, it often produces disastrous consequences	2.17	21.0	53.2	16.1	7.5	2.2
2. The earth is like a spaceship with only limited room and resources	2.09	27.8	49.2	11.8	8.6	2.7
3. Plants and animals exist primarily to be used by humans	2.09	31.9	42.6	13.3	9.0	3.2
11. Humans have the right to modify the environment to suit their needs	2.07	29.9	47.1	11.2	9.6	2.1
10. The positive benefits of economic growth far outweigh any consequences	2.01	30.4	48.4	12.5	7.6	1.1
20. Humans need not adapt to the environment because they can remake it to suit their needs	1.85	36.0	50.5	7.5	4.3	1.6
9. The balance of nature is very delicate and easily upset	1.82	40.6	44.4	7.5	7.5	0
23. Mankind is severely abusing the environment	1.81	41.7	45.5	5.9	3.7	3.2
7. Humans must live in harmony with nature in order to survive	1.60	45.2	50.5	3.8	.5	0

* Statements arranged in descending order of mean score.

stopped growing" and agreed with the statement, "We can continue to raise our standard of living through the application of science and technology."

The second set of eight statements, displaying relatively equal percentages in the moderate ecocentric, moderate technocentric, and neutral response categories, addressed a wide variety of issues reflected in the 24 statements. The statements in this section dealt with the application and effects of science and technology, the idea of a balanced, "steady-state" economy, and the reduced consumption of material goods.

The last set of eight statements dealt with limits to human population and economic growth, and the relationship between mankind and nature. For example, statements such as "Humans must live in harmony with nature in order to survive" and "The Earth is like a spaceship with only limited room and resources" were generally agreed with, while statements such as "Humans have the right to modify the environment to suit their needs" and "Plants and animals exist primarily to be used by humans" were generally disagreed with.

Arranging the statements by descending order of mean score reveals some basic patterns based on average responses to the 24 statements: technocentric responses were given most often to those statements that condone continued growth of the Canadian economy, and, consequently, standard of living through the use of science and technology; ecocentric responses were given most often to those statements that dealt with limits to population and economic growth, and a balanced relationship between man and nature; neutral responses were given most often to a variety of issues including a balanced, steady-state economy, and the limits of science and technology to solve the problems of mankind. While this is an effective arrangement with which to describe these data, more effective methods of aggregation are explored in the following sub-section, including several different arithmetic divisions among the total scores on each of the 24 statements.

Environmental attitude total and frequency distribution

Once the scores for the 24 environmental attitudes scale statements were reversed so that a low score uniformly reflected an ecocentric perspective on the issue covered by the statement, each respondent's total score was computed by summing his or her scores on each of the 24 statements (Table 4.4). Total scores were combined into 19 groups of 5 adjacent values (i. e. 24 - 28, 29 - 33 and so on) and a frequency distribution was constructed, which assisted in interpreting the environmental attitude trends among the entire sample. It was also possible to compare this sample's distribution of total scores to the distribution among the sample reported by Jackson (1986) (Figure 4.5). The theoretical range of total scores was 24 (24 x 1) to 120 (24 x 5); the observed range for the present study, at 34 to 98, was slightly smaller than that found by Jackson (1986), namely 27 to 108. Both of these samples are similar since they demonstrated a tendency to avoid the theoretical extremes of environmental attitudes.

The theoretical mean of the total scores is 72 (24 x 3 = neutral). The observed mean in the present study was 57.7, which is not only lower than the theoretical mean, but also lower than the observed mean in Jackson's study (63.5). This may, perhaps, be an indication of increasing environmental concern among the general Albertan population. Although both studies are placed in the ecocentric direction, the frequency distributions represent reasonable approximations of a normal distribution around their observed means.

Since the observed ranges and means of the two studies were approximately equal, (Figure 4.5) and Jackson's sample adequately represented the environmental orientations of the general urban population of Alberta, the environmental orientations of the present sample are assumed to also adequately represent the environmental orientations of Albertans. This sample, however, includes rural residents of Alberta, therefore, it was expected that the distribution of environmental attitudes would be placed nearer to the technocentric side of the scale than Jackson's distribution. This study's curve, however,

Table 4.4
Environmental Attitude Scale Scores

Score	n	%	Cumulative %	Score	n	%	Cumulative %
34	1	.6	.6	58	7	4.1	50.0
36	1	.6	1.2	59	4	2.4	52.4
38	1	.6	1.8	60	11	6.5	58.8
39	1	.6	2.4	61	12	7.1	65.9
40	1	.6	2.9	62	6	3.5	69.4
41	1	.6	3.5	63	7	4.1	73.5
42	1	.6	4.1	64	7	4.1	77.6
43	4	2.4	6.5	65	6	3.5	81.2
44	4	2.4	8.8	66	5	2.9	84.1
45	5	2.9	11.8	67	5	2.9	87.1
46	3	1.8	13.5	68	4	2.4	89.4
47	4	2.4	15.9	69	3	1.8	91.2
48	3	1.8	17.6	70	4	2.4	93.5
49	8	4.7	22.4	71	2	1.2	94.7
50	4	2.4	24.7	72	1	.6	95.3
51	8	4.7	29.4	73	2	1.2	96.5
52	4	2.4	31.8	74	1	.6	97.1
53	3	1.8	33.5	79	2	1.2	98.2
54	3	1.8	35.3	82	1	.6	98.8
55	9	5.3	40.6	84	1	.6	99.4
56	4	2.4	42.9	98	1	.6	100.0
57	5	2.9	45.9				

Number of missing cases = 19
Mean = 57.7; Median = 58
Standard deviation = 9.8; Range = 34 to 98
(Theoretical mean = 72; Theoretical range = 24 to120).

was placed even farther in the ecocentric direction than Jackson's curve despite the addition of rural Albertans. This may be interpreted in two ways. First, if urban and rural Albertans do have different environmental orientations in the hypothesized direction, then the pro-environmental attitudes of urban Albertans are much stronger than the relatively

anti-environmental attitudes of rural Albertans. Second, there is no difference in environmental attitudes of rural and urban Albertans and there has been a genuine shift to ecocentric environmental orientations among all Albertan in the last six years.

Development of "ecocentric" and "technocentric" groups

The total environmental attitude scores were calculated using the frequency distribution just described. Like the process used to find the optimal aggregation of recreation activities, the frequency distribution of total scores on the environmental attitude scale was subdivided in different ways to determine the optimal aggregation of these individuals.

For this study, the frequency distribution was subdivided in three different ways: first, by using the mean and first standard deviations, second by using quartiles and finally, by using thirds. Each set of groups was compared for its utility in future bivariate examinations.

The first grouping of four classes split the frequency distribution at the mean (57.7) and first standard deviations (+ and - 9.8), the same method of aggregation used by Jackson (1986) (Table 4.5). The category with the lowest scores (between 24 and 47.9) was called "ecocentric" and contained 15.9% of respondents. The second category, with scores ranging from 48.0 to 57.7, was referred to as "moderate ecocentric" and contained 30.0% of the sample. The category with scores ranging from 57.8 to 67.5 was named "moderate technocentric" and contained 41.2% of the sample; the final, "technocentric," category ranged from 67.5 to 120.0, and accounted for 12.9% of the sample. As expected, there were lower percentages of respondents in the ecocentric and technocentric groups, compared to both the "moderate" categories. This subdivision of the frequency distribution, however, was deficient for use in bivariate analysis since the extreme ecocentric and technocentric groups did not contain an adequate number of individuals (approximately 28 people in each). Thus, to ensure that any lack of association between

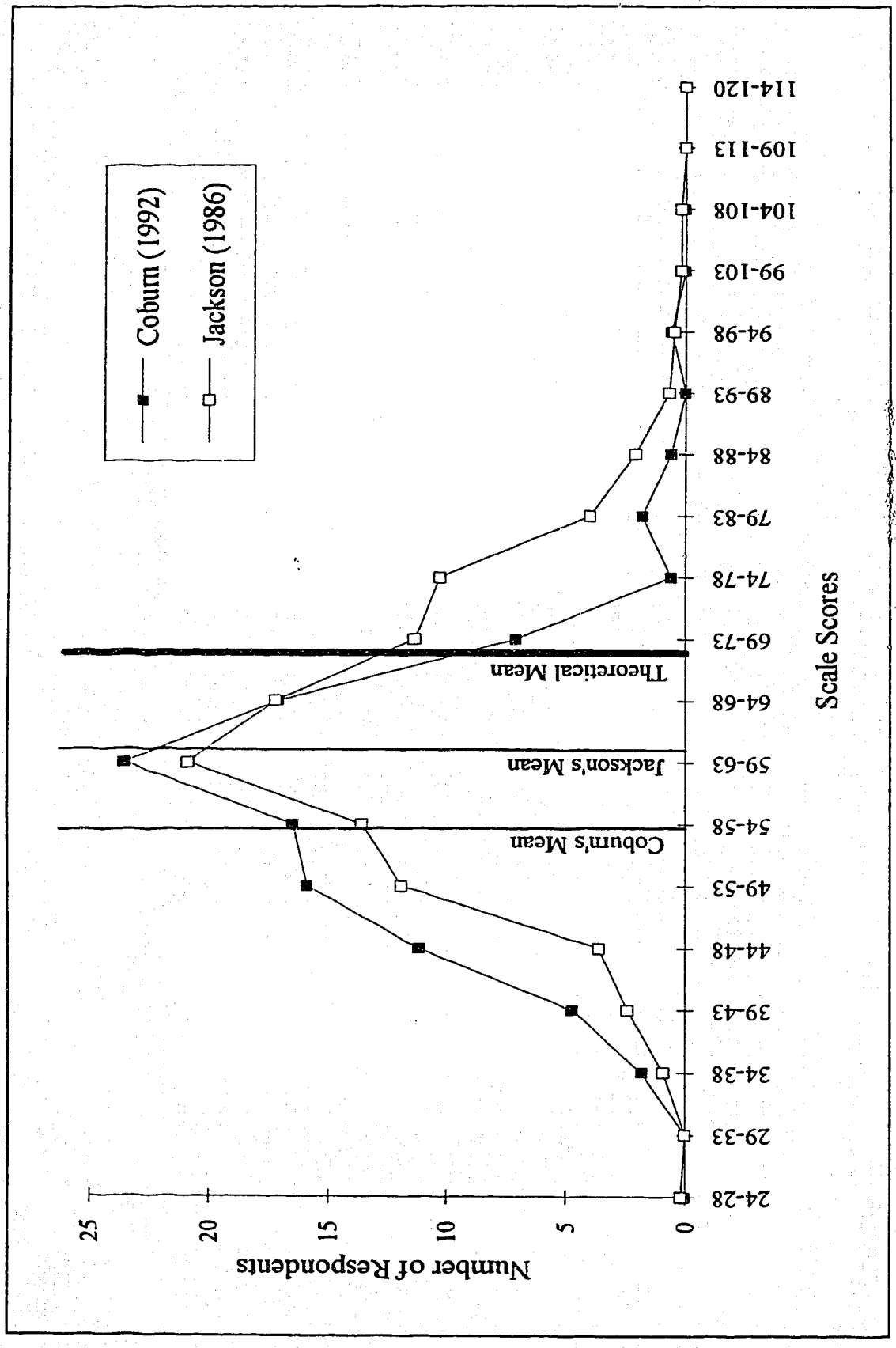

Figure 4.5 Distribution of Total Scores for Environmental Attitudes Scale.

