AN EXAMINATION OF THE INTERRELATIONSHIPS BETWEEN ENERGY CONSUMPTION AND LEISURE ACTIVITIES: A CASE STUDY OF VICTORIA, BRITISH COLUMBIA

by

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ABSTRACT

This thesis examines the interrelationships between energy consumption/conservation and recreation and leisure activities. The behavioral approach developed by geographers in the field of resource management is utilized, and a questionnaire survey undertaken, to test hypotheses formed from a review of the relevant literature and past research conducted by the author.

The first part reviews the development and application of the behavioral methodology with a focus on natural hazard research. The extension of this methodology into the area of energy conservation research is then discussed. It is noted that conceptual similarities between natural hazards and energy scarcity exist in that they may both be viewed as "negative resources." Thus, no new methodological framework is necessary to establish and test hypotheses. The remainder of the literature review focuses on studies undertaken on recreation and leisure activities and energy consumption.

The second part of the thesis reports the results from a questionnaire survey conducted by the author in Greater Victoria. A diverse amount of information was collected, including: attitudes toward energy issues, energy conservation practices adopted, ownership of recreation equipment, participation in recreation and leisure activities and perceived energy intensiveness of recreation and leisure activities.

The conclusions show that individuals are generally reluctant to modify their leisure behavior in response to energy scarcity or price increases. Differences in attitudes, socio-economic characteristics and equipment ownership did not alter their reported behavior. However, it was

found that respondents consistently underestimated the energy intensiveness of all recreation and leisure activities they participated in, a factor which may, in part, be responsible for the general unwillingness to modify leisure behavior. Finally, this study has shown the applicability of the behavioral methodology as developed in hazard research to be valid as an initial starting point in developing a more wideranging and rigorous methodological framework relevant to all studies concerned with environmental resources.

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CHAPTER I

INTRODUCTION

1.1 Introduction

The effects of the 1973 oil embargo imposed by the Organization of Petroleum Countries have caused a major reappraisal of energy resources and energy use, particularly by the industrialized nations. In the space of ten years the price of crude oil has quadrupled and dramatic changes in economic conditions have resulted. The impacts of this new energy situation are still working their way through the world economic system.

It is generally recognized that Canada, like most other nations, will experience shortages of fossil fuels within the next thirty years (Brooks, 1979). This knowledge has resulted in a substantial amount of research to be undertaken into the area of increasing energy supplies, establishing viable alternatives to fossil fuels and increasing energy efficiency in terms of technical innovation. The emphasis on the technical component of energy availability is no doubt related to the assumption that it is probably easier to modify technology than to bring about changes in human behavior that would be required to achieve equivalent reductions in energy consumption (Evans et al., 1979). The non-technical component dealing with attitudinal and regulatory measures toward conserving energy, however, is just as important as research conducted along technical dimensions. Until recently this aspect has generally been ignored or not given the full attention it warrants. The folly of neglecting or underestimating the importance of the behavioral concepts related to energy conservation has been discussed by various authors. For example, Olsen (1981, p.6) comments:

> Relatively little attention has been given to social aspects of energy conservation and only recently have we begun to realize that, of all the major barriers to implementing energy conservation, none are strictly technical. The barriers are social, political, economic and institutional.

Similarly, Wilbanks (1981, p.xv) notes:

> Our energy crisis is more of a social crisis than a technological one... yet it is paradoxical that so little effort is directed at social and institutional questions.

The lack of attention given to social aspects of energy conservation, however, may be changing as research in this area is becoming more rigorous and methodologically sound.

A significant body of research in the area of behavioral and attitude research with respect to energy conservation is now emerging (Anderson & MsDougall, 1980; Evans et al., 1979; Farhar et al., 1980; Jackson & Foster, 1982; Olsen & Goodnight, 1977). With the exception of studies dealing with general travel behavior (Smith, 1981), however, there is a relative absence of research on the interrelationships between energy parameters and leisure behavior. While it is currently not clear just how important leisure activities are in energy consumption relative to other consumer activities, it would appear that their importance is both significant and growing. For example, Clark (1977) reports that approximately 30% of all automobile travel in Canada is carried out for leisure related purposes. Furthermore, Ritchie (1979) argues that while it might be assumed that leisure activities are less energy intensive than work/production activities and that energy requirements per capita might decline as less time is spent on the job, such would not appear to be the case for two reasons. First, the trend to increased leisure time is generally gained by replacing manual activities with capital and energy intensive equipment. Second, there is a strong probability that, as a result of rising incomes, the increased leisure time acquired

by the population will be directed towards areas which require substantial amounts of energy either directly or indirectly. These facts suggest that energy policy makers should become more knowledgable about the relationships between energy consumption and leisure activities.

1.2 Research Objectives

This thesis will review behavioral research perspectives of energy conservation with the specific aim of determining the interrelationships which exist between energy consumption/conservation and leisure and recreation activities of individuals and households in Greater Victoria. It is hypothesized that variations in reported, intended and actual behavior will be a complex function of at least the following factors:

-- the energy intensiveness of past and present leisure activities
-- perceptions of energy intensiveness of leisure activities
-- attitudes towards energy parameters
-- ownership of leisure related equipment
-- socio-economic factors

Adjustments to energy scarcity (both real and perceived) have had major effects on individual energy consumption in North America. These have been documented by a number of authors including Anderson et al., 1980; Farhar et al., 1980 and Jackson and Foster, 1982. Individuals in British Columbia have not been immune to these changes despite the relative abundance of energy resources available in the Province (Province of B.C., 1980). For example, a study conducted in Ladysmith found that 57% of respondents to a questionnaire survey had adopted energy conservation measures in the home (Foster & Kuhn, 1981). Furthermore, a study in the Cowichan Valley, which asked respondents how a doubling in gasoline prices might affect their leisure activities, found that 52% of the respondents indicated it would have

no effect (Foster & Kuhn, 1981). It was concluded from the above studies that there is no strong evidence to suggest that individuals perceive clear interrelationships between energy consumption and leisure activities.

Given the predictions of increases in leisure time per capita and energy uncertainty, studies attempting to discern the relationship between leisure and recreation activities and energy consumption may have important implications for policy makers as well as for individual participants. Indeed, the major and acknowledged role of studies such as this are to provide behavioral information that is useful for public policy decisions. The utility of these studies has been well summarized by Sadler (1980, p.176):

> Environmental and resource decisions typically incorporate a range of unchecked assumptions and judgements about social attitudes and responses that work towards filtering out certain options and entrenching others. Such a process often obscures appropriate combinations of actions and generates controversy because benefits and costs are unequally distributed. One of the ways in which more accurate social guidelines to decision making may be obtained is through public input from perception and attitude surveys.

A second objective of this thesis is to examine an assumption made by Jackson (1980a, 1982) that findings from hazard studies may be used to develop hypotheses about energy perceptions and conservation behavior. For example, many studies concerning natural hazards have concluded that people consistently underestimate the degree of hazard they are exposed to and hence do not take adequate precautions to ward off the impending dangers and risks. This conclusion can be extended to include behavior towards energy scarcity. In other words, it can be hypothesized that individuals may underestimate or not be aware of the energy intensiveness of their recreation and leisure pursuits and hence do not perceive the need to modify these activities to conserve energy. The confirmation of such a hypothesis would suggest

that a more rigorous and exacting methodological framework is necessary for all studies dealing with public attitudes and behavior toward environmental resources. This matter is considered in Chapter VI.

1.3 Data Collection

The primary data used in this thesis were collected by means of a questionnaire survey conducted in January 1982. The questionnaire was a modified version of one used by the author in a previous study (Foster & Kuhn, 1981). A random sample of approximately 260 households in the Victoria area were given questionnaires of which 243 (approximately 90%) were returned in a useable form.

The previous study which was conducted in Ladysmith was concerned with investigating respondents' adoption of energy conservation practices as well as measuring their perceptions and attitudes toward energy in general. A distinct pattern of adoption of energy conservation practices emerged which could not be explained given the data collected at the time. In particular, the adoption of recreation and leisure energy conservation practices was consistently lower than the adoption of travel, shopping and household energy conservation measures. This result was unexpected given the discretionary nature of leisure and recreation activities. This present study can be viewed as a continuation of this earlier research and is concerned with revealing more about the relationship between energy conservation and recreation and leisure activities. The relationships were examined through the use of general frequencies and crosstabulation (X^2) analyses using the Statistical Package for the Social Sciences (SPSS).

1.4 Thesis Outline

The following chapter (II) will review the emergence

of the behavioral tradition in geographic research and focus on the behavioral methodology employed in the subfield of resource management. This methodology has been used extensively in natural hazard research and has subsequently been employed in a variety of resource-related issues studied by geographers.

Chapter III will review some of the major research emphases concerning energy conservation utilizing the behavioral approach. A focus of the research (albeit scarce) on energy conservation and recreation and leisure will be presented. This chapter also examines the formulation and use of an energy leisure lifestyle index.

The fourth chapter will review the questionnaire design, sampling methodology and characteristics of the sample who participated in the Greater Victoria Energy Survey.

An in-depth review and discussion of the survey results are provided in chapters V and VI. The final chapter provides a summary and general discussion of the major findings of the thesis.

CHAPTER II

REVIEW OF BEHAVIORAL GEOGRAPHY

2.1 Introduction

A study of the interrelationships between energy consumption/conservation and leisure behavior has to be seen in the context of the emerging behavioral approach in contemporary geography. Consequently, this chapter will review the growth and meaning of the behavioral tradition in geography, specifically focusing on the "behavioralist method" as it is practiced in the area of resource management and the sub-field of natural hazard research. The intent here is to outline the methodological constructs underlying hazard research. The following chapter will subsequently demonstrate that these constructs are applicable to research into energy conservation attitudes, perceptions and behavior.

It should be pointed out that the behavioral method in geography is not confined to resource management studies. Important contributions using this method are also being made in the areas of spatial behavior (Cox, 1969; Golledge, 1969, 1970; Wolpert, 1965), mental maps (Downs & Stea, 1977; Gould, 1966; Gould & White, 1974; Lynch,1960) and time-space geography (Hagerstrand, 1968; Pred, 1977). Furthermore, the behavioralist method is also incorporated into studies of historical and cultural geography (Kirk, 1951; Lowenthal, 1961; Prince, 1971; Wright, 1947).

2.2 The Emergence of Behavioral Geography

To a great extent, the emergence of the behavioral approach in geography arose due to a feeling of dissatisfaction among many geographers with the models being propounded and tested within the positivist camp. It was

acknowledged that a more realistic view of man and environment was needed. For example, the theoretical constructs underlying central place theory were built on certain axioms regarding human behavior with regard to choice between spatial alternatives and from these axioms a settlement pattern was deduced. But, as Johnston (1979, p.112) maintains: "The deductions were often only vaguely reflected in settlement morphologies which suggested that the axioms on which they were based provided a weak foundation for understanding this aspect of the spatial organization of society." The major weakness of the positivist methodology is that it assumes economic rationality and perfect and complete information in decision-making and given these stipulations, models for the most part did not provide adequate representations of the real world.

In reaction to this tradition and in response to the development of a behavioral approach to man in the social sciences, human geographers have experimented with a more human and in a sense "less geographic" approach to human geography by studying men and not objects (English & Mayfield, 1976). Many geographers were calling for a more "human" approach. For example, Berry (1973, p.8) asserted that "Geographic explanation should be viewed as dealing with antecedants and consequences of environmental and locational decision-making in which man, as the prime actor, is viewed as an information-processing, decision-making, cybernetic machine whose value systems are built up by a feedback process from his environment." In other words, the world must be viewed as a complex living system with a continuous process of decision-making and dynamically interrelated actors, which includes individuals, social groups and institutions. Similarly, Buttimer (1974) questions if science can continue to serve a useful function by measuring and explaining the objective face and underlying mechanics of social reality without penetrating and incorporating its

subjective dimension. Newly and Rees (1973, p.283) also maintain that geographers should aim at something other than an experimental approach since there are tremendous risks associated with what have been prevailing notions of "scientism" and attempts should be made to develop a philosophical and aesthetic understanding as counterbalancing ideas. The behavioral approach, therefore, represents a fundamental change in the conceptual approach to understanding human spatial behavior and is characterized by a more realistic view of man (Downs, 1970).

2.3 The Foundations of Behavioral Geography and Resource Management

Within the broad category of behavioral geography, two general traditions have emerged. The first is that approach adopted by historical and cultural geographers with the intent to understand the individual *qua* individual. The basis for this approach were the works of Wright (1947), Kirk (1951) and Lowenthal (1961). The importance of personal experience in these studies is paramount. According to Lowenthal (1961, p.259):

> Every image and idea about the world is compounded of personal experience, learning and meaning. The place we live in, the realms of imagination and fantasy, the places we visit and travel through, the worlds we read about, each contribute to our image of nature and man.

The second category which will be focused on (resource management), has retained strong ties with the positivist/spatial science tradition (Johnston, 1979). The behavioral approach is an inductive one with the aim being to build general statements out of ongoing processes. Much effort is spent on data collection as information is needed from the individual decision-makers. The data (usually conscious elements in action), once collected, are then aggregated in order to allow statistically substantive and significant

generalizations to be made. As a result of this social survey work, links between geography and other disciplines, namely sociology, psychology, political science and anthropology, have strengthened. For example, geographers use the participant observer method from anthropology, social survey questionnaires from sociology and projective tests from psychology (Porter, 1978).

The application of the behavioral methodology occurred early in resource management studies. The foundations of this approach are the decision-making theories of H.Simon (1975). Simon maintained that the decision-maker's model of the world encompasses only a portion of all the relevant characteristics of the real environment and his inferences extract only a minute fraction of all the information that is present even in his model. Simon's theory, therefore, requires some important modifications to the concepts of "economic man" and "maximization" used regularly by those adhering to the positivist methodology. For example, a description of the choice process must recognize that alternatives are not given but must be sought, and a description must take into account the tasks of determining what consequences will follow each alternative. As part of his theory, Simon coined the terms "bounded rationality" and "satisficing behavior" to replace "maximimization" and "economic man". On closer inspection, however, there are similarities between the concepts of Simon and these used by the positivists. Both concepts are interpreted as optimizing behavior. The only difference between them is the nature of the objective function. Economic rationality presumes profit is to be maximized; satisficing behavior presumes it is some other function such as minimum effort, maximum leisure time, and the like (Harvey, 1969).

Robert Kates, a major exponent of the behavioral approach in resource management, developed a schema relevant to a wide range of behaviors which incorporates Simon's concept.

This schema was, and still is, used in much geographical work in resource management and consists of four components (in Johnston, 1979, pp. 113-115):

(1) men are rational when making decisions but only in relation to the environment as it is perceived by the decision-maker; which may be quite different from "objective" reality;

(2) men make choices, but many decisions are trivial or habitual (decisions may become habitual after the original choice has been made);

(3) choices are made on the basis of knowledge, but only rarely can a decision-maker bring together all of the information; and

(4) information is evaluated according to predetermined criteria -- in habitual choice, the criterion is what was done before, but in conscious choice, the information must be weighed (satisficing).

It must be pointed out, however, that this schema does not differentiate between individual and group decision-making.

A major focus of the behavioral approach is on the study of perceptions and attitudes. These components of human thought processes, however, are rich in ambiguity and therefore it is hardly surprising to find that no generally agreed on definitions can be supplied. A simple definition of perceptions may be: a mental image or awareness of the elements of environment through physical sensation. Schiff (1971, p.7) defines perception of the environment as being concerned with "the impression one has of social stimulus or set of stimuli as that impression is modified by the perceiver's past experience in general, his previous experience with the same or similar stimuli, and the individual's state at the moment he is viewing the stimulus of interest." In this sense, awareness is considered as one aspect of perception.

An attitude may be defined as a mental position with regard to a fact or state, or as an organismic state of readiness to respond in a characteristic way to a stimulus. Schiff (1971, p.8) defines an attitude as "an organized set of feelings and beliefs which will influence an individual's behavior." Attitudes, therefore, also develop as a result of past experiences. The major differences between attitudes and perceptions are that perceptions are more transitory than attitudes, less stable and more subject to change with the immediate past experience and present state of the perceiver. Further, perceptions, unlike attitudes, may lack an effective or evaluative component (Schiff, 1971).

2.4 The Application of the Behavioralist Methodology to Resource Management Studies

One of the first attempts by geographers to employ the behavioral approach was the series of investigations into human response to environmental hazards, initially floods, at the University of Chicago in the late 1950's and early 1960's. Much of the work was conducted under the direction of Gilbert White. Natural or environmental hazards may be defined as "those elements in the physical environment harmful to man and caused by forces extraneous to him" (Burton & Kates, 1964, p.413). Hazards may also be defined as "an interaction of man and nature, governed by the coexistent state of adjustment in the human use system and state of nature in the natural events system" (Kates, 1971, p.438).

White (1961) recognized that economic considerations may not be the determining factors in coping with environmental hazards or resource management in general. With respect to floods, he noted that in the design and appraisal of protection projects and water resource projects, almost all examination was conducted within the framework of benefit-cost analysis, the time horizon and the discount rate. White found that this method of inquiry did not describe all

aspects of the process of decision-making leading to choice of adjustment to floods either by public or private managers. In order to gain a clearer understanding of flood plain management beyond that provided by normative models, White developed a model which has been widely adopted (or variations of it) in the field of resource management. This descriptive model considers five elements other than economic efficiency (White, 1965):

(1) the perception which the manager has of the theoretical range of choice of adjustments -- which should be specified so as to recognize the limits within which he makes his choice;

(2) the perception which the manager has of the flood (or other hazard), a perception which may be radically different from that of the hydrologist, for example (i.e. the practical range of choice);

(3) the actual availability of technology for different possible adjustments should be determined rather than assuming that only flood plain technology will be known;

(4) the manager's recognition of the extent of spatial linkages between action in the flood plain and resource use in other areas (i.e. to what extent does floodloss reduction in one place hinder or promote use of land in another place); and

(5) what are the roles of social guides as they affect the other elements.

It must be recognized that although this model examines the social setting and attempts to reveal the facts, perceptions, aims and values upon which a decision is based, it does not necessarily explain why the manager arrives at his final decision. The model, though, is not without value. As White (1961, p.36) explains:

> When questions become the framework for investigation, understanding of the flood-plain occupancy sometimes deepens through a more nearly precise description of crucial elements in

> management decisions. Accordingly, the capacity to predict probable effects of a given choice of flood-plain management is strengthened.

White's model provided the basis for many other subsequent geographical policy models. White was concerned with describing actual choices in resource management and contrasting them with the theoretical range of choice. Kates (1962) developed an integrative model which included a simple paradigm which has guided hazard research. Five components form the basis of the model:

(1) estimating the extent of human occupancy in areas subject to extreme events in nature;

(2) determining the range of possible adjustments by social groups to these extreme events;

(3) examining how people perceive the extreme events;

(4) examining the process of choice among damage-reducing adjustments; and

(5) estimating the effects of varying policy to broaden the range of adjustments.

Work in hazard research is not confined strictly to the occupants of hazard-prone areas, but is also concerned with the decision-making process involved in the amelioration of the hazard. Studies have shown, for example, that variations in attitudes to natural hazards cannot be explained only in terms of magnitude and frequency, but professional affiliation and background is also an important component. Burton and Kates (1964) found that a resource manager's (and managers as a group) perception of a hazard not only differs from that of experts, but variations also exist among experts themselves. Furthermore, they reported that "...differences persist even when all scientific evidence upon which conclusions are based is identical" (1964, p.423). Sewell (1972) noted that dependence on experts to alleviate problems both in government and industry is a major feature in modern society as these experts play an integral role in

the policy-making process. But as a result of a study of the environmental perceptions and attitudes of engineers and public health officials in British Columbia, Sewell reported: "Attitudes as to one's own role in dealing with problems and the role of others, appear to have important bearing on one's perception of problems and on action proposed and taken" (1972, p.255).

Burton (1971) has also demonstrated that perceptions and attitudes play a significant role in the decision-making process. He recognized that decisions are not only affected by a group's perception of the environment, but also by its view of what things in the environment other groups may wish to preserve or enhance. He cites the example of formulating a plan for the development and management of a river basin and concludes: "The plan... is based not only on the perceptions of the planners themselves, but also upon what the planners or decision-makers take to be the preferences of those affected" (1971, p.3). Too often, however, the attitudes, perceptions, values, preferences and opinions of the people are not studied, at least not systematically.