environmental attitude categories and rural-urban residence or recreation participation was the result of a real world disassociation, rather than insufficient numbers, this method of subdivision was rejected.

The second aggregation of environmental attitude scale scores divided the frequency distribution into quartiles. The category names were the same as the previous aggregation, but division points were different (Table 4.5). This grouping, unlike the first one, assigned an equal number of respondents to each category. The range of scores for the ecocentrics was from 24.0 to 50.0; 51.0 to 58.0 for the moderate ecocentrics; 59.0 to 63.0 for the moderate technocentrics; and, 64.0 to 120.0 for the technocentrics. This subdivision of the environmental attitude frequency distribution was also deficient for further analysis because of the fragmentation of individuals in the four categories (approximately 47 individuals in each). Thus, this subdivision was rejected.

The final aggregation subdivided the frequency distribution into thirds (Table 4.5). This grouping, like the quartile grouping, assigned an equal number (approximately 33.0%) of respondents to each category. In this case, the first group had a range of scores from 24.0 to 53.0, and was called "ecocentric." The second groups' scores ranged between 53.1 to 61.0, and were called "moderates," while the third group had scores of 61.1 and higher, and were called "technocentrics." This subdivision represented the most reasonable compromise between fragmentation (too few individuals in any category due to a large number of categories) and total aggregation (one large group). Thus, this subdivision is optimal for future bivariate analysis compared to the previous two subdivisions.

Verification of ecocentric, moderate and technocentric aggregation

To determine if the "thirds" subdivision of the environmental attitudes frequency distribution was reliable in identifying individuals with ecocentric, moderate and technocentric environmental orientations, the groups were examined for consistent mean

Table 4.5
Frequencies of Ecocentrists to Technocentrists in Frequency Distribution Aggregations

Environmental Attitude Group	Jackson (1986)			Mean and Standard deviation			Fourths			Thirds		
	Range	n	%	Range	n	%	Range	n	%	Range	n	%
Ecocentric	24 - 53	86	15.1	24 - 47	27	15.9	24 - 50	42	24.7	24 - 53	57	33.5
Moderate Ecocentric	54 - 63	214	37.5	48 - 57	51	30.0	51 - 58	43	25.4	54 - 61	55	32.5*
Moderate Technocentric	64 - 74	182	31.9	58 - 67	70	41.2	59 - 63	40	23.6			
Technocentric	75 - 120	88	15.4	68 - 120	22	12.9	64 - 120	45	26.6	62 - 120	58	34.2

* represents the "Moderate" environmental attitude group.

scores (low mean scores for ecocentrics, high mean scores for technocentrics and mean scores in between ecocentric and technocentric mean scores for moderates) on each of the 24 environmental attitudes scale statements. This second stage analysis was conducted using an analysis of variance (F-test) of each of the three groups on the 24 statements. The results were graphed (Figure 4.6) and show that mean scores were consistently lower for ecocentrics than moderates and technocentric on all statements ($p < 0.01$ in all cases) with the exception of statement 5, "We can continue to raise our standard of living through the application of science and technology," for which the ecocentrics and moderates had identical scores, and statement 6, "We attach too much importance to economic measures of the level of well-being in our society." Moreover, technocentrics consistently had higher mean scores than moderates and ecocentrics on all statements, while moderates consistently exhibited mean scores in the mid ranges between those of the ecocentrics and technocentrics.

Further verification of the distinctness of ecocentrics, moderates and technocentrics can be found in subjecting these groups to an analysis of variance using Jackson's (1986) four dimensions of the environmental attitudes scale (negative consequences of science and technology, relationship between man and nature, quality of life, and limits to the biosphere). Similar to the analysis of variance on the 24 statements, the ecocentric, moderate and technocentric groups were examined for consistent mean scores (low mean scores for ecocentrics, high mean scores for technocentrics and mean scores in between ecocentric and technocentric mean scores for moderates) on each of the four dimensions.

The analysis showed that while the direction of agreement was similar between groups for all the dimensions, the strength of agreement was significantly different at the 0.01 level (Figure 4.7). Ecocentrics consistently displayed lower mean scores than did moderates, who in turn consistently displayed lower mean scores than did technocentrics.

The results of the analysis of variance tests support the distinctness of the three environmental attitude groups generated in the previous section. For all but two of the 24

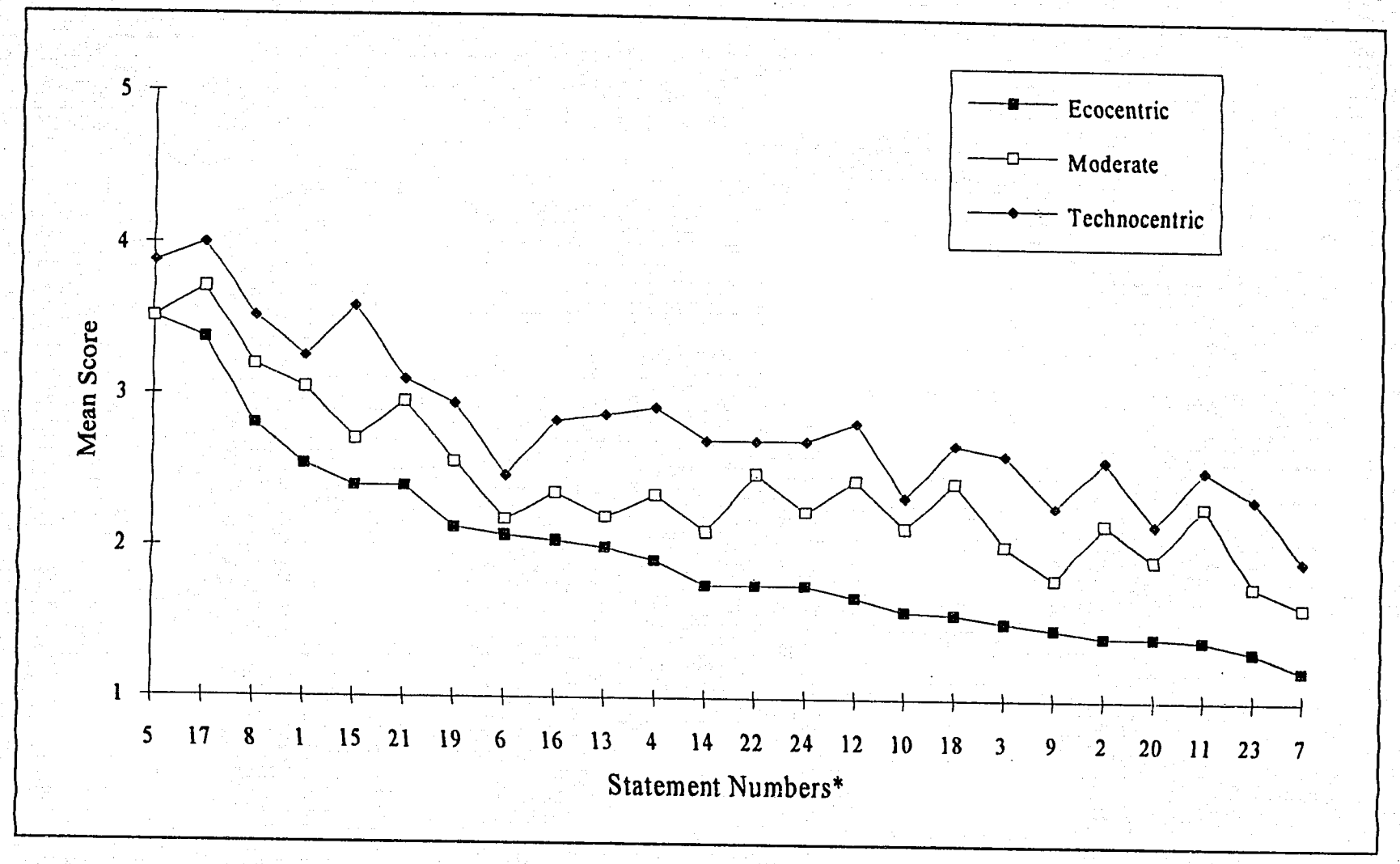

Figure 4.6 Mean Scores of Ecocentric, Moderate, and Technocentric Groups on 24 Environmental Attitude Statements.
* Statements in full in Table 4.3; all statement-differences between groups significant at 0.01 with exceptions of statements 5 and 6.