Generally, work in hazard perceptions can be seen as being affected by four main variables (Mitchell, 1974). The first is that of the resource manager's past experience. The studies by Kates (1962) and Saarinen (1966), for example, maintain that persons with greater experience of floods and droughts perceive and adopt more adjustments to compensate for the hazards. Second is the manager's perception of the physical characteristics of the hazard events, which can strongly influence the perception of hazards (see Burton & Kates, 1964; and Saarinen, 1966). The third variable is the personality traits of the resource manager. Work in this area, however, is still at an early stage and decisive conclusions are pending. And finally, the situational characteristics of adjustment decisions are also important. There is considerable evidence that perception of a hazard

is a function of resource use. A farmer in a flood-prone area, for example, is more aware of the potential hazard than adjacent non-agriculturalists (Mitchell, 1974).

Another way in which the behavioral approach to resource management has been useful is in the area of public participation, although much more work remains to be done. According to White (1972, p.242):

> Human perceptional preferences are related to the environment and personality in ways which are not well explained. Much of the public discussion is masked by a rough plaster of horseback judgements that hide the structure of action and opinion formation.

No adequate models have as yet been put forth to describe the role of public attitudes and perceptions in the decision-making process. Geographers employing the behavioral or descriptive approach recognize that a basic assumption to make is that the information available to the public is not complete and therefore attitudes may be highly dependent on what information is made available to them. The role of the media is crucial in this process and must be taken into account.

O'Riordan (1971) proposes a model concerning public involvement which visualizes resource management as a bargaining process taking place between the few who are responsible for formulation and implementing decisions and those groups and/or individuals who feel threatened by the implications of these decisions upon their patterns of resource use. In his model, public involvement is recognized only when it is able to exert sufficient political pressure to act with a force somewhat equivalent to other interest-based groups. The many factors which inhibit the clear expression and political articulation of public preferences are recognised as well.

Much work remains to be done on determining just how useful public participation is and what impact it has in the decision-making process. To date, few "objective"

evaluations of methods and levels of participation have been conducted. Several models for the evaluation of public participation programs have been reviewed by Sewell and Phillips (1979, p.316), who concluded: "The models are becoming more comprehensive in coverage and attempts are being made to take account of the wide range of goals pursued and the impact on both the agency and the public at large."

2.5 A Critique of Behavioral Geography

Despite many significant insights made in the area of resource management by geographers employing the behavioral methodology, criticism concerning the field itself and the behavioral method in general has emerged. Much of the criticism should be viewed as constructive rather than destructive. The behavioral tradition in geography is barely twenty years old and although firmly established as a legitimate field of enquiry, it is not without problems. The criticism which arises is concerned not only with problems of methodology or theory, but is also focused on some of the concepts and assumptions underlying behavioral research. This type of criticism is necessary to ensure sound development by pointing out deficiencies and offering solutions to them.

One of the major criticisms levelled against geographers using the behavioral approach is the lack of theory or the development of theory. Bunting and Guelke (1979) maintain that although behavioral geographers hoped that the use of empirical models of actual human preferences and perceptions would lead to the development of general theories in geography, which were deductively sound and empirically valid, these have not been produced. They argue that although the objectives of behavioral and perception geographers were to understand human behavior in terms of subjective images using scientific procedures, many researchers became taken up with the measurement of images rather than their behavioral implications. In their words (1979, p.450): "A concern

with methodology and technique often became a substitute for substantial contributions -- the present trend, however, appears only to lead into more and more complex statistical and psychological analysis without the promise of contributing to an understanding of overt behavior in relation to the environment."

Berry (1973) makes a similar assertion. To alleviate these problems he suggests that geographers adopt an approach of "process metageography" -- that part of geographic speculation dealing with principles lying behind perceptions of reality and transcending them, including such concepts as essence, cause and validity (i.e. a humanistic approach). To carry out this type of study, Berry argues that research priorities should be the logical classification of the variety of action modalities, the formal treatment of decision and action sequences and further analysis of emergent properties, including systematic transformations.

The development of a theory in behavioral geography is indeed formidable. If a behavioral theory in geography (or any other social science) is ever to be more than vague speculation, it will need to settle a whole host of conceptual and measurement problems in such a way that we can understand what has eluded the behavioral sciences as a whole: the real reason why people behave with respect to their environment the way that they do. It is unlikely, of course, that complete understanding will ever be achieved. As Harvey (1969, p.64) states "I doubt if anything satisfactory will emerge in the way of general theory until the year 2000 A.D. or so."

A major problem facing resource management studies is the lack of standardized definitions of common concepts or themes which seem to appear frequently. There is a need to reduce the emphasis placed upon originality in the sense of each study being conducted within different terms of reference in order that comparative studies can be made. Attempts

to establish comparable evidence is furthest advanced in hazard research. Without standardization, at least to a degree, the development of a common theoretical framework is severly hindered. This is also true of models; for models have yet to lead to the generation of a geographical theory of natural resources or a more limited theory applicable to a specific problem in resource management such as carrying capacity, natural hazards and environmental impact (Mitchell, 1979).

The problems of defining specific indicators for the measurement of abstract concepts in order to "operationalize" data collected by geographers studying behavior is recognized by Jackson and Foster (1982). They argue that given the inherent subjective elements of behavioral processes, it is only to be expected that independent researchers utilize varying measures of multidimensional concepts which often results in contradictory conclusions. For example, the abstract and wide concept "perception of an energy crisis" suggests possible specific meanings and may therefore be operationalized in a variety of ways. From a review of the literature they illustrate the variety of interpretations which have been given to the above example:

-- perceived seriousness of the cost of gasoline
-- perceived seriousness of the cost of home heating fuel
-- perceived seriousness of shortages of energy in general and of specific resources
-- anticipated dates of shortages for specific types of energy resources
-- past impacts of shortages
-- anticipated impacts of shortages
-- past impacts of price increases
-- anticipated impacts of price increases (p.23)

Comparable problems also surround the choice for an appropriate definition and measure of "energy conservation behavior", especially when it is recognized that the process of classification is in part a subjective response by the

researcher to the problem of collapsing vast amounts of raw data into a form manageable for further analysis (Jackson & Foster, 1982). Examples cited include:

-- perceived importance of individual efforts to conserve energy
-- frequency of the adoption of specific practices
-- grouping to various levels of abstraction, e.g. structural, habitual, transportation
-- "minimal" vs. "significant" conservation practices
-- range, as measured by the number of conservation practices perceived and/or adopted (p.24)

It can be noted that these methods vary from the relatively concrete to the relatively abstract, each with their own advantage and limitations with respect to understanding patterns of conservation behavior.

Jackson and Foster (1982) conclude their discussion of these problems by stating that there can be no single or most appropriate measure of "concern about energy" or "conservation behavior" since:

> Attempts to operationalize these concepts in various ways may mean that, in reality, significantly different perceptions and behaviors are investigated. A great deal of care should therefore be taken in generalizing back from specific indicators to abstract concepts; at the same time, apparent contradictions in results should not be accepted at face value (p.26).

What geographers must strive for is a common conceptual framework to work with: in other words, a common methodology using standardized definitions. In this way a common understanding becomes possible. Human geography and the social sciences in general, should not strictly adhere to a nomothetic orientation. This does not mean we cannot, or should not, generalize. Generalizations are indeed an important, if not vital, goal in social science research and hence generalizations can emerge only if researchers work within a common framework.

Two of the basic assumptions underlying behavioral and

perception studies have also been questioned (Bunting & Guelke, 1979). The first assumption behavioral geographers make is that identifiable environmental images exist that can be measured accurately. But, even if these images can be measured, the question arises if specific environmental images can be extracted from the totality of mental images without undue distortion. Studies of floods or droughts, for example, have been placed in a narrow environmental context. Yet, the image of an environment does not exist in isolation; it is embedded in social, political and economic ideas. Furthermore, it can be questioned if an environmental image can be extracted amid the myriad of other images in a person's mind. Another major problem in perception research concerns the lack of any acceptable standards or criteria against which environmental images and preferences can be checked. A significant amount of research is needed to clarify these points (Bunting & Guelke, 1979).

The second basic assumption in behavioral geography is that a strong relationship exists between cognitive or mental images and actual behavior (or stated and actual behavior). Bunting and Guelke (1979) identify two problems concerning this assumption. The first is that little work has actually been undertaken which concerns itself with the interrelationships between cognitive and overt behavior; and second, that geographers are not inherently concerned with images and other aspects of cognitive behavior, but only with those as they represent a means to an end (i.e. man-environment relationships). However, "findings associated with the study of images, preferences, and attitudes to environmental phenomena show no direct or self-evident relationship to overt ongoing behavior" (Bunting & Guelke, 1979, p.455). Some authors argue that geographers' primary concern should be the study of overt behavior with an increased focus on the objective aspects of the environment. For example, Riesser (1973, p.53) states: "Behavioral geog-

raphy usually ignores the most influential aspects of the objective conditions."

Another criticism of the behavioral approach and of much empirical research is that it explains that which is, not that which should be. As Kasperson (1971, p.9) explains: "It (the behavioral approach) provides little or no direction or strategy for change... it has produced a disposition which is more conducive to the status quo, or incremental change at best." This is indeed a valid statement. The behavioral approach is innately conservative as it is tempered to fit the criteria necessary for decision-making and policy formulation within the present political and social system. The radical transformation of society is not the aim of behaviorist studies (as compared to the radical and Marxist "movements" in geography; see Peet, 1980), but rather, the alleviation or amelioration of problems facing society (i.e. natural hazards) is what is of interest.

2.6 Overview

In natural hazard research, three consistent and connected elements of perception and behavior have been found to characterize human response to many environmental hazards. These are: variations in the perception of hazard; crisis orientation in behavior; and a limited range of alternative adjustments both perceived and adopted (Slovic *et al*, 1974).

The major pursuits undertaken by geographers employing the behavioral approach to resource management studies include: the identification of behavioral aspects to be included within the scope of institutional arrangements and then to determine how they might be measured and defined; how people perceive the physical environment and its resources, and how their experiences structure their perceptions and how this affects their behavior; and how public attitudes and perceptions can be better understood (or measured) and

incorporated into the decision-making process with respect to natural resources. At a more general level, geographers employing the behavioral methodology attempt to produce research which is directly relevant to immediate policy issues. This has led geographers to study numerous facets of man-environment relationships, including natural hazards, pollution problems, outdoor recreation, energy scarcity, nuclear power and urban design.