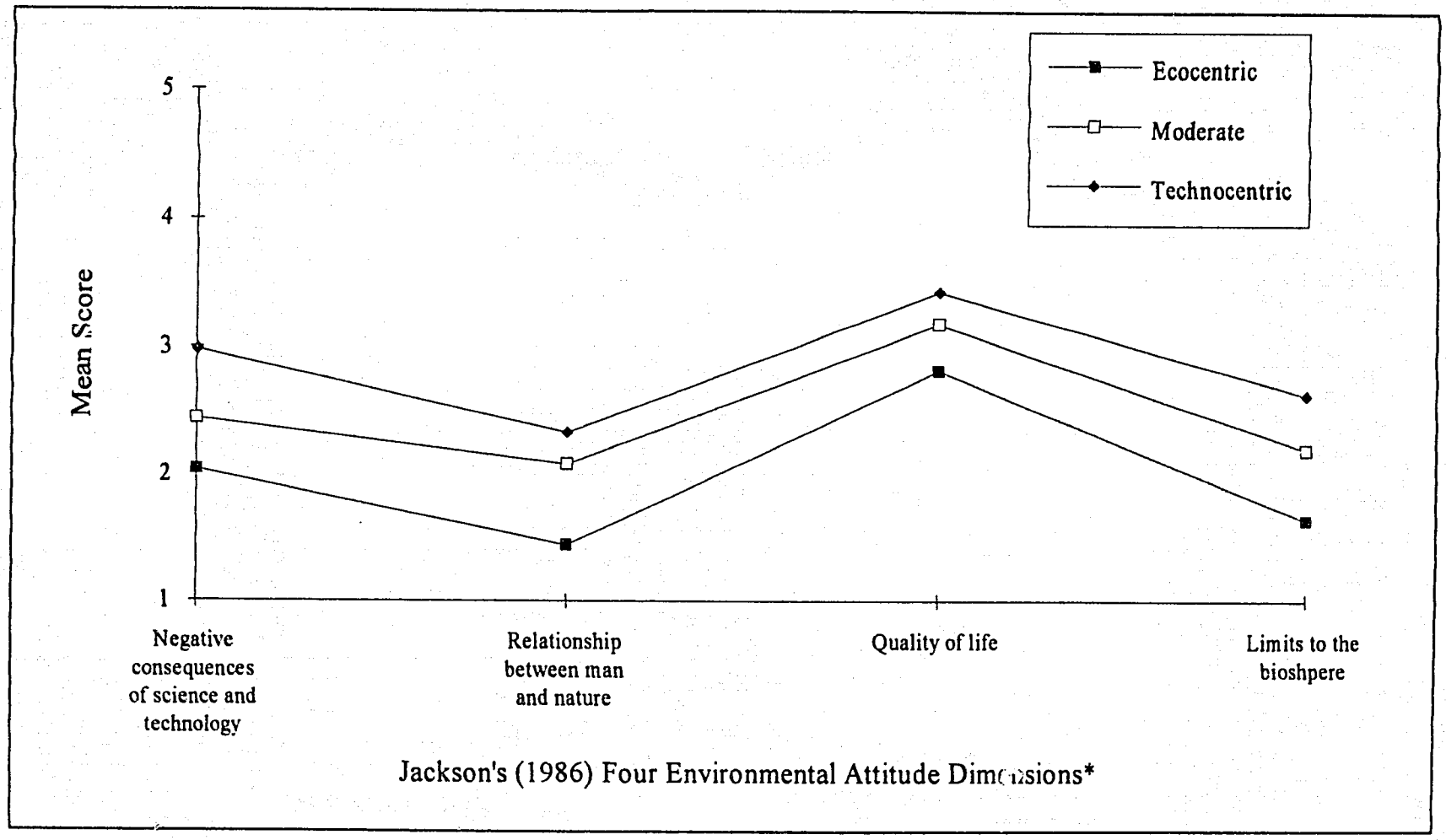

Figure 4.7 Mean Scores of Ecocentric, Moderate, and Technocentric Groups on Jackson's (1986) Four Environmental Attitude Dimensions.

* All differences significant at 0.01.

environmental attitudes scale statements, ecocentrics had significantly lower mean scores than did moderates who, in turn, had significantly lower mean scores than the technocentrics. Moreover, the three environmental attitude groups exhibited the same results when analyzed against Jackson's (1986) four scale dimensions. Thus, these groups reliably represent individuals with distinct ecocentric, moderate and technocentric environmental orientations and will be used in bivariate analyses presented in Chapter 5.

Residence Variables

Rural and urban residence categories were examined in two ways: by where the respondents live presently (current residence) and where they spent the majority of their childhood (childhood residence). Current residence was determined by the postmark on the return envelope. Wherever possible, each town or city a questionnaire was returned from was recorded (Appendix F). For these data, persons from places with under 2,500 persons were coded as "rural", while persons from places with populations over 2,500 persons were coded as "urban". Thus, for n = 189, current rural and urban respondents accounted for 24.9% and 75.1% of the sample respectively.

To determine childhood residence, respondents were asked to indicate which of the following categories best described where they grew up: "farm or acreage", "village/small town", "town/small city", or "city". The four categories were aggregated in the same way as current residence, so that persons from places with under 2,500 persons were coded as "rural", and persons from places with over 2,500 persons were coded as "urban". Thus, for n = 188, respondents identifying rural or urban childhood residence accounted for 56.9% and 43.1% of the sample respectively.

CHAPTER 5

RELATIONSHIPS BETWEEN RECREATION PARTICIPATION, ENVIRONMENTAL ATTITUDES AND RURAL-URBAN RESIDENCE: RESULTS OF THE BIVARIATE ANALYSIS

In Chapter 4, aggregation of the recreation participation, environmental attitudes and residence attributes uncovered patterns within each variable. The purpose of this chapter is to apply those attribute groups in an examination of bivariate relationships among the three main variables, and thus, test the first three hypotheses stated in the second chapter. It is advantageous to reword these hypotheses to incorporate the results of Chapter 4 (there are no "consumptive" recreationists in the analyses), and to more appropriately reflect the chi-square tests used to detect relationships in these analyses. Since the data are nominal, chi-square tests, rather than correlation or regressions, will be used to assess the presence or absence of relationships between each pair of variables. The significance level used to distinguish between significant and non-significant relationships throughout all analyses in this chapter is 0.05.

The restated hypotheses are as follows:

1. There is a relationship between recreation participation and environmental attitudes: appreciative recreationists will exhibit stronger pro-environmental attitudes than mechanized recreationists.
2. There is a relationship between rural and urban residence and recreation participation: respondents either currently living in, or socialized in, rural places will be associated with mechanized recreation styles; urban residents will have a stronger tendency to exhibit appreciative recreation styles than rural residents.
3. There is a relationship between residence (rural versus urban) and environmental attitudes: urban residents would be more likely to express ecocentric

environmental attitudes, whereas rural residents would be more likely to express technocentric environmental attitudes. Similarly, respondents who were socialized in urban areas would be more likely to express ecocentric environmental attitudes, and respondents who were socialized in rural areas would be more likely to express technocentric environmental attitudes.

If these hypotheses are supported, then the fourth hypothesis which links the three variables in a multivariate analysis will be tested. The following sections examine the relationships between the variables and test the hypotheses in sequence.

The Relationship Between Recreation Participation and Environmental Attitudes

In this section, the relationship between the three recreation participation groups derived in the "best" cluster solution (appreciatives, mechanized, and inactives) and the three equally sized environmental attitude groups (ecocentrics, moderates and technocentrics) is examined to test the first hypothesis.

The chi-square test revealed no significant relationship between recreation participation clusters and environmental attitude groups (Table 5.1). Although this relationship was not significant, a review of the frequencies exposed some interesting patterns. First, as expected, ecocentrics were more frequently classified as "appreciative" recreationists (22.0%) than were moderates (17.4%) and technocentrics (14.9%). However, there was also a higher frequency of mechanized recreationists in the ecocentric group (14.0%) than in the moderate (8.7%) and technocentric (10.6%) groups. Approximately equal percentages of each environmental attitude group were classified as "inactive" with respect to their outdoor recreation participation. Although there were more appreciative recreationists in the ecocentric environmental attitude group than in any other environmental attitude group, there were also more

Table 5.1
Variations in Recreation Participation by Environmental Attitudes

Recreation Participation Groups %	Environmental Attitude Groups: Ecocentric %	Moderate	Technocentric %	Totals %
Appreciative	22.0	17.4	14.9	18.2
Mechanized	14.0	8.7	10.6	11.2
Inactives	64.0	73.9	74.5	70.6
Totals (n)	(50)	(46)	(47)	(143)

Chi-square = 1.80; d.f. = 4; not significant.

mechanized recreationists in the ecocentric environmental attitude group than in any other environmental group. This pattern does not reflect the hypothesized direction of the relationship between environmental attitudes and recreation participation since it was expected that there would be fewer ecocentrics and more technocentrics in the mechanized recreation group.

The Relationship Between Rural-Urban Residence and Recreation Participation

Rural and urban residence was measured by both current residence and childhood residence. Relationships between each residence measure and the recreation participation clusters are examined separately in the following sub-sections. Through these tests, the second hypothesis will be tested.

Childhood residence and recreation participation

Table 5.2 shows the results of the analysis of relationships between childhood rural and urban residence and recreation participation clusters. The results indicate no significant relationship. The frequencies, however, suggest a slightly higher proportion of urban residents in the appreciative activity cluster (21.9%) than rural residents (16.5%), and a higher proportion of rural residents in the mechanized activity cluster (16.5%) than urban residents (6.8%). There was a relatively even distribution of rural and urban residents in the "inactive" outdoor recreation cluster. Therefore, while there was not enough evidence to suggest that there was a significant relationship between these two variables, the pattern of frequencies revealed the expected pattern: that more urban people were categorized as "appreciative" recreationists than were rural people, and more rural people were categorized as "mechanized" recreationists than were urban people.

Table 5.2
Variations in Recreation Participation by Childhood Rural-Urban Residence

Recreation Participation Groups	Childhood Residence		Totals
	Rural %	Urban %	%
Appreciative	16.5	21.9	19.0
Mechanized	16.5	6.8	12.0
Inactives	67.1	71.2	69.0
Totals (n)	(85)	(73)	(158)

Chi-square = 3.74; d.f. = 2; not significant.

Current residence and recreation participation

Table 5.3 shows the results of the analysis of relationships between recreation participation clusters and current rural-urban residence. Unlike the relationship between childhood residence and recreation participation, there was a significant, albeit weak, relationship in the hypothesized direction. The findings show that there were significantly more current urban residents classified in the appreciative activity cluster (20.2%) than current rural residents (11.4%). Moreover, there were significantly more current rural residents allocated to the mechanized activity cluster (28.6%) than current urban residents (6.4%). This analysis lends weak support to the second hypothesis since recreation participation styles were associated with current residence in the hypothesized direction.

Table 5.3
Variations in Recreation Participation by Current Rural-Urban Residence

Recreation Participation Groups	Current Residence		
	Rural %	Urban %	Totals %
Appreciative	11.4	20.2	18.1
Mechanized	28.6	6.4	11.8
Inactives	60.0	73.4	70.1
Totals (n)	(35)	(109)	(144)

Chi-square = 12.81; d.f. = 2; $p < 0.05$.

Summary

These results indicate that the effects of growing up in a rural or urban setting had no measurable influence on recreation styles adopted later in life; however, there was a weak significant relationship between current rural-urban residence and recreation styles. The relationship may be weak because current residence is not the only determining variable in recreation participation, but acts in concert with other variables to influence recreation participation choices.

The Relationship Between Environmental Attitudes and Rural-Urban Residence

Measures of current and childhood residence and their relationships with environmental attitudes are examined in this section. The results of the test of the relationship between the measure of rural and urban childhood residence and environmental attitudes will be discussed first, followed by the results of the test of the relationship between the measure of rural and urban current residence and environmental attitudes.

Table 5.4 shows that there was no significant relationship between residents socialized in rural or urban places and environmental attitudes. The frequencies revealed that there were virtually identical distributions of respondents socialized in urban and rural places in the ecocentric, moderate and technocentric categories. This even distribution suggests that the same range of attitudes exist in rural and urban areas of Alberta. This finding is congruent with the proposition of cultural homogenization of environmental attitudes of rural and urban populations proported by Spencer, Kelly and van Es (1992) and van Es and Brown (1974). This proposition states that rural and urban environmental attitudes are similar as a result of improvements in transportation and communication networks, increased geographic mobility and higher education standards.

Table 5.4
Variations in Environmental Attitudes by Childhood Rural-Urban Residence

Environmental Attitude Groups	Childhood Residence: Rural %	Childhood Residence: Urban %	Totals %
Ecocentric	33.7	33.3	33.5
Moderate	31.5	33.3	32.4
Technocentric	34.8	33.3	34.1
Totals (n)	(92)	(78)	(170)

Chi-square = 0.07; d.f. = 2; not significant.

Table 5.5 shows the results of the chi-square test of the hypothesized relationship between current rural-urban residence and environmental attitudes. Like the relationship between childhood residence and environmental attitudes, there was no significant difference. Both current rural residents and current urban residents were allocated equally to the three environmental attitude groups. In conclusion, neither current nor childhood residence measures seemed to affect environmental attitudes.

Implications for the Multivariate Analysis

While the relationship between environmental attitudes and recreation participation was not statistically significant, the frequencies revealed a trend consistent with the hypothesis: ecocentrics were more frequently classified in the appreciative recreation group than were the other environmental attitude groups. However, ecocentrics were also more frequently classified in the mechanized recreation group than were the other

Table 5.5
Variations in Environmental Attitudes by Current Rural-Urban Residence

Environmental Attitude Groups	Current Residence: Rural %	Current Residence: Urban %	Totals %
Ecocentric	34.2	31.6	32.3
Moderate	26.3	34.2	32.2
Technocentric	39.5	34.2	35.5
Totals (n)	(38)	(117)	(155)

Chi-square = 0.84; d.f. = 2; not significant.

environmental attitude groups.

There was no support for the second hypothesis about the relationship between the childhood residence measure and recreation participation; however, there was a significant relationship between current residence and recreation participation in the hypothesized direction. Thus, the effect of socialization in a rural or urban area had no affect on recreation styles adopted by Albertan adults. Current residence, however, does affect recreation styles in Alberta.

Finally, no support was found for the third hypothesis. Respondents socialized in, or currently living in, rural areas did not constitute a higher percentage of the technocentric environmental attitudes group compared with respondents socialized in, or currently living in, urban areas. In fact, the frequencies show that there were virtually equal proportions of both measures of rural and urban residence among the

environmental attitude categories, which supports the theory of cultural homogenization.

Given that significant relationships were not found between all pairs of variables, the planned multivariate analysis was not conducted. It is important to examine the effects of these variables on each other in the context of a multivariate analysis; however, before these analyses can be executed, the dynamics of the bivariate relationships must be understood and enough evidence must be found for the existence of significant bivariate relationships between these variables.

CHAPTER 6

CONCLUSIONS AND FUTURE RESEARCH

This thesis has attempted to further our knowledge about the relationship between recreation participation and environmental attitudes with the addition of a third variable, rural-urban residence. Although not all hypothesized relationships were found and thus, the linkages between these variables are still unclear, much has been learned about conducting this type of research. The first section of this concluding chapter gives an overview of the univariate and bivariate findings and their implications. The second section details the analytical and inferential research problems which originated from the low response rate. The third section discusses future research ideas, including the nature of research methods used, the recreation activities examined, and aggregation of the rural-urban residence variable. The final section reiterates the possible linkage between environmental attitudes and recreation participation behaviours, and encourages further research in this subject since it reflects social environmental and recreational trends.

Summary and Implications of the Findings

This thesis was conducted to increase understanding of the relationship between outdoor recreation participation and environmental attitudes by adding a third variable, rural-urban residence. Each variable was described and aggregated in Chapter 4, while Chapter 5 provided an interpretation of the bivariate relationships between all possible pairs of these variables. The first and second sub-sections of this chapter discuss the univariate and bivariate findings respectively and their implications.

The univariate analysis findings and their implications

The description and aggregation of the three main variables in Chapter 4 revealed some interesting patterns. The cluster analysis of recreationists resulted in three well-defined clusters or aggregates of respondents who have higher than average participation rates in mechanized and appreciative recreation activities, and a third group of respondents who were not active in these recreation activities. For this thesis, cluster analysis was a more appropriate method of aggregation than factor analysis, because it aggregates individuals who participate in similar combinations of recreation activities, and thus reveals recreation styles. In contrast, the type of factor analysis used in this study assigns each individual activity to a category exclusively. Factor analysis does not reveal aggregates of individuals with distinct recreation styles, but groups similar types of recreation activities to a single factor. Further, cluster analysis provides a more appropriate method of aggregation than factor analysis for the nominal recreation participation rate data used in this thesis.

The environmental attitudes statements were aggregated first by computing the total scores on each statement, and then dividing the frequency distribution of the total scores into three equally-sized groups. The consistency of these groups in reflecting a ecocentric, moderate and technocentric orientation was tested using F-tests among each environmental attitude group on the 24 environmental attitude statements and on Jackson's (1986) four environmental attitude dimensions. With only a few exceptions, the ecocentrics exhibited significantly lower total scores, technocentrics exhibited significantly higher total scores, and moderates exhibited significant total scores between the ecocentrics and technocentrics on the 24 environmental attitude statements and four dimensions. Thus the analysis of variance confirmed that the three environmental attitude groups were significantly different in their environmental orientations.

The bivariate findings and their implications

Environmental attitudes and recreation participation findings

The results of the analysis of the relationship between environmental attitudes and recreation participation showed that they were not significantly related; however, the frequencies revealed the hypothesized trend: more ecocentrics were classified as appreciative recreationists than any other environmental attitude group. Ecocentrics, however, were also categorized as mechanized recreationists more often than moderates and technocentrics.

The pattern shows that ecocentrics are at least 10 percentage points higher in the appreciative and mechanized recreation clusters than are both the moderates and technocentrics. This is congruent with one of Dunlap and Heffernan's (1975) rationales for studying recreation participation and environmental attitudes: that participation in outdoor recreation creates an awareness of environmental problems. Further, Bikales and Manning (1990) found that a cumulative measure of outdoor recreation participation is positively associated with environmental concern. These findings suggest that regardless of the type of outdoor recreation activity, increased overall participation in outdoor recreation may lead to concern for the environment.

Rural-urban residence and environmental attitudes findings

The results of the analysis of the relationship between rural and urban residence and environmental attitudes revealed that there was no significant relationship between either the measures of childhood rural and urban residence or current rural and urban residence and environmental attitudes. For both measures of residence, there were virtually equal numbers of rural and urban respondents in the three environmental attitude groups.

This result may reflect efforts of educational institutions, governments and environmental interest groups to increase concern for the environment which have been diffused evenly into rural and urban Alberta.

Rural-urban residence and recreation participation findings

The results of the analysis of the relationship between rural and urban residence and recreation participation showed that there was a significant relationship between current residence and recreation participation in the hypothesized direction; however, there was no significant relationship between the childhood residence measure and recreation participation. Thus, socialization in a rural or urban area has not influenced recreation styles adopted by these Albertan adults, why then, did current residence influence recreation participation?

Theories outlined by Hendee (1969) and others may help to explain this relationship. Hendee (1969) divided theories that attempt to explain differences in rural and urban recreation participation into two groups: those that base rural-urban recreation differences on size and density of population influences on behaviour, and those that base these differences on cultural influences on behaviour (see Chapter 2).

We can assume that the cultural composition of rural and urban Albertans is similar because of extensive communication and transportation systems throughout the province. Research findings from this thesis further support this assumption. First, the environmental attitudes of rural and urban respondents (for both current and childhood measures of residence) were not significantly different. Since environmental attitudes are not influenced by rural and urban residence (the size and density of a population in an area), then environmental attitudes may, instead, be affected by cultural influences, such as television and radio programs, and educational classes. If this is true, and there is no difference in rural and urban environmental attitudes, then the cultural influences on rural and urban residents in Alberta are similar.