From this review of the general context of the behavioral methodology as it pertains to resource management studies, attention can now be focused on energy conservation research. As will be seen in the following chapter, the methodological constructs underlying behavioral studies concerning energy issues have been adapted successfully from hazard research. In other words, the behavioral approach has wide-ranging applicability and no new methodological developments are needed to examine a variety of resource management issues.

CHAPTER III

BEHAVIORAL ENERGY CONSERVATION RESEARCH

3.1 Introduction

This chapter will examine research undertaken on attitudes, behaviors and perceptions of energy resources. A voluminous amount of material has been written in this area, particularly since the 1973 oil embargo which marked the dawn of the "energy crisis". The methodological constructs underlying this research will be discussed initially, followed by a review of energy conservation as it pertains to general behavior and attitudes. A final section will be devoted to behavioral research on energy and leisure activities.

According to Jackson and Foster (1980, p.1), Canadian research on energy attitudes has been initiated for three reasons. First, there has been a growing recognition on the part of governments concerning the economic, social and environmental consequences of energy scarcity and the uncertainty of supplies. As a result, the need to develop viable long-term alternatives and the necessity for energy conservation have been realized, "the latter especially calling for the identification of present patterns of energy consumption and the possibility for the widespread adoption of conservation practices among the public" (p.1). Second, the modification of the public's consumption of energy in the face of growing demands has been sought by the energy supply industry, particularly the public utilities. The monitoring of the public's attitudes, expectations and behaviors is therefore imperative to achieving this result. Finally, irrespective of "crisis" there has been an ongoing interest among academics, particularly geographers, in problems of environmental perception and resource use.

3.2 Methodological Orientation

Recent work of relevance to this study concerning energy resources by geographers has been largely an extension of the exploration of theories and concepts formulated originally with respect to natural hazards. There is, of course, substantial literature on energy resources that is more traditional in approach (see Lovins, 1977; Odell, 1979) which is not directly relevant to this study.

The research undertaken by E.L.Jackson (1978, 1980a, Jackson & Foster, 1982) in promoting the use of "hazard theories" to energy conservation studies has been the most pervasive to date and will now be reviewed in some detail. Jackson (1980a) notes that "owing to the lack of previous research on energy perceptions and conservation behavior, no direct precedent for choosing appropriate questions existed" (p.115). However, he argues that no new conceptual framework is needed as concepts and theories derived from the study of human behavior are relevant to research into emerging energy behavior patterns. This possibility was also noted by Burdge and Field (1972). This argument applies particularly well to the development of a framework on energy perception research and the application of concepts from perception studies already completed by geographers. The general hypotheses and findings of natural hazard research and specifically the work undertaken by Kates (1962) on relationships between the perception of environmental risk and the awareness and adoption of adjustments to flood hazard, are particularly useful.

Jackson (1978, pp. 7-9) develops two linkages or relationships between resources and natural hazards which are fundamental to his argument. The first linkage consists of a conceptual relationship: both hazards and resources are culturally or functionally defined. For example, it has been argued (Hunker, 1964) that physical and biological elements of the biosphere only become resources as a function

of the value placed upon them by man, and the uses to which they may be put. O'Riorden (1971) defines a resource as being, "an attribute of the environment appraised by man to be of value over time within the constraints imposed by his social, political, economic and institutional framework." Hazards, like resource scarcity, may therefore be defined as "negative resources" and, as White (1974) maintains, no natural hazard exists apart from human adjustment to it. From these definitions, Jackson (1978, p.8) argues:

> Resources become relatively abundant or scarce not only as a result of absolute abundance or scarcity of raw materials in the environment but also in relation to patterns of human use as affected by changes in perception, economic and political constraints, and changes in knowledge, science and technology. In the same way the damage potential from natural hazards rises not only according to event magnitude but also according to human factors such as population pressures in hazard zones, the degree of economic impacts, perceptions of the hazard, and the adoption of damage-reducing adjustments by the inhabitants of the hazard zone.

Resources and hazards may be defined similarly by virtue of common factors which characterize relationships between human and environmental systems.

A second linkage between hazards and resources can be considered as behavioral and conceptual. Downs (1970) maintains that the human use system can be thought of as a set of variable perceptions and decisions. The natural events or environmental system provide information which is subject to cognitive limitations (perceptions) of the people affected by it.

> Thus, people's response to both resources and hazards are not determined by the environment <u>per se</u> but defined instead on how they perceive the environment. In turn, the decisions which follow can modify the natural events system. (Jackson, 1978, p.9)

Therefore, it may be concluded that people of certain cultural groups will perceive and behave with regard to environ-

mental hazards in generally similar ways. Behavior may be conceived of as adaptation to the environment, and thus the purchase of insurance in the case of earthquake or flood hazard represents the adaptation of an adjustment comparable to purchasing a more fuel-efficient automobile in the case of increasing energy costs and scarcity.

From the above review, Jackson (1978, pp. 12-15) cites six ways in which hazard research findings are likely to be reflected in similar patterns of behavior with regard to energy conservation:

(1) Variations in the perception of energy problems is likely to be evident.

(2) Elements of crisis orientation and the impact of experience in the patterns of adoption of energy conservation adjustments will be found.

(3) No one is likely to be aware of the full range (i.e. the theoretical range) of conservation alternatives. "The range of adjustments adopted is likely to be even narrower than the range of which people are aware" (p.13).

(4) There will be groups of people who are very aware of possible energy conservation measures and will adopt a significant number of them. There will also be those who are not aware and consequently will do nothing to effect energy conservation, while the majority of the population will be aware of some conservation practices and will adopt a few of them.

(5) The widespread faith among the population in the efficacy of new technology as a solution to increasing energy scarcity and cost.

(6) Socio-economic variables will have some influence over the adoption or non-adoption of energy conservation measures.

It was from the above review that the methodological constructs of the present study were drawn, and indeed, hypotheses formed. For example, it will be hypothesized later

(chapter V) that individuals may underestimate, or not be aware of, the energy intensiveness of their recreation and leisure pursuits and hence do not perceive the need to modify these activities to conserve energy. This hypothesis emerged as a result of Jackson's fourth postulation given above, as well as from reviewing hazard literature which concluded with a great deal of regularity, that citizens generally underestimate the risk and discount the impact of resource hazards, at least until these reach crisis proportions (Sadler, 1980).

3.3 Behavioral Energy Conservation Research

Several major research works indicate the growing attention that has been focused on household and individual energy consumption and conservation. In 1977 Cunningham and Lopreato annotated some 50 articles in this area, while in 1979 Joreges listed over 500 studies. A major annotated bibliography by Anderson and McDougall (1980) covered over 400 consumer energy studies. Furthermore, numerous review papers have also been published. These include studies undertaken by Farhar et al., 1980; Jackson, 1980b; Jackson and Foster, 1982; and Olsen and Goodnight, 1977. Although this line of research essentially began in 1973 (Newman & Day, 1975), it is clear that in less than a decade interest and concern have become well established (Claxten et al., 1980b).

From a policy maker's perspective, a major consideration in the evaluation of conservation program alternatives is an assessment of the probable magnitude of energy savings. This includes consideration of both potential energy savings in a technical sense, and probable energy savings in a behabioral sense. It is this distinction between potential and probable energy savings that forms the rationale for behavioral energy research. In other words, "the underlying reason for this research is to provide evidence that can help conservation policy-makers classify behavioral response

assumptions" (Claxton et al., 1980b, p.4). The importance of examining the public's perceptions and attitudes towards energy issues has also been noted by Resources for the Future (1978) who maintain that peoples' perception of facts, not just facts alone, help shape public opinion. Most studies are based on an assumption which follows from this view; namely that the success of government and industry efforts to stimulate energy conservation among the public will ultimately depend on explaining relationships between attitudes and behavior (Jackson, 1980b).

"In the most general sense, questionnaire surveys can help provide a realistic basis for the formulation and evaluation of policies and programs which are directed towards achieving a sustainable energy balance acceptable to the consuming public" (Jackson & Foster, 1982, p.30). It is the realization that energy decisions are issues of political economy rather than the application of technology (Sadler, 1980), and that social processes are fundamental to energy policy making and to the success of energy conservation policies, that has evoked an enthusiastic interest in public awareness, perception, attitude and behavior studies. Indeed, the failure to evaluate and anticipate these factors has been responsible for the preclusion of certain options in the past and resulted in the failure of myriad public programs (Jackson & Foster, 1982).

A model for analysis and policy formulation with respect to energy use and consumer behavior has been provided by Evans et al., (1979). Six stages are outlined in the model; the first three are concerned with policy questions whilst the remainder focus on program implementation. The six stages are (Evans et al., 1979, p.166):

(1) problem identification and analysis. The aim here is to identify the public level of concern with respect to energy;

(2) Policy definition, emphasizing public attitudes

toward energy conservation;

(3) Impact analysis and policy selection, where public knowledge of potential energy conserving behavior, general reaction and resistance to policy alternatives, and current energy conserving behaviors, are addressed;

(4) The program development and

(5) Program implementation stages involve the identification of the types of programs which are perceived by the public as being useful in assisting energy conservation; and the identification of target groups which are likely to be receptive to program initiatives;

(6) The program evaluation stage identifies that portion of the public who react to the various programs.

This framework is useful in that it indicates how questionnaire studies can contribute to energy policy making. However, most studies are limited and tend to be specific rather than strategic in nature (Jackson & Foster, 1982). A thorough and succinct discussion of the problems and limitations of attitude surveys has been undertaken by Sadler (1980) who makes several important observations. First, questions are asked, yet the implications have received little thought by the public. This is especially important for complex issues such as those involved in energy policy. Such opinions are likely to be inconsistent or unstable and there is generally a poor correlation between measured attitudes and actual behavior. Second, surveys have generally neglected to pay much attention to situational factors which may affect responses. Third, questions are often generalized and hypothetical in nature and assume the public is well informed about complex interrelationships. Fourth, responses to questionnaries are often conformist, meeting the accepted norms which bear little or no relationship to actual behavior. "In short, questionnaires are prone to elicit public preferences and attitudes that may be accurate but are only marginally relevant for predicting behavioral res-

ponses which have significance for policy" (Sadler, 1980, p.186). Farhar et al., (1980) derived a similar conclusion from their review of "hundreds of studies." In their words (p.166): "Most studies on energy opinion are atheoretical, which limits their usefulness for policy purposes and perpetuates research gaps." However, these criticisms have not gone unchallenged. Jackson and Foster (1982, p.32) rebut:

> While such strong criticism is perhaps justified in some instances, it should be emphasized that much of the research... was initiated for reasons other than policy making. Rather policy implications of the research are mainly implicit, rather than explicit.