Second, there was no significant relationship between childhood rural-urban residence and recreation participation. If there is no difference in the cultural influences on rural and urban Albertans (see argument in previous paragraph), then where a person was socialized will not influence his or her outdoor recreation behaviour.

Assuming that cultural influences on rural and urban behaviour are similar, Hendee's group of theories that base rural and urban differences on cultural influences on behaviours are not as effective in explaining the significant difference between current rural and urban recreation participation as are those theories that contribute these differences to the size and density of population influences on behaviour. The latter group of theories include the "opportunity theory" and the "compensation theory" which may help explain this relationship.

The "opportunity theory" holds that activities readily available in the city will have an over-representation of urban participants, and an under-representation of rural residents and vice versa (Hendee, 1969). For example, rural residents may have better access than urban residents to unpopulated areas for using ATVs, snowmobiles, and motor bikes. Rural residents, therefore, are over-represented in those recreation activities. This theory is not effective in explaining differences in all recreation activities since rural residents may have as much access as urban residents to areas used for appreciative recreation, such as nature trails, for cross-country skiing, and hiking, or lakes and rivers for canoeing. According to the "opportunity" theory, urban residents should not represent a larger proportion of recreationists in these activities.

The "compensation" theory, which involves people's desire to "get away from it all," may help explain why urban residents are slightly over represented in appreciative activities compared to rural residents. This theory holds that individuals participate in recreation activities that allow them to reduce social contact with others (Hendee, 1969). Assuming that the daily lives of rural residents are different from those of urban

residents, they seek recreation activities and experiences that are different from those desired by urban residents and vice versa. Although Hendee states that this theory implies "a desire by *everyone* to escape to levels of extraneous social contact less intense than normally experienced in their daily lives" (Hendee, 1969, p. 336, emphasis added), (thus, rural residents would participate more often in recreation activities with less social contact than urban residents) the results of the analysis may imply the opposite. For example, if a rural farmer spends most of his or her days communicating with relatively few people in a low stress job, then he or she may participate in fast-paced, recreation activities such as motor-boating, and ATVing. In contrast, if the urban worker spends most of his or her time in contact many people in a high stress job, or in situations caused by high density populations (such as rush-hour traffic), then he or she would be more likely to seek recreation and leisure activities that are quiet and relaxing, such as canoeing and hiking. However, one must assume that there is greater social contact associated with motorboating and ATVing compared to canoeing and hiking, which may not be the case. Characterizing the daily lives of all rural and all urban residents in this way is superficial when, in reality, there are many levels of perceived and real intensity associated with daily experiences; however, these patterns may, in general, be true.

Clearly, many factors influence recreation activity choice other than residence, such as lifestyles, interests, and ability. The effect of residence on recreation choices requires further investigation. Hendee's (1969) "opportunity" and "compensation" theories which contribute rural and urban differences in recreation participation to the influences associated with the size and density of an area provide a theoretical framework for further study in this area.

Since significant relationships were not found between all sets of variables, the planned multivariate analysis was not conducted; therefore, whether rural and urban

differences in environmental attitudes influenced differences in rural and urban outdoor recreation participation can not be discussed.

Research Problems

The primary analytical problem encountered in this thesis was fragmentation of recreation participation and environmental attitude variables into groups with small numbers. The results of these aggregations decreased the likelihood that significant relationships would be detected in the chi-square tests. The principal cause of this problem was the low response rate to the questionnaire. While it is impossible to know the exact causes of the low response rate, a critical review of the questionnaire package design, subject matter, and administration may increase our understanding of these causes. The low response rate also influences how the results of the analyses are interpreted. Since the sample size was too small to be able to make confident inferences about the population of Albertans, these results are simply a description of the sample.

Possible causes of low response rate

There are three possible causes of the low response rate. First, the questionnaire package could have been improved by adding an interesting picture, and personalizing the cover letter and mailing envelope. Second, the subject matter may not have been interesting, and could have been shortened; and, finally, the timing of the questionnaire administration could have been improved.

Design of the questionnaire package

The individual must be interested and willing to invest time to complete the questionnaire. To achieve a high response rate, the questionnaire must not be long or complicated to complete. If possible, the potential respondent must be offered a reward for completing the questionnaire; in this study, each person was offered a copy

of the results to reward them with greater knowledge of the subject. Further, every effort was made to follow Dillman's (1978) "Total Design Method" so that the questionnaire was not long, looked interesting and was easy to complete. There were, however, some improvements that could have been made to increase response. Dillman suggests that a picture representing the subject should be placed on the cover of the questionnaire booklet; since this was not included, potential respondents may have lost interest. Dillman also suggests that the names of the individuals sampled be placed on the cover letter and the address on the front of the envelope. While the names of each individual sampled were used in the mailing address, their names were not printed on the cover letters due to time and money constraints. The cover letter stressed that each person was important to the success of the study; however, the absence of their names on the cover letter may have decreased this personalized effect and led to non-response.

Subject matter

The subject matter contained within the questionnaire must be interesting to the people sampled, or they will be less likely to respond. In the questionnaire, the first question asked how often he or she participated in a large number of recreation activities. Although this was a relatively easy question to answer, it may not have been interesting to some people. Further, the large number of recreation activities confronting the potential respondent might have seemed cumbersome. To avoid this problem in future, the question could ask about participation in a smaller set of activities.

Later in the questionnaire, the potential respondent was confronted with a list of 24 statements about the natural environment and related issues. Many of these statements are difficult to answer because they require an in-depth examination of personal values and attitudes. Further, with an increased emphasis on environmental

issues in our society, it is possible that these issues are overemphasized, which may have led to boredom with this subject. Response rates might have increased if a smaller number of these types of questions were asked. For example, the study by Bikales and Manning (1990) asked about only six environmental issues, which were similar in nature to the environmental attitudes scale. Decreasing the number issues in this type of question may have been partially responsible for their relatively high response rate of 84.0%.

There was a surprising willingness for respondents to relate the total annual income of their household; however, many respondents were reluctant to relate their occupation and the occupation of their parents (even after total confidentiality was stressed in both the cover letter and the questionnaire). This may have made others reluctant to complete and return the questionnaire.

Timing of questionnaire administration

Since the design and subject matter of the questionnaire was virtually identical to Jackson's (1986), and his response rate was nearly 50.0%, it is more likely that the timing of questionnaire administration was the main reason for the low response rate. The survey package was sent to the sample of Albertans in June and July, 1992; and, since many people are on their summer holidays during these months, they would not be available to complete and return the questionnaire. The reminder postcards, which were sent out two weeks after the questionnaire packages, had little effect on the overall response rate. This, again, this might have been a function of poor timing. If the questionnaire packages had been sent in another season, and funding was available for a third reminder card with an additional questionnaire, the response rate may have been increased.

Effects of low response rate

The low response rate had two main effects on this study. First, the focus of the analysis was placed on those respondents participating in only six outdoor recreation activities. Therefore, the number of respondents being examined was reduced from 189 people to less than 50 people in each of the appreciative and mechanized recreation clusters. The resulting small number of persons in any one recreation group affected the results of the analyses of the relationships between this variable and the other two variables, since only when the sample size is sufficiently large does the chi-square statistic provide a reasonably good approximation of the measure of association between two variables (Clark and Hosking, 1986).

Second, small sample size limits the ability to make inferences about the population from which the sample was taken. Thus, the findings tell us nothing about the population of Albertans; rather, it is a description of the sample. This is a limitation to the formation of theories or generalizations about these relationships for the population of Albertans.

Future Research

In the process of conducting this research, several ideas about conducting this type of research became apparent. This section is devoted to a discussion of these ideas about research methods, the types of recreation activities examined and the aggregation of rural and urban residents.

The majority of studies examining recreation and the environment have concentrated on quantitative methods. The use of triangulation (a combination of qualitative and quantitative methods) may improve our understanding of the complex and, at times, elusive relationship between recreation participation and environmental attitudes. Although qualitative methods tend to be more time-consuming than

quantitative methods, triangulation may be helpful to focus on issues that are important to the public rather than relying on the preconceived notions of the researcher. For example, qualitative methods to determine relative levels of recreation participation were used successfully in concert with quantitative methods in Bikales and Manning's (1990) study. Asfeldt (1991) also effectively used qualitative methods to understand the meaning of environmentally responsible behaviours and attitudes.

The study of the relationship between recreation participation and environmental attitudes has concentrated on outdoor recreation activities; however, there may be differences in environmental orientations between indoor and outdoor recreationists, or between recreationists who seek different recreation experiences. Efforts should be directed toward expanding on the types of recreation studied and the environmental orientations of each. Moreover, Bikales and Manning (1990) have suggested that people recreating in similar pairs of recreation activities with opposing environmental impacts be compared for differences in environmental orientations. Several pairs of opposing recreation activities should be examined, rather than just cross-country skiing and alpine skiing, to determine the utility of this kind of investigation.

This thesis followed the conventional definitions of "appreciative", "mechanized" and "consumptive" recreationists; however, only the nature of the activity is considered when making these distinctions. The environmental impacts of each of these activities, however, are equally potentially harmful to the environment (Burton, 1993; Butler, 1989). Appreciative activities participated in by a large number of people have severely damaged some natural environments (Burton, 1993). Large numbers of "appreciative" recreationists, however, do not provide the only source of environmental damage, the equipment used in these activities, such as skis, hiking boots, freeze-dried food, tents, and canoes, all rely on mass production in factories that pollute. Further, driving a car to an "appreciative" recreation site is, perhaps, more polluting than going for an equal length drive on a snowmobile, or motorboat.

The ability of statistical tests to identify relationships between residence and recreation participation or environmental attitudes is dependent upon how "rural" and "urban" are defined. This author, for reasons of small sample size, used a two-way division of rural and urban residents. Perhaps, if the sample size had been larger, a significant relationship would have been found between rural and urban residence and environmental attitudes if finer subdivisions of residence were used.

A Final Comment

The trend in Western society appears to involve a shift from a "consumer" society, in which the majority of Canadians hold the tenets of the DSP to a "conserver" society, in which the majority of Canadians hold the tenets of the NEP. Evidence for these trends has been documented in various studies that found that their samples, in general, held pro-environmental views (Derksen & Gartrell, 1991; Dunlap & Van Liere, 1978; Jackson, 1986; Noe & Snow, 1990; Shetzer, Stackman & Moore, 1991).

Various lifestyle and behavioural changes, including recreation participation behaviours, may be associated with this apparent paradigmatic shift (Jackson, 1989b). A shift from a consumer to a conserver society may facilitate a corresponding shift from recreation activities that pollute, and waste energy, to those that are simpler, and not as environmentally harmful. Spry (1980) stated that while some leisure activities contribute to environmental degradation (i.e., activities requiring high energy inputs), those leisure activities that are environmentally friendly not only cost less to participate in, but provide more personal satisfaction (Spry, 1980). Studies that have examined recreation activity trends show that some of these environmentally oriented recreation trends are emerging. Outdoor recreation activities such as walking, gardening, swimming, nature study and hiking/backpacking have increased in popularity (Alberta Recreation and Parks, 1988; Foot, 1989; Gauthier and Haman, 1992; Wilkinson, 1992) while activities such as snowmobiling and alpine skiing, which are potentially

harmful to the environment, have declined in popularity (Wilkinson, 1992) The former group of activities are not only environmentally friendly, but involve lifestyle changes since they are low in cost, have little scheduling restraints, can be participated in close to home, and involve little need for training and supervision (Gauthier & Haman, 1992). These types of activities reflect the recent movement toward "active living" which is "characterized by the integration of physical activity in daily routines and leisure pursuits throughout all aspects and stages of life" (Fitness Canada, 1990). It is interesting to note that the concept of active living works toward an integration of all aspects of life with the environment and is, therefore, compatible with the components of a conserver society:

> In Active Living, the physical, psychological, social and spiritual aspects of life are intertwined in a larger dynamic harmony that includes the environment. Although physical activity is a cornerstone of Active Living, it is insufficient without these other aspects (Fitness Canada, 1990).

Given that recreation participation trends seem to be following the apparent shift in the Western world from consumer to conserver society, and there is some empirical evidence for the relationship between recreation participation and environmental attitudes (Jackson 1986, 1987; Manning and Bikales, 1990) the examination of their effects upon each other is valid and should continue. The introduction of rural and urban residence as an additional explanatory, perhaps antecedent, variable has provided some, albeit weak, evidence that it is a determinant of the types of recreation activities people participate in. It is, therefore, important to continue research in this area to examine the effects that residence, and other variables, have on the relationship between environmental attitudes and recreation participation. Through these examinations, our understanding of the nature of the connection between these variables will be enhanced.

If our society places great value on a healthy environment, then steps should be taken to achieve this goal. This includes fundamental changes in the way we think and behave in our environment. If we assume that participation in recreation and leisure activities not only affects our physical and psychological well-being (Schreyer & Driver, 1989), but also the environment, and if environmental quality is important, then the types of recreation activities we participate in should reflect this desire. Recreation managers should continue to create opportunities for "environmentally friendly" recreation and, perhaps, restrict opportunities for environmentally detrimental recreation. The challenge for recreation managers will also be to limit the numbers of "appreciative" recreationists so that environmental impacts are kept to a minimum.

References

Alberta Environmental Network. (1987). The Alberta Environmental Directory Fifth Edition. Red Deer, Alberta: The Pembina Institute for the Alberta Environmental Network.

Alberta Environmental Network. (1992). The Alberta Environmental Directory Second Edition. Red Deer, Alberta: The Pembina Institute for the Alberta Environmental Network.

Alberta, Recreation and Parks. (1984). Public Opinion Survey on Recreation. Unpublished data.

Alberta, Recreation and Parks. (1988). General Recreation Survey. Unpublished data.

Alberta, Recreation and Parks. (1988). Recreation Trends: A Look at Leisure. No. 20.

Alberta Tourism, Parks and Recreation.(1992). 1992 Alberta Recreation Survey. Unpublished data.

Albrecht, D., [illegible] Hoiberg, E. & Nowak, P. (1982). The New Environmental Paradigm scale: Measuring environmental concern. Journal of Environmental Education 13, 39-43.

Asfeldt, M. (1992). "The impact of guided wilderness canoe trips on the participants' attitudes to, concerns for, and behaviour towards the environment." Unpublished M. A. Thesis, Department of Recreation and Leisure Studies, University of Alberta.

Babbie, E. (1989). The Practice of Social Research 5th Edition. Belmont, California: Wadsworth.

Bem, D. (1970). Beliefs, Attitudes and Human Affairs. Belmont, California: Brooks Cole.

Bikales, E. A. & Manning, R. E. (1990). Outdoor recreation and environmental concern: A further exploration. Proceedings of the 1990 Northeastern Recreation Research Symposium. Saratoga Springs, New York: United States Department of Agriculture Forest Service, pp. 13-18.

Burch, W. R. Jr. & Wenger, W. D. Jr. (1967). Leisure and recreation places. Ann Arbor, MI.: Ann Arbor Science Publishers, Inc.

Burdge, R. J. (1961). "Rural-urban differences in leisure orientation." Paper read at the Rural Sociological Society, in Ames, Iowa.

Burton, T. L. (1993). "Active living and the environment." Unpublished paper.

Butler, R. (1989). "The future." In G. Wall (ed.). Outdoor Recreation in Canada. Toronto: John Wiley & Sons, pp. 277-310.

Clark, W. A. V. & Hosking, P. L. (1986). Statistical Methods for Geographers. Toronto: John Wiley.

Collins, R. & Hodge, I. (1984). Clustering visitors for recreation management. Journal of Environmental Management 19, 147-158.

Cotgrove, S. (1982). Catastrophe or Cornucopia: The Environment, Politics and the Future. Chichester: John Wiley.

Cotret, R. R. (1990). "Statement by the Minister of the Environment." In Canada's Green Plan. Ottawa: Government of Canada.

Derksen, L. & Gartrell, J. (1991). "The social context of recycling in Alberta." Unpublished report for the Population Research Laboratory and the Department of Sociology at the University of Alberta.

Dillman, D. A. (1978). Mail and Telephone Surveys: The Total Design Method. New York: John Wiley.

Dunlap, R. E. & Heffernan, R. B. (1975). Outdoor recreation and environmental concern: An empirical examination. Rural Sociology 40, 18-30.

Dunlap, R. E. & Van Leire, K. D. (1978). The 'New Environmental Paradigm'. Journal of Environmental Education 9, 10-19.

Dunlap, R. E. & Van Leire, K. D. (1984). Commitment to the Dominant Social Paradigm and concern for environmental quality. Social Science Quarterly 65, 1013-1028.

Durning, A. T. (1992). "How much is enough: The consumer society and the future of the Earth." In The Worldwatch Environmental Alert Series. Linda Starke (ed.). New York: W. W. Norton, p. 25.

Farbrother, S. C. (1985). "The influence of environmental attitudes on energy preferences and behaviours." Unpublished M. A. thesis, Department of Geography, University of Alberta.

Foot, D. K. (1990). The age of outdoor recreation in Canada. Journal of Applied Recreation Research 15, 159-178.

Fortmann, L. & Kusel, J. (1990). New voices, old beliefs: Forest environmentalism among new and long-standing rural residents. Rural Sociology 55, 214-232.

Gauthier, P. & Haman, A. (1992). Physical fitness. Canadian Social Trends 25, 18-20.

Geisler, C. C. Martinson, O. B. & Wilkening, E. A. (1977). Outdoor recreation and environmental concern: A restudy. Rural Sociology 42, 241-249.

Geller, J. M. & Lasley, P. (1985). The New Environmental Paradigm scale: A reexamination. Journal of Environmental Education 17, 9-12.

Glenn, N. D. & Hill, L. Jr. (1977). Rural-urban differences in attitudes and behavior in the United States. The Annals 429, 36-50.

Globe and Mail. (1993). "Court asked to overturn Clayoquot ruling." July 6 and 7, 1993.

Green, A. (1964). Recreation , Leisure and Politics. New York: McGraw-Hill.

Harry, J., Gale, R. & Hendee, J. (1969). Conservation: An upper-middle class social movement. Journal of Leisure Research 1, 246-254.

Heberlein, T. A. (1973). Social psychological assumptions of user surveys: The case of the wildernism scale. Journal of Leisure Research 5, 18-33.

Hendee, J. (1969). Rural-urban differences reflected in outdoor recreation participation. Journal of Leisure Research 1, 333- 341.

Hendee, J., Gale, R. & Harry, J. (1969). Conservation, politics and democracy. Journal of Soil and Water Conservation 24, 212-215.

Jackson, E. L. (1986). Outdoor recreation participation and attitudes to the environment. Leisure Studies 5, 1-23.

Jackson, E. L. (1987). Outdoor recreation participation and views on resource development and preservation. Leisure Sciences 9, 235-250.

Jackson, E. L. (1989a). Public views about resource development and preservation: Results from an Alberta study. The Canadian Geographer 33 163-168.

Jackson, E. L. (1989b). Environmental attitudes, values, and recreation. In E. L. Jackson & T. L. Burton, (eds.) Understanding Leisure and Recreation: Mapping the Past and Charting the Future. State College, PA.: Venture, pp. 357-383.

Jackson, E. L. (1993). Recognizing patterns of leisure constraints: Results from alternative analyses. Journal of Leisure Research 25, 129-149.

Knopp, T. B. & Tyger, J. D. (1973). A study of conflict in recreational land use: Snowmobiling vs. ski-touring. Journal of Leisure Research 5, 6-17.

Kuhn, R. G. (1988). "Geography, energy, and environmental attitudes: An investigation of policy scenarios and public preferences." Unpublished Ph.D. thesis, Department of Geography, University of Alberta.

Lasley, P. & Nolan, M. (1980). Landowner Attitudes Toward Soil and Water Conservation in the Grindstone-Lost-Muddy Creek Project. Final report to the Soil Conservation Service.

Lowe, G. D. & Peek, C. W. (1974). Location and lifestyle: The comparative explanatory ability of urbanism and rurality. Rural Sociology 39, 392-420.