The model of policy formulation presented above, however, is evidence that a more rigorous path of research with respect to policy implications is emerging. For example, the research funded by the Consumer Research and Evaluation Branch of Consumer and Corporate Affairs Canada, has been modified to fit Evans et al's framework (Claxton et al., 1980b). Indeed the general body of behavioral energy conservation research has become increasingly more coherent. This trend developed in response to a number of factors, including; identification and description of the essential dimensions of perceptions, attitudes, preferences and behavior; identification of typologies of behavior; increased understanding of the influences of perceptions, attitudes and preferences on behavior; and growing evidence of socioeconomic differences in energy consumption and conservation. Jackson and Foster (1982, p.33) comment on the present state of energy conservation research: "In many respects, North American energy perception and conservation research stands where natural hazard research stood fifteen years ago." They go on to suggest three main avenues for future research: replication elsewhere; the assessment of relationships between energy consumption, conservation and other behaviors; and the influence of fundamental attitudes and lifestyles

on energy-oriented behavior.

3.4 Energy and Leisure

The interrelationships between energy and leisure are both myriad and diverse. The survey presented here contains the major recent research emphasis and findings, which, like work in other new fields is limited, with findings often inconsistent. However, some useful ideas and results can be identified, particularly, with respect to behavioral changes in response to energy scarcity.

At the most fundamental level, increases in leisure time have been largely brought about because of automation in the home and factory associated with large inputs of energy as well as the emergence of trade unions. Widespread affluence, which has accompanied this automation, has resulted in new leisure pursuits, often based on expensive, energy using equipment such as the automobile, being made available to the masses (Goodale, 1975; Jacobs & Foster, 1980). Furthermore:

> Many recreation facilities and arenas have been acquired, developed and managed with the implicit assumption of plentiful, low cost gasoline supplies. Such investments also implicitly encourage the continued dependence on automobiles as the primary means of transportation to reach recreation areas. (McCool, 1980, p.77)

In support of this contention, it has been estimated that over 30% of all driving in the United States and Canada is associated with recreation (Armbruster, 1980; Transport Canada, 1979). It is not surprising, therefore, that much of the leisure/energy research has been devoted to the travel component. Several surveys have been undertaken to measure responses to energy scarcity in terms of reported and intended travel behavior. To a lesser extent, actual behavior has also been measured. While it should be noted that not all results are consistent, in reviewing much of this literature, Smith (1981) has identified the following leisure travel

responses to energy scarcity:

(1) Increase in use of mass transit

(2) Decrease in trip length

(3) Increase in single destination trips at the expense of touring

(4) Purchase of more energy efficient automobiles

(5) More domestic travel at the expense of foreign travel.

However, Smith (1981) also concludes that,

> It appears that escalating prices of fuel is having small impacts on recreation activities. The results of rationing would likely be stronger. However, the change is not significant -- there are alternatives available to people and they will always recreate in some manner.(p.15)

Furthermore, even though the majority of recreation travel is undertaken by automobile, its use is not foreseen to change. It has been suggested by McCool (1980) that significant short run price increases in gasoline would substantially reduce discretionary leisure travel, but because of increases in real income and the need for certain leisure outlets, over the long run, there would be no major reduction in traditional leisure travel.

Therefore, it is believed that the majority of people will not change the amount of recreation they partake in due to the energy situation, but may alter the configuration. Although this process is slow, a survey of the major literature on energy scarcity/price increases indicates that changes are taking place (Table 3.1). These range from trip cancellation to different modes of reducing travel costs. Not all individuals are equally susceptable to price changes; higher income groups, for example, have been shown consistently to be less affected (Corsi & Harvey, 1979; Becker et al., 1976). Other factors,such as stage in the family life cycle, are also important (Corsi & Harvey, 1978).

In a more general sense, other impacts of energy scarcity have been noted on leisure behavior. A United States

Table 3.1

Some Reported Effects of Energy Shortages/Price Increases on Leisure Travel

Study	Travel Effects						
	Cancel Vacation Trip	Fewer Trips/ Visits	Shorter Trips/ Closer Location	Combine Trips	Change Travel Mode	Longer Stays	One Place Vacation
Burke and Williams (1979), Williams et al., (1972) (2)		*	*		*	*	*
C.T.R.N. (1974) (1)	*	*		*	*		
Corsi and Harvey (1978, 1979) (1)	*		*		*		
Osborn and Peine (1979) (1)		*	*		*		
McCool (1974) (2)		*	*		*		
Dan Kemp et al., (1979) (2)	*						
McCool (1980 (3)		*	*			*	

(1) Study discusses reported behavior

(2) Study discusses intended behavior

(3) Study discusses actual behavior

Based on McCool (1980)

Gallup Poll released in 1980 noted that a decline in sports and outdoor activities such as motorboating, golf, bowling, fishing and camping was "undoubtedly due in considerable measure to the energy crunch" (p.1). A study by McCool (1980) also showed that outdoor recreation vehicle participants normally very active in outdoor recreation were more susceptible to gasoline price increases. Furthermore, Goodale (1975) suggests that, increasingly in the future, some recreation activities heavily dependant on energy use will have to give way to home based activities such as gardening.

It should be noted that not all results are consistent; differences emerge between reported, intended and actual behavior, the latter being difficult to relate to changes in energy situations alone. Interviewing socio-economic, attitudinal, and established leisure pattern variables will be important in helping to account for different responses.

Studies of energy and recreation as they pertain to the "urban field" have also been undertaken (Knapper et al., 1981). Knapper and his associates were concerned with investigating the effects of changing energy conditions on outdoor recreation patterns, in the Kitchener-Waterloo area. They began their analysis with a review of a delphi investigation undertaken by geographers into the effects of changing energy conditions on outdoor recreation participation (pp.8-9). The most significant conclusions found in this study were:

(1) automobile owners will decrease travel distances for recreation trips;

(2) there will be increased use of less desirable but nearer areas (i.e. emphasis on proximity over quality);

(3) there will be available a greater variety of recreation resources closer to home;

(4) development of outdoor recreation areas in cities may make them more livable; and

(5) public policy will emphasize accessibility to recreation opportunities. It will be noted that some of these

conclusions mirror those presented earlier.

Knapper et al., attempted to determine exactly what impact developments in recreation and energy will have on the urban field. To obtain data, they surveyed over 500 individuals in the Kitchener-Waterloo area. Of the various conclusions they reached, one is particularly significant, namely, that respondents who displayed greater awareness of the energy crisis were actively involved in practicing energy conservation measures with respect to their outdoor recreation behavior (p.77). Furthermore, they concluded that energy is only one of a set of interacting economic forces that underly observed changes in personal ways of life, although economic factors work in the same direction as energy factors. Also, change in recreation behaviors in response to energy considerations will not be immediate but rather, as suggested earlier, will take place gradually as energy sources decrease or energy prices increase significantly with respect to income.

This brief review of energy and recreation/leisure has shown that some consistent results are emerging from a variety of studies. This should be expected as many studies have been undertaken in this area and a good data base and methodology exist.

The remainder of this chapter will focus on less concise areas of the energy/leisure interface, namely, the development of a classification of the energy intensiveness of leisure activities and the study of motivations, satisfactions, and substitutability of leisure activities as they pertain to energy consumption.

3.5 Energy Intensiveness of Leisure Activities

There are many ways in which energy scarcity can affect leisure behavior and those activities with high energy consumption are likely to be most affected. While travel and on site activity are the most obvious components of leisure behavior which involve energy consumption, there are other aspects

where leisure activities are dependent on non-human energy inputs. The model proposed by Clawson and Knetsch (1966) is useful in this instance. They argue (p.33) that the total recreation experience is almost always more inclusive than the on site participation. In fact, they define five different phases of the recreation experience. First, an outdoor recreation experience begins by anticipation, including planning. The second phase is travel to the actual site. On site experiences and activities make up the third major phase. This phase is often associated with the total outdoor recreation experience and is usually discussed and studied in most detail. But on site experiences may actually be less than half the total recreation experience, whether measured by time involved, expenses incurred, or total satisfactions gained. The travel back is considered as the fourth major phase and finally, the fifth phase is recollection.

On the basis of this model, it can be argued that energy may be consumed by an individual at all phases of the Clawson recreation experience model, the amount used being a function of the activity, distance travelled and on site equipment use (Table 3.2). Indeed, certain activities are particularly dependent on extra-corporeal equipment which require energy inputs for manufacture, operation and maintainence, including certain leisure facilities such as arenas and indoor swimming pools. For example, in the City of Victoria, the Crystal Pool and Memorial Arena accounted for 32% and 10% respectively of all energy used by public buildings in 1977/78 (Collins, 1980).

Leisure activities can be classified in terms of energy intensiveness using the framework presented in Table 3.2. To date, however, few have attempted such a classification and those who have demonstrate a low level of sophistication. The reasons for this include the cost of assembling the necessary data given the range of possible leisure activities, the relatively low priority given to leisure for energy

Table 3.2
Leisure Activities and Energy Consumption: A General Framework

Individual	Equipment	Facility
Planning	Manufacturing	Construction
Travel	Maintenance	Operation
On Site	Use	Maintenance
Recollection		

related research, the lack of clarity concerning the types of energy consumption that should be attributed to participation in leisure activities, and finally, the difficulty in allocating energy consumption requirements to an individual activity in a non-specific context (Ritchie & Claxton, 1981). Despite these problems, some attempts have been made to achieve a measure of energy intensiveness for different leisure activities. These attempts will now be reviewed.

Osborn and Peine (1979) have created an index of activity energy intensiveness based on travel and on site energy consumption for some 30 leisure activities. They utilized a numerical methodology to calculate indices, from zero to unity, for comparative purposes to express the relative energy consumptive nature of the average recreation per individual, for any management agency, site or unique population. They also developed a corollory methodology to introduce the concept of travel time related to individual activities generating indices which indicated the relative energy consumptive nature of individual activities as a function of the weighted average travel time to participate in these activities (1979, p.329). The results of their analysis are presented in Table 3.3.