Lowe, G. D. & Pinhey, T. K. (1982). Rural-urban differences in support for environmental protection. Rural Sociology 47, 114-128.

Manfredo, M. J., Yuan, S. M. & McGuire, F. A. (1992). The influence of attitude accessibility on attitude-behavior relationships: Implications for recreation research. Journal of Leisure Research 24, 157-170.

Newhouse, N. (1990). Implications of attitude and behaviour research for environmental conservation. Journal of Environmental Education 22, 26-32.

Noe. F. P. & Snow, R. (1990). The New Environmental Paradigm and further scale analysis. Journal of Environmental Education 21, 20-26.

Pinhey, T. K. & Grimes, M. D. (1979). Outdoor recreation and environmental concern: A reexamination of the Dunlap-Heffernan thesis. Leisure Sciences 2, 1-11.

Rodgers, J. N. (1987). "A comparison of environmental attitudes, energy preferences, and energy conservation behaviour among environmentalists, business executives and the public." Unpublished M. A. thesis, Department of Geography, University of Alberta.

Samdahl, D. M. & Robertson, R. (1989). Social determinants of environmental concern: Specification and test of the model. Environment and Behavior 21, 57-81.

Schreyer, R. & Driver, B. L. (1989). "The benefits of Leisure" In E. L. Jackson & T. L. Burton, (eds.) Understanding Leisure and Recreation: Mapping the Past and Charting the Future. State College, PA.: Venture, pp. 385-419.

Science Council of Canada. (1977). Canada as a conserver society: Resource uncertainties and the need for new technologies. Report No. 27, Science Council of Canada, Ottawa.

Shetzer, L., Stackman, R. W., & Moore, L. F. (1991). Business-environment attitudes and the New Environmental Paradigm. Journal of Environmental Education 22, 14-21.

Smith, L. & Peterson, K. (1980). Rural-urban differences in tolerance: Stouffer's "Culture Shock" revisited. Rural Sociology 45, 256-271.

SPSS Inc. (1986). SPSSx User's Guide 2nd Edition New York: McGraw-Hill.

Spencer, R. C. Kelly, J. R. & van Es, J. C. (1992). Residence and orientations toward solitude. Leisure Sciences 14, 69-78.

Spry, I. M. (1980). "The prospects for leisure in a conserver society." In T. L. Goodale & P. A. Witt (eds.) Recreation and Leisure: Issues in an Era of Change. State College, PA.: Venture, pp. 141-153.

Swanson, L. E. & Maurer, R. C. (1983). Farmers' attitudes toward the energy situation. Rural Sociology 48, 647-660.

Thompson, J. G. & Blevins, A. L. (1983). Attitudes toward energy development in the northern great plains. Rural Sociology 48, 148-158.

Trembley, K. R. & Dunlap, R. E. (1978). Rural-urban residence and concern with environmental quality: A replication and extension. Rural Sociology 43, 474-491.

van Es, J. C. & Brown, J. E. Jr. (1974). The rural-urban variable once more: Some individual level observations. Rural Sociology 39, 373-391.

Van Liere, K. D. & Noe, F. P. (1981). Outdoor recreation and environmental attitudes: Further examination of the Dunlap-Heffernan thesis. Rural Sociology 46, 505-513.

Wicker, A. W. (1969). Attitudes versus actions: The relationship of verbal and overt behavioral responses to attitude objects. Journal of Social Issues, 25, 41-78.

Wicker, A. W. (1971). An examination of the "other-variables" explanation of attitude-behavior inconsistency. Journal of Personality and Social Psychology, 19, 18-30.

Wilkinson, P. F. (1992). An environmental perspective on recreation: The "Environment-Recreation Interaction Model". Journal of Applied Recreation Research 17, 178-210.

Williams, J. A. Jr., & Moore, H. A. (1991). The rural-urban continuum and environmental concerns. Great Plains Research 1, 195-214.

Yu, Jih-Min. (1985). The congruence of recreation activity dimensions among urban suburban, and rural residents. Journal of Leisure Research 2, 107-120.

Appendix A
Questionnaire

RECREATION AND THE ENVIRONMENT

A SURVEY OF ALBERTANS' OPINIONS

C.M. Coburn
Recreation and Environment Project
c/o Department of Geography
University of Alberta
Edmonton, Alberta T6G 2H4

THE PURPOSE OF THE FIRST FEW QUESTIONS IS TO FIND OUT WHAT RECREATIONAL AND LEISURE ACTIVITIES YOU TAKE PART IN, AND HOW OFTEN.

Q-1 On average, about how often have you, personally, taken part in the following recreation and leisure activities (in season, were applicable) in the last year? (Circle the appropriate number for *each type* of activity).

	AT LEAST ONCE A WEEK	AT LEAST ONCE A MONTH	LESS THAN ONCE A MONTH	NEVER IN THE LAST YEAR
Aerobics/gymnastics	1	2	3	4
Archery	1	2	3	4
ATV/moto-cross	1	2	3	4
Baseball/slow pitch/softball	1	2	3	4
Basketball	1	2	3	4
Bicycling	1	2	3	4
Bowling	1	2	3	4
Canoeing	1	2	3	4
Cross-country skiing	1	2	3	4
Curling	1	2	3	4
Dancing	1	2	3	4
Downhill skiing	1	2	3	4
Driving for pleasure	1	2	3	4
Fishing	1	2	3	4
Football	1	2	3	4
Gardening	1	2	3	4
Golf	1	2	3	4
Hiking/backpacking	1	2	3	4
Horseback riding	1	2	3	4
Hunting	1	2	3	4
Ice hockey	1	2	3	4
Ice skating	1	2	3	4
Jogging/running	1	2	3	4
Judo/karate	1	2	3	4

Kayaking	1	2	3	4
Lawn bowling	1	2	3	4
Motor boating	1	2	3	4
Mountain climbing	1	2	3	4
Orienteering	1	2	3	4
Photography	1	2	3	4
Picnicking	1	2	3	4
Playing bingo, casinos, etc	1	2	3	4
Playing video/electronic games	1	2	3	4
Reading	1	2	3	4
Ringette	1	2	3	4
Rollerblading/skateboarding	1	2	3	4
Rugby	1	2	3	4
Sailing/yachting	1	2	3	4
Shooting (trap/skeet/target)	1	2	3	4
Snowmobiling	1	2	3	4
Soccer	1	2	3	4
Squash/racqetball/badminton	1	2	3	4
Swimming (in lakes, rivers, etc.) ...	1	2	3	4
Swimming (in pools)	1	2	3	4
Table tennis	1	2	3	4
Tennis	1	2	3	4
Tent camping	1	2	3	4
Tobagganing/sledding	1	2	3	4
Trailer/RV camping	1	2	3	4
Volleyball	1	2	3	4
Walking for pleasure	1	2	3	4
Watching TV	1	2	3	4
Water skiing	1	2	3	4
Windsurfing	1	2	3	4

Q-2 Please rank the *three* recreation or leisure activities in which you *most frequently* take part.

MOST FREQUENT _____

SECOND MOST FREQUENT _____

THIRD MOST FREQUENT _____

THE NEXT TWO QUESTIONS ARE CONCERNED WITH YOUR FAVOURITE RECREATIONAL OR LEISURE ACTIVITIES, AND SOME OF THE POSSIBLE REASONS WHY YOU ENJOY THEM.

Q-3 Please rank your *three favourite* recreation or leisure activities.

FAVOURITE _____

SECOND FAVOURITE _____

THIRD FAVOURITE _____

Q-4 People have many reasons for taking part in recreation. Based on your *favourite* recreation activity, how important are each of the following to you? (Circle the appropriate number for *each* reason).

	NOT IMPORTANT	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT
For excitement	1	2	3	4
To meet new people	1	2	3	4
For a challenge	1	2	3	4
To be creative	1	2	3	4
To be in pleasant surroundings	1	2	3	4
To do something different from work	1	2	3	4
For physical health or exercise	1	2	3	4
To relax	1	2	3	4
To do things with my friends	1	2	3	4
To be with my family	1	2	3	4
To show others I can do it	1	2	3	4
To help my community	1	2	3	4

To compete with others	1	2	3	4
To enjoy peace and quiet	1	2	3	4
To enjoy nature	1	2	3	4
To learn new skills and abilities	1	2	3	4
To keep busy	1	2	3	4
To be away from my family	1	2	3	4
For prestige	1	2	3	4
For pleasure	1	2	3	4
For a sense of accomplishment	1	2	3	4
For intellectual stimulation	1	2	3	4
To be alone	1	2	3	4
To escape from man-made things	1	2	3	4

IN ADDITION TO INFORMATION ABOUT YOUR RECREATION AND LEISURE ACTIVITIES, WE WOULD ALSO LIKE TO KNOW HOW YOU FEEL ABOUT THE NATURAL ENVIRONMENT.