Graef et al., (1980) using a Lifestyle Index developed by Fritsch (1975), classified 15 leisure activities into High, Medium and Low energy intensities based on Btu's consumed on average in a year. Fritsch's index was designed to demonstrate how much energy an individual uses each year and how his/her standard of living compares with that of the average individual in other countries of the world. The basic unit employed in calculating the Lifestyle Index is the Energy Unit, which is equivalent to one ten thousandth of the energy expended by the average United States citizen in 1972 (1 Energy Unit is equivalent to 34,300 Btu's). The Lifestyle Index consists of six parts including household energy expenditures, leisure activities and transportation. Graef et al.,

(1980) were concerned with the "leisure activities" portion of Fritsch's index. Their intention was to explore the relationship between high energy consumption in leisure activities and quality of life by gathering data from peoples' everday life experiences. Leisure activities were weighted by their average Btu consumption indices and by the amount of time people spent doing them. However, as previously mentioned, rather than calculate Btu consumption figures for each person sampled, leisure activities were categorized (according to Fritsch's Btu estimates) into Low (less than 5 Btu's), Medium and High (more than 100 Btu's) (Table 3.3).

A more complete, although subjective, classification has been prepared by Ritchie (1979). His index was based on four major dimensions (pp.5-6):

(1) energy consumption necessitated by participation in the activity (direct consumption)

(2) energy consumption necessary to produce equipment/products required for participation in the activity (indirect consumption)

(3) energy consumption required to maintain equipment in a functional state (maintenance consumption)

(4) energy consumption necessary to travel to the site where the activity is to be performed (travel consumption).

The 1976 Statistics Canada data was employed as the primary frame of reference to identify the broad range of leisure activities which exist. This framework viewed leisure activities as being composed of "sport and physical recreation activities" and "other leisure activities". Since travel was not included, Ritchie added a third component; vacation and travel activities. The recreation and leisure pursuits in each of the three categories were then evaluated with a view toward establishing their direct, indirect, maintenance, travel and total energy consumption. "Due to the lack of quantitative data available, the energy consumption requirements in each category were established on a judgemental

basis" (Ritchie, 1979, p.6). Over sixty activities were rated High, Medium, Low and Nil in this manner (Table 3.3).

Finally, an average measure, based on the three studies already mentioned, has been developed by Foster and Kuhn (1981). Over 70 activities were rated High, Medium, or Low in terms of energy intensiveness. (Table 3.3). It is this system of classification which will be employed for the empirical investigation of this thesis.

Some discrepancies occur between the different ratings but these are to be expected given the different assumptions made by the various authors and given the somewhat arbitrary and perhaps simplifying judgements made in establishing the measures. Nevertheless, a complete and comprehensive classification system could help guide policymakers and concerned individuals make decisions about shifting participants from high energy intensive leisure activities to low ones. Indeed, as detailed in the following section, Graef et al., (1980) have suggested that such a shift would benefit not only energy conservation but also the individual. Ritchie and Claxton (1981), however, believe that there are very few opportunities for substituting low energy intensive for high energy intensive activities without substantially modifying satisfactions derived by participants.

3.6 Satisfactions, Motivations and Substitutability

Attention will now be given to reviewing the area of satisfactions, motivations and substitutability of leisure activities with respect to energy conservation. Work in this area is extremely limited and hence only two studies will be reviewed; they are the study by Graef et al., (1980) and the works of Ritchie (1979) and Ritchie and Claxton (1981). The latter two reports are basically the same, although the 1979 study places greater emphasis on reviewing the relevant literature, while the second study presents more of an in-depth analysis of the empirical findings.

Table 3.3
Energy Intensiveness of Leisure Activities

Activity	Rating by Author			
	Ritchie, (1979)	Osborn & Peine, (1979)	Graef et al., (1980)	Foster & Kuhn (1981)
Vacation Travel	H ±	-	-	H
Camping	H-L	0.64 - 0.60	-	H
Downhill Skiing	M+	0.60	-	H
Waterskiing	H-	0.51	-	H
Snowmobiling	H-	0.41	-	H
Sailing/Yachting	M+	0.48	-	H
Skin Diving	M+	0.47	-	H
Motorcycling	M+	0.43	-	H
Golf	M+	0.40	-	H
Visit Festivals (etc.)	L+	0.50	M	H - M*
Fishing/Hunting	L+	0.56 - 0.55 0.56 - 0.55	-	H - M*
Attend Sports Events	M	0.44	-	M
X-Country Skiing	L+	0.47	-	M*
Attend Theatre/ Music per-formance	M	0.39	M	M
Hiking	L	0.52	-	M*
Football	M	(0.34)**	-	M
Horseback Riding	M-	0.39	-	M
Canoeing	L	0.45	-	M*
Swimming	L	0.47 - 0.38	-	M*
Watching Movies	M-	-	M	M
Watching T.V.	L+	-	H	M*
Shopping	-	-	H	M
Restaurant/Disco	-	-	H	M

Table 3.3 (cont.)

Activity	Rating by Author			
	Ritchie, (1979)	Osborn & Peine, (1979)	Graef et al., (1980)	Foster & Kuhn, (1981)
Basketball/ Baseball/ Ice Hockey	L+	(0.34)	-	M
Visit Cultural Centre	L	0.39	M	M
Socializing/ Visit Friends	M - L+	-	L - M	M
Reading Newspapers	L-	-	H	M*
Listening to Records	L+	-	M	M
Visit Friends	L+	-	M	M
Curling, Bowling	L	(0.34)	-	M
Badminton/ Volleyball	L	(0.34)	-	M
Dancing/Soccer	L	(0.34)	-	M
Squash/Broomball	L	(0.34)	-	M
Bowling	L	(0.34)	-	M
Racquet/ Paddleball	L	(0.34)	-	M
Gymnastics	L	(0.34)	-	M
Listening to Radio	L	-	M	M
Ice Skating	L	0.29	-	M
Reading Books	L-	-	H	M*
Crafts/Hobbies	L	-	L	L
Judo	L-	(0.34)	-	L
Floor/Road Hockey	L-	(0.34)	-	L
Weightlifting	L-	(0.34)	-	L
Tennis	L-	0.31	-	L

Table 3.3 (cont.)

Activity	Rating by Author: Ritchie, (1979)	Osborn & Peine, (1979)	Graef et al., (1980)	Foster & Kuhn, (1981)
Bicycling	L-	0.31	-	L
Community Activities	L	-	-	L
Toboganning	L-	0.28	-	L
Yard Maintenance/ Home Repair	L	-	-	L
Calisthenics	L-	-	-	L
Bingo/Cards/ Chess	L-	-	L	L
Snow Shoeing	L-	-	-	L
Attend Classes	L-	-	-	L
Roller Skating	L-	-	-	L
Sexual Activities	-	-	L	L
Ping Pong/Yoga	Nil+	-	-	L
Jogging/Walking	Nil	-	-	L

* Represents uncertain ratings

** Bracketed numbers were classified generally as "other sports" by Osborn & Peine (1979)

‡ H,M,& L represent high, medium and low energy intensiveness on a relative scale

As we have seen earlier, Graef et al., were concerned with exploring the relationship between high energy consumption in leisure activities and the quality of life. Specifically, they tested two hypotheses:

(1) Leisure activities that require more energy will not produce higher levels of happiness than leisure activities requiring less energy; and

(2) People who use up more energy overall in their leisure behavior will not have a higher level of happiness in either their leisure activities, or over their lives as a whole (p.4).

The authors derivation of the energy intensiveness of leisure activities was described in the previous section. The quality of experience or happiness and the level of energy consumption in leisure was measured using the Experience Sampling Method. "This technique, which depends on electronically induced self-reports to random paging in normal daily activities, provides reliable and valid assessments of how people feel about the various things they do in their life" (p.5). The sampling of respondents occurred over a seven day period and each respondent answered approximately 56 "beeps" over their paging devices and filled out a questionnaire at that time.

As a result of their investigation, the authors could not find any positive realtionships between energy use and happiness and thus accepted their hypotheses. In fact, they found that happiness is inversely related to energy use. As they explain:

> It seems clear from this study that increased energy consumption does not result in greater satisfaction with life. In fact, results from this study lend some empirical support to the suggestions of some social scientists that increased consumption (generally) ends up impoverishing life instead of enriching it (1980, p.9).

In attempting to explain their results, Graef et al., suggest that a fuller understanding of the factors which dis-

tinguish high and low energy intensive activities must be sought. For example, they discovered (1980, p.9) that one clear differentiating factor is the degree of personal involvement required by the activities. The high energy intensive activities are characterized by almost passive participation compared to the low energy intensive activities which actively involve the participants.

The relationships between energy consumption, leisure activities and satisfaction/substitutability have been examined by Ritchie (1979) and Ritchie and Claxton (1981). These studies attempted to determine if leisure activities which are highly energy intensive could be substituted for low energy consuming activities and still provide participants with the same satisfactions. Specifically, three objectives were detailed by Ritchie and Claxton (1981, p.7):

(1) to identify sets of leisure activities offering similar patterns of perceived satisfaction;

(2) to examine how perceived satisfactions related to various leisure activities vary across activities of differing energy intensity;

(3) to identify leisure activities of low energy intensity which might substitute for activities which are highly energy intensive without significantly reducing individual satisfactions derived from leisure. To achieve these objectives, the research obtained a range of measures on attitudes, satisfactions and behaviors for a set of 24 leisure activities gained from interviewing 420 individuals in three Canadian cities.

In both studies, three major concepts were examined. First was the energy intensiveness of leisure activities, discussed earlier. Second, the concept of satisfaction was studied in order to gain information on the reasons why individuals choose to participate in a particular activity and different sets of activities. A 45 item need-satisfier scale developed by Tinsley and Kaas (1978, 1979) was employed in

this aspect of the research. The third major concept was the substitutability concept, which is, as the name implies, the idea that various activities might be viewed as substitutes for others. The idea satisfaction is fundamental to the basic purpose of substitutability research.

A number of conclusions were reached in both studies and the major ones will now be briefly discussed. First, the substitution from a high energy activity to a low one may not be easily achieved. Of the 45 need dimensions identified by Tinsley and Kaas (1978), which can be potentially satisfied through certain leisure pursuits, the majority were activity specific, and only a few are important for leisure in general. Furthermore, 17 physical and psychological variables were identified as barriers to changing from high energy intensive to low energy intensive activities. These include a non-perception of the existence of a serious energy shortage, a belief that technology will resolve the issue, opposition to government involvement and an unwillingness to modify lifestyle (Ritchie, 1979, pp18-20). Similar factors have been identified as barriers to general energy conservation behavior (Farhar et al., 1980; Jackson, 1980; Jackson & Foster, 1982).