Q-5 Here are some statements that various people have made about natural resources and the environment. Please read each statement carefully, then circle the number that corresponds *most closely* to your opinion about the statement. There are no right or wrong answers: we are only interested in *your* opinion.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
In the long run, there are no limits to the extent to which we can raise our standard of living	1	2	3	4	5
The earth is like a spaceship with only limited room and resources	1	2	3	4	5
Plants and animals exist primarily to be used by humans	1	2	3	4	5
There are limits to economic growth beyond which our industrialized society cannot expand	1	2	3	4	5
We can continue to raise our standard of living through the application of science and technology	1	2	3	4	5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
We attach too much importance to economic measures of the level of well-being in our society	1	2	3	4	5
Humans must live in harmony with nature in order to survive	1	2	3	4	5
Economic growth improves the quality of life for all Canadians	1	2	3	4	5
The balance of nature is very delicate and easily upset	1	2	3	4	5
The positive benefits of economic growth far outweigh any consequences	1	2	3	4	5
Humans have the right to modify the environment to suit their needs	1	2	3	4	5
Canadians are going to have to drastically reduce their consumption of material goods over the next few years	1	2	3	4	5
Science and technology often do as much harm as good	1	2	3	4	5
When humans interfere with nature, it often produces disastrous consequences	1	2	3	4	5
More emphasis should be placed on teaching children about ecology than on teaching them about science and technology	1	2	3	4	5
We cannot keep counting on science and technology to solve mankind's problems	1	2	3	4	5
In general, the Canadian people would be better off if the nation's economy stopped growing	1	2	3	4	5
Mankind was created to rule over the rest of nature	1	2	3	4	5
To maintain a healthy economy, we will have to develop a "steady-state" economy where industrial growth is controlled	1	2	3	4	5
Humans need not adapt to the environment because they can remake it to suit their needs	1	2	3	4	5

Most problems can be solved by applying more and better technology	1	2	3	4	5
We are approaching the limit to the number of people the earth can support	1	2	3	4	5
Mankind is severely abusing the environment	1	2	3	4	5
Rapid economic growth often creates more problems than benefits	1	2	3	4	5

FINALLY, WE WOULD LIKE A FEW FACTS ABOUT YOURSELF. THESE QUESTIONS WILL BE USED FOR CLASSIFICATION PURPOSE ONLY. LIKE THE REST OF THE QUESTIONNAIRE, YOUR ANSWERS WILL BE KEPT COMPLETELY CONFIDENTIAL.

Q-6 Are you male or female? (Circle number).

1 MALE

2 FEMALE

Q-7 In what year were you born? 19 _____

Q-8 What is the highest level of education you have completed? (Circle number).

1 ELEMENTARY SCHOOL (UP TO GRADE 6)

2 SECONDARY SCHOOL (UP TO GRADE 12 OR 13)

3 POST-SECONDARY/TECHNICAL

4 SOME UNIVERSITY

5 UNIVERSITY GRADUATE

6 POST-GRADUATE

Q-9 How many people from your household received an income during the past 12 months? (Circle number).

1 ONE

2 TWO

3 THREE OR MORE

Q-10 In which of the following categories does the total annual income of your household fall? (Circle number)

1 LESS THAN $10 000

2 $10 001 TO $30 000

3 $30 001 TO $50 000

4 $50 001 TO $70 000

5 $70 001 TO $90 000

6 $90 001 OR MORE

Q-11 Which of the following places best describes where you grew up? (Circle number)

1 FARM OR ACREAGE

2 VILLAGE/SMALL TOWN (UP TO 2,500 PEOPLE)

3 TOWN/SMALL CITY (2,500 TO 25,000 PEOPLE)

4 CITY (25,000 PEOPLE OR OVER)

Q-12 If you work outside the home, what is your occupation? (If not, skip to Q-14)

_____

Q-13 Approximately how long have you been working in this job? (Circle number).

1 FIVE YEARS OR LESS

2 SIX TO TEN YEARS

3 ELEVEN TO FIFTEEN YEARS

4 FIFTEEN YEARS OR MORE

Q-14 If either of your parents worked outside the home when you were growing up, what were their occupations?

FATHER'S OCCUPATION _____

MOTHER'S OCCUPATION _____

THANK YOU FOR YOUR HELP IN COMPLETING THIS QUESTIONNAIRE

Appendix B
Cover Letter

University of Alberta
Edmonton
Canada T6G 2H4

Department of Geography

3-32 HM Tory Building, Telephone (403) 492-3274
Bitnet: USERGEOG@UALTAMTS
Fax: (403) 492-7598

June 16, 1992

Dear Sir/Madame,

I am a student conducting research for my Master of Arts degree at the University of Alberta. The focus of my research is on the recreational activities and the environmental attitudes of Albertans.

Yours is one of a small number of households randomly chosen among Albertans. So that the sample truly represents recreation preferences and attitudes of all Albertans, I would greatly appreciate your completing and returning the enclosed questionnaire. Since it is also important that the same amount of males and females complete the questionnaire, I would like the adult who will have the next birthday in your household to complete the questionnaire.

The information from the questionnaire is *completely* confidential. Once your questionnaire is returned, *I will have no way of identifying who has filled it out.*

Apart from being used as the basis of my research, the results of this study will be made available to Alberta Recreation and Parks, the Alberta Recreation, Parks and Wildlife Foundation, Parks Canada, Environment Canada, and interested citizens. If you wish, you may receive a summary of the results by writing "Copy of results requested" on the back of the return envelope, and printing your name and address below it. Please do not put this information on the questionnaire itself.

I will be happy to answer any questions or concerns you might have. Please write or call. My telephone numbers are (403) 492-4158 or (403) 436-4147.

Thank you for your help.

Sincerely,

C. Coburn

Caroline M. Coburn
Master of Arts Student

Appendix C
Reminder Postcard

ENVIRONMENTAL ATTITUDES AND RECREATION PARTICIPATION:
A SURVEY OF ALBERTAN'S OPINIONS

Dear Sir/Madame,

About two weeks ago, we sent you a questionnaire about recreation participation and environmental attitudes in Alberta.

Everyone who received the questionnaire will also be receiving this card. The survey is completely anonymous, therefore we have no way of telling if your questionnaire is one of those already returned. If you have filled out and returned your questionnaire, we'd like to thank you for your cooperation.

The success of this study is dependent upon the cooperation of all who received the questionnaire. If you have not already completed it and mailed it back to us, we'd be grateful if you would do so.

Thank you for your participation in the survey.

Sincerely,

C. Coburn

Caroline M. Coburn
Master of Arts Student

Appendix D
Additional Recreation Activity Codes

Activity	Code	Activity	Code
Stairmaster	55	Archery	74
Weight lifting	56	Tai Chi	75
Concerts/opera/theatre	57	Weaving	76
Art galleries/shows	58	Tracing family tree (genealogy)	77
Travelling	59	Hobby metal fabricating	78
Listening to music	60	Hobby gunsmithing	79
Doing art (painting)	61	Repairing things for house	80
Playwritting	62	Drinking	81
Drama	63	Sight seeing	82
Exercise	64	Power walking	83
Restoration of antiques/old cars	65	Night entertainment	84
Sewing	66	Entertaining	85
Playing piano	67	Frisbee	86
Soaring	68	Prospecting	87
Shopping	69	Darts	88
Visiting with friends/family	70	Ball hockey	89
Crafts	71	Stock car racing	90
Working	72	Water sliding	92
Playing games	73	Choir singing	93

Appendix E
Occupation Codes

Occupation	Code	Occupation	Code
Office Clerk	1	Pharmacist	40
Farmer/Rancher	2	Janitor	41
Housewife/Homemaker	3	Bookkeeper	42
Teacher/Instructor	4	Forestry Officer	43
Retired	5	Nurse's Aide	44
Bricklayer	6	Truck Driver	45
Engineer	7	Seed Cleaning Technician	46
Librarian	8	Assistant School Superintendent	47
Entrepreneur	9	Gas Plant Worker	48
Nurse	10	Cat Skinner (Heavy Equip Operator)	49
Heavy Equipment Operator	11	Accounts Receivable Clerk	50
Airline Industry worker	12	Volunteer	51
Accountant	13	Operator	52
Production Analyst	14	Jack-of-all-Trades	53
Landman	15	Independent Wholesaler	54
Driller	16	Waitress	55
Manager	17	Contractor	56
Boilermaker	18	Doctor	57
Manufacturer	19	Wool Buyer	58
Secretary	20	Lifeguard	59
Medical Technician	21	Oil Field Worker	60
Milkman	22	Hairdresser/Barber	61
Other	23	Laborer	62
Salesperson	24	Pipefitter	63
Cook/Baker	25	Store Owner	64
Caregiver/Health care worker	26	Civil Servant	65
Architect	27	Research Assistant	66
Mechanic	28	School Principal	67
Self employed at home	29	Interviewer	68
Prospector	30	Blacksmith	69
Politican	31	Court Reporter	70
Electronic Technologist	32	Gas Station Manager	71
Production Foreman	33	Executive in Social Service Organization	72
Student	34	Religious Educator	73
Construction Worker	35	Occupational Therapist	74
Production Worker	36	Railroad Engineer	75
Social Worker	37	Forensic Scientist	76
Hotel Owner	38		
Electrician	39		

Carpenter	77	Oil Developer	94
Welder	78	Corrections Officer	95
Commercial Artist	79	Word Processing Operator	96
Bus Driver	80	Gas Fitter	97
Gardener	81	Mailman	98
CPR Official	82	Painter	99
Esthetician	83	Educational Administrator	100
Bartender	84	Manpower Supervisor	101
Blue Collar Worker	85	Institutional Service Worker	102
Training Coordinator	86	Miner	103
Real Estate Agent	87	Emergency Paramedic	104
Armed Forces	88	Steel Worker	105
Municipal Worker	89	Meat Wrapper	106
Salvation Army Officer	90	Geophysicist	107
Caterer	91	Grain Inspector	108
H.V.A.C. Technician	92	Grain Buyer	109
Computer System Administrator	93	Housing Administrator	110
		Policeman	111

Appendix F
Codes for Questionnaire Origins

Origin	Code	Origin	Code
Banff	1	Hairy Hill	29
Barons	2	Hay Lakes	30
Barrhead	3	High Level	31
Berwyn	4	High River	32
Blackie	5	Irvine	33
Bowden	6	Leduc	34
Brooks	7	Lethbridge	35
Calgary	8	Medicine Hat	36
Camrose	9	Morrin	37
Cardston	10	Neerlandia	38
Coaldale	11	Olds	39
Craigmyle	12	Pincher Creek	40
Delburne	13	Rainbow Lake	41
Denwood	14	Red Deer	42
Devon	15	Rosemary	43
Donnelly	16	Sexsmith	44
Drumheller	17	Slave Lake	45
Edmonton	18	Spruce Grove	46
Falher	19	Stettler	47
Foremost	20	Stony Plain	48
Fort McLeod	21	Strathmore	49
Fort McMurray	22	Sylvan Lake	50
Fox Creek	23	Trochu	51
Girouxville	24	Twin Rivers	52
Grande Centre	25	Vimy	53
Grande Prairie	26	Wainwright	54
Granum	27	Westlock	55
Grimshaw	28		