The second major conclusion resulting from this research is that, in general, it appears that time devoted by consumers to participate in many leisure activities involves relatively low levels of energy consumption. Also, there are certain activities of high energy intensity (i.e. driving, motorboating) for which there appear to be no obvious substitutes. If energy conservation became a primary social objective, there may be no alternative but consciously to discourage such activities. The fourth major conclusion is that evidence from these studies indicates that the most preferred leisure activities are those which are relatively low in energy consumption. This last conclusion is similar to that reached by Graef et al., who concluded that increased energy consumption does not necessarily result in greater satisfaction with life.

3.7 Overview

The above review shows that behavioral energy conservation research has reached a stage where its utility in energy policy making cannot be denied. A methodological framework and large data base now exist which can allow researchers to focus on particular facets of energy conservation such as travel and recreation and leisure behavior. Furthermore, the model proposed by Evans et al. (1979) provides a good guide for relating research to policy formation, which, as we have seen in chapter II, is often the main goal of behavioral studies in the field of geography.

With the exception of studies dealing with general travel behavior, however, the identification of barriers to, and potential for, energy conservation with respect to recreation and leisure activities is still at an early stage. As a result, some of the measures used in this research area are simplistic in that they are based on judgemental decisions and cannot be checked until much more data are available. Nevertheless, studies undertaken in this area may eventually be used as basic guidelines for future research.

From the review of behavioral geography as it pertains to resource management and the application of the behavioral methodology to energy conservation research, several general comments can be made. It has been noted that geographers employing the behavioral approach are concerned with individuals' reactions and behavior towards natural resources and hazards and thus, attention is largely focused on behavior rather than on the resource itself.

As a result of the conceptual similarity between natural hazards and energy scarcity, a common methodological framework can be employed and a number of hypotheses generated which are relevant to energy studies. For example, it was concluded from hazard research that peoples' perceptions of the options available to cope with impending hazards are significantly fewer than the actual or theoretical range of choices. This

conclusion may be applicable to potential responses to energy scarcity and price increases. Furthermore, it can be hypothesized that socio-economic factors will influence individuals' decisions to alter their behavior to effect energy conservation as these factors account for variation in behavior towards natural hazards. Also, individuals were found consistently to underestimate the seriousness of the "energy situation" and their ability to contribute to energy conservation generally. Finally, a great deal of the behavioral response to natural hazards was found to be crisis oriented. This conclusion may be extended to include energy scarcity/price increases: individuals will only adopt energy conservation when a crisis in supply or drastic increases in price necessitate conservation measures to be adopted. It is from the above review that the general framework for the empirical study of this paper was drawn and hypotheses initiated.

The remainder of this thesis will present the results of a questionnaire survey undertaken by the author with the intent to learn more about the interrelationships between energy consumption/conservation and recreation and leisure behavior. The results are presented in two chapters following a brief discussion of the sampling design and questionnaire formulation (chapter IV). Chapter V will examine patterns of leisure energy conservation behavior and will attempt to explain the pattern by analyzing it with reference to socio-economic factors and attitudes and perceptions of energy variables. Chapter VI will discuss the development and use of the Energy Leisure Lifestyle Index.

CHAPTER IV

SAMPLING METHOD AND QUESTIONNAIRE DESIGN

4.1 Introduction

A questionnaire survey was conducted between February 1 and 15, 1982 and was, in part, a modified version of one used earlier by the author in Ladysmith, British Columbia (see Foster & Kuhn, 1981). New questions were added based on the classification of recreation and leisure activities and their energy intensiveness (see chapter III).

The questionnaire itself consisted of eight pages and included thirty questions as well as providing space for respondents to include comments about the questionnaire or energy in general.* The information which was sought can be classified under eight general headings which will be discussed following a review of the sampling method.

4.2 Sampling Method

Approximately 265 questionnaires were distributed to various households (apartments, houses, etc.) in Victoria. A total of 243 questionnaires were returned in a useable condition (i.e. completed in entirety) representing a return rate of 92%.

Potential respondents were selected from the 1982 Greater Victoria Telephone Directory. A random sample table was used to determine the page numbers and respondents were chosen from the bottom of the second column of that page. In cases where a business or some other obvious non-residential address was selected, the first residential address above was chosen. When an apartment dweller was selected, their phone number was

* A copy of the questionnaire is presented in Appendix A.

recorded and they were later called and requested to participate in the survey. This step was undertaken in order that the potential respondent would expect the survey and allow the researcher to enter the apartment complex, which is normally locked.

Once selected, a questionnaire and plain envelope were dropped off at the respondents' home by the author and retrieved some time later (normally about two hours later). This mode of distribution and retrieval was employed for several reasons: first, the personal contact with the respondents enabled the author to explain the nature and purpose of the survey as well as to answer any questions which arose. Second, the success rate of this method has been very good in past research (over 90% completion rate). Third, a plain envelope was provided to ensure the respondents that their anonymity would be protected as well as to allow them to leave the completed questionnaire outside and thus avoid being disturbed a second time. Finally, this method of distribution was the most economical in terms of time and money.

There were some flaws with the sampling technique employed in this project which should be pointed out. First, although the most recent telephone directory was used to generate the list of respondents, the lag time between the compiling of the directory and its publication is sufficiently long to allow part of the population to relocate and thus not be included. A more recent and corrected list of the population of Victoria, such as a voters list or assessment list, could have been used. Second, those individuals and households with unlisted telephone numbers were not included in the survey. This problem could have been overcome by the addition of a step in the sampling procedure. Once selected from the directory, (i.e. the individual listed on the bottom of the second column), the last digit in the telephone number could be changed using a random sample table. The potential respondent would then be called and their willingness to participate

in the survey requested. The third oversight in the sample design was that no attempt was made to select randomly a household member over the age of seventeen. In other words, a questionnaire was given to whomever answered the door so long as that individual was over the age of seventeen. To overcome this problem a list of occupants of each household could have been requested and then one of the respondents randomly selected and asked to complete a questionnaire. For example, if household X had five occupants over the required age, each would be listed and designated a number which would then be randomly selected by using a prepared table or by rolling a die .

4.3 Questionnaire Design

This section will examine the questions included in the survey. As alluded to earlier (4.1), these will be presented under eight general headings. The final subsection (4.3.8) will also present the socio-economic characteristics of the sample.

4.3.1 Attitudes Toward Energy Parameters

Question 1 asked the respondents to indicate their level of concern over ten issues facing the people of British Columbia. A scale of 1 (not concerned) to 5 (very concerned) was provided. Two of the issues listed were related to energy: energy costs and energy shortages. The results of this exercise reveal the relative importance of the energy issue with respect to other concerns (i.e. inflation and unemployment). It was determined only after the survey was completed that the issue "resources ownership" was too vague and should not have been included.

A series of thirteen attitude statements were also included (questions 3 through 15) which requested respondents to indicate their level of agreement with a number of facets of energy conservation. These included provincial government

involvement, environmental and technological issues, lifestyle, recreation and leisure, and renewable energy sources. Again, a five-point scale was provided with 1 representing total disagreement, 3 neutrality, and 5 total agreement.

There are two reasons for the inclusion of these attitude statements. First, the respondents' attitudes toward energy conservation generally as well as specific aspects of conservation can be ascertained. Second, it is hypothesized that a relationship between energy conservation behavior of the respondents and their attitudes toward energy parameters would emerge.

As was the case with Question 1, some problems with the attitude statements were noted after the survey was completed. For example, Question 6 asked "if energy shortages occur, recreation travel should be severely limited." The word "severely" should not have been included as it may be viewed as being too extreme and may make respondents hesitant to endorse such a proposition.

4.3.2 Perceptions of Energy Futures

This question (#2) was designed to determine if the sample was optimistic or pessimistic about the availability of six different energy sources in the future. Also, it is hypothesized that respondents' perception of energy availability may have a relationship to their adoption or non-adoption of energy conservation practices. The six energy sources listed were coal, heating oil, hydro electric power, natural gas, gasoline and wood. A seven-point scale was provided with:

(1) representing energy scarcity would occur at present;
(2) by 1985;
(3) by 1990;
(4) by 2000;
(5) beyond 2000;
(6) never, and
(7) don't know.

4.3.3 Ownership of Leisure Related Equipment

Question 18 asked respondents to indicate if they or their family owned any of a list of nine pieces of recreation and leisure equipment. Items on the list included sailboat with motor, cottage and dirt bike as well as an "other recreational vehicle" category. Analysis was undertaken to determine if a relationship exists between energy conservation behavior and equipment ownership.

4.3.4 Energy Conservation Behavior

This part of the questionnaire (Question 16) asked the respondents which of a series of 26 energy conservation practices they had adopted. The conservation practices listed were derived mainly from reviewing the relevant literature on the subject, as well as those constructed by the author. Five major areas of energy conservation are represented: shopping, transportation, household, structural adjustments to the home, and recreation and leisure. One of the conservation practices, "moved closer to place of work," is not included in the analysis as it is an anomaly compared to the other practices listed and the percentage of respondents not answering it was very high.

This section of the questionnaire is crucial to the study as most of the hypotheses are generated from these responses and an explanation of the pattern of adoption of the practices is sought.

4.3.5 Future Intended Energy Conservation Behavior

This question (Question 20) sought to determine how a doubling in energy prices might affect the respondents' recreation and leisure activities. Respondents could indicate that a doubling in energy prices would have no effect or they could choose from a list of eight possible effects, including an "other" alternative which provided space for individual answers not included in the list. A question of this nature

allows analysis to be undertaken concerning the willingness or unwillingness of the sample to alter their leisure lifestyle in response to dramatic increases in energy prices, albeit hypothetically.

4.3.6 Past and Present Leisure Activities

A list of 25 different recreation and leisure pursuits were presented and respondents were requested to state how often they participated in each activity during the previous twelve months (Question 21). Four categories of responses were provided: frequently, occasionally, rarely and never. This information, coupled with the classification of energy intensiveness of each activity (see chapter III), allows an energy leisure lifestyle index to be constructed. Once respondents are classified according to the total energy intensiveness of their recreation and leisure pursuits, analysis can be undertaken to determine if a relationship is evident with their energy conservation behavior.

4.3.7 Perceptions of Energy Intensiveness of Different Leisure Activities

An identical list of recreation and leisure activities as those mentioned above (4.3.6) was included on the following page of the questionnaire (Question 22). This time, however, respondents were asked to indicate the amount of non-human energy used in pursuing these activities. A five-point scale was provided representing energy inputs ranging from very low (1) to very high (5). The purpose of this question was to allow a comparative index of energy intensiveness to be made. This index was derived in a similar manner to the one previously mentioned; the difference being that one is based on the energy intensiveness of each activity given in the literature and the other using the energy intensiveness given by the respondents. Again, analysis was undertaken using this second index and the respondents' energy conservation behavior.

4.3.8 Socio-Economic Factors

The last two pages of the questionnaire (Questions 23 through 30) asked respondents to provide information concerning their socio-economic status. The various characteristics of the sample will now be looked at in some detail.

Compared to the 1976 census data, the sample overrepresents all age categories, particularly those in the 18-34 age group (Table 4.1). This overrepresentation may be accounted for, in part, by the deliberate ommision of those under 18 years of age from the sample. This age group, according to the census, comprises 29.1% of the population of Victoria.

The majority of respondents had between 1 and 4 members in their households with only 16.4% indicating more than four members (Table 4.2). Furthermore, 54.1% indicated that they did not have any members under 17 years of age while 28.8% stated they had more than one child. These figures correspond well with those from the 1976 census as can be noted in Table 4.3. Almost two-thirds of the sample were home owners while only 36.1% rented their dwellings (Table 4.4).

With respect to employment, almost a quarter of the sample were retired and 26.9% were classified as "other" (clerical, unemployed, labourer, managerial and student). The remainder of the sample belong in the categories of professionals, homemakers, and skilled workers (Table 4.5).

Close to 30% of the respondents were university graduates and just over a quarter had some university training (Table 4.6). None of those sampled had less than a secondary school level of education and 22.1% had post secondary training (i.e. college or technical school). An almost even division of annual income was reported by the respondents (Table 4.7) of which 50.7% were female (Table 4.8).

Although there are some discrepancies between the socio-economic characteristics of the sample and those data available in the 1976 Census, none of the differences are so great as to negate the validity of the sample. Nevertheless, it

must be kept in mind that the socio-economic characteristics of the sample do not mirror those provided in the 1976 Census and thus some of the results of the analyses must be viewed in this context. The reason for this discrepancy is no doubt related to the deliberate omission of that segment of the population under seventeen years of age. As this young age group represent approximately 30% of the population of Victoria, this study is mainly concerned with the remaining 70%. This fact has obvious repercussions in terms of the results to the questionnaire. For example, no respondents reported having less than a secondary level of formal education although in reality this certainly is not the case as the majority under the age of seventeen have not completed secondary school.

Some of the data collected from the questionnaire survey is presented in a "collapsed"form. For example, five possible responses were provided with regard to the attitude statements but these categories were reduced to three in the analysis of the results. This step was undertaken to satisfy the prerequisites of crosstabulation (X^2) analyses. In order for the tests to be valid a minimum of five observations must be evident for each relationship. Often there were insufficient data in all categories to meet this criterion and the data had to be grouped. Hence, whenever variables had to be collapsed they are presented throughout the thesis in that format. The grouping of data was undertaken for most of the socio-economic variables, the attitude statements and for the participation in recreation and leisure activities variables.

Table 4.1
Age (%)

Age Groups	Sample (%)	1976 Census (%)
less than 18	N/A	29.1
18-34	40.4	23.3
34-55	25.1	20.9
greater than 55	34.5	26.7
	n=235	

Table 4.2
Household Size (% of sample)

Number	%
1-2	42.2
3-4	41.4
greater than 4	16.4
	n=232

Table 4.3
Number Under 17 Years of Age (% of sample)

Number	%	1976 Census (%)
0	54.1	42.7
1	17.2	21.2
more than 1	28.1	36.1
	n=233	

Table 4.4
Occupancy (%)

	% of sample	1976 Census (%)
own	63.5	60.8
rent	36.1	39.1
	n=233	

Table 4.5
Employment (%)

	%
Professional	18.3
Homemaker	17.0
Skilled	13.0
Retired	24.8
Other	26.9
	n=230

Table 4.6
Education (%)

	%
Secondary	31.6
Post Secondary	22.1
Some University	26.4
University Graduates	19.9
	n=231

Table 4.7
Annual Income (%)

	%
less than 20,000	36.6
20 - 30,000	31.7
greater than 30,000	31.7
	n=205

Table 4.8
Sex

	%	1976 Census (%)
Male	49.3	47.8
Female	50.7	52.2

CHAPTER V

REVIEW OF FINDINGS: PART I

5.1 Introduction

This chapter analyses part of the questionnaire survey. The respondents' leisure behavior modifications in response to energy parameters will be discussed and this information will provide a factual basis for the development of several hypotheses which are examined in this and the following chapter. The respondents' reported "energy conservation practices adopted" variables are then examined in relation to their socio-economic characteristics.

The "recreation and leisure energy conservation practices adopted" variables will then be measured against the issue consern, energy perception, attitude and recreation equipment ownership variables. The intent here is to identify the relative importance of these variables with respect to respondents' adoption of certain energy conservation practices. In order to test for statistically significant relationships, crosstabulation (X^2) analysis is employed.

5.2 Leisure Behavior Modifications in Response to Energy Parameters

Respondents were asked if they had adopted any of 25 energy conservation measures which had been identified in the literature (Foster & Kuhn, 1981). These conservation practices were divided into five major groups as follows:

-- modifications to general travel behavior
-- modifications to household behavior
-- modifications to shopping behavior
-- structural adjustments in the home

-- modifications to recreation and leisure behavior

The results are presented in Table 5.1 and show that at the group level changes have occurred most frequently for household behavior, followed by changes to travel behavior, shopping behavior and structural adjustments in the home. Modifications to leisure activities were the least popular with less than half the respondents reporting their adoption of these energy conservation practices. In fact, 16.4% had not adopted any of the leisure conservation practices while 34.9% had adopted between one and three of the seven measures included in the questionnaire. A comparison of the results of this exercise and those done in Ladysmith (Foster & Kuhn, 1981) reveals almost identical findings. The mean scores for each of the major conservation categories produce the same rank order although they are somewhat higher in the Victoria survey in each case (Table 5.1). The reason for the discrepancy in mean scores is no doubt related to the fact that Victoria is much larger than Ladysmith and offers more opportunities for the individual to conserve energy. Also, the cost of energy has risen significantly between the time both surveys were conducted thus acting as a further impetus toward conserving energy.

Respondents were asked to give their level of agreement with a series of specific statements concerning leisure and energy use. As shown in Table 5.2, respondents' are somewhat reluctant to modify leisure behavior to effect energy conservation and a significant number expressed a neutral view towards these attitude statements.

Finally, respondents were asked what effects a doubling in energy prices would have on their recreation and leisure activities. While nearly one-quarter indicated there would be no effect, the same percentage felt that they would vacation closer to home or change to more home-based activities (Table 5.3). Next in popularity was reducing weekend recreation and leisure travel, followed by increased use of

Table 5.1

Percentage of Respondents Adopting Specific Energy Conservation Practices

Travel Behavior	Ladysmith	Victoria	Mean Scores	Rank
Drive less	45.2	64.2		
Drive slower	61.9	53.5	Ladysmith: 51.4	
Walk more	58.3	57.2		2
Purchase smaller car	40.5	47.3	Victoria: 55.5	
Household Behavior				
Use less hot water	53.6	56.4		
Lower thermostat	81.0	84.0	Ladysmith: 61.1	
Recycle materials	41.7	55.6		1
Turn lights off	84.5	84.4	Victoria: 64.4	
Use appliances less	40.5	47.7		
Wear more clothing	65.5	58.4		
Structural Changes				
Increase insulation	61.9	66.7		
Install weather stripping	54.8	57.2	Ladysmith: 48.8	
Install storm doors/windows	47.6	45.7		4
Install thermostat control	31.0	35.0	Victoria: 51.2	
Shopping Behavior				
Purchase more per trip	54.8	51.9		

Table 5.1 (cont.)

Shopping Behavior	Ladysmith	Victoria	Mean Scores	Rank
Shop less frequently	47.6	51.0	Ladysmith: 51.2	
Shop closer to home	56.0	64.6		3
Shop on the way to or from work	46.4	41.6	Victoria: 52.3	
Leisure Behavior				
Vacation closer to home	39.3	49.1		
Reduce leisure and recreation travel	36.9	40.7	Ladysmith: 38.3	
Less energy intensive recreation activities	27.4	35.8		5
More home-based leisure activities	53.6	56.4	Victoria: 42.7	
Fewer vacations	41.7	51.4		
Vacation at one time and place	31.0	32.1		
Use public transit for recreation and leisure travel	N/A	33.3		

Table 5.2
Energy/Leisure Attitudes

Attitude Statement	Level of Agreement		
	Disagree %	Neutral %	Agree%
1. If energy shortages occur recreation travel should be severely limited	44.9	22.7	32.4
2. An additional tax on high energy consuming recreation vehicles should be implemented to curtail their use	39.9	15.8	44.3
3. Leisure activities are an important part of peoples' lifestyles and such acts should not be changed merely for energy conservation purposes	36.8	18.8	44.4
4. People should reduce vacation travel to conserve energy	45.1	25.7	29.2

Table 5.3

Effects of Doubling Energy[1] Prices on Leisure Behavior

Response	Victoria %	Cowichan Valley[2] %
No effect	23.5	26.3
Change to less energy intensive recreation and leisure pursuits	14.4	5.3
Reduce weekend recreation and leisure travel	17.2	12.6
Reduce daily recreation and leisure travel	13.9	17.5
Increase use of public transportation to recreation and leisure facilities	16.9	N/A
Vacation closer to home	23.5	22.9
Take fewer vacations	16.8	12.3
Change to more home-based recreation and leisure activities	18.9	27.9
No response	7.8	8.8

1 In the Cowichan Valley the term gasoline was used, rather than energy

2 source: Foster and Kuhn, 1981

public transit, fewer vacations and change to less energy intensive recreation and leisure activities.

In summarizing these results, which confirm those found in earlier surveys of Vancouver Island (Tables 5.1 and 5.3), it is clear that leisure behavior has been modified and will continue to be modified in response to energy scarcity. Nevertheless, given the discretionary nature of leisure there appears to be some reluctance to make extensive changes to leisure behavior.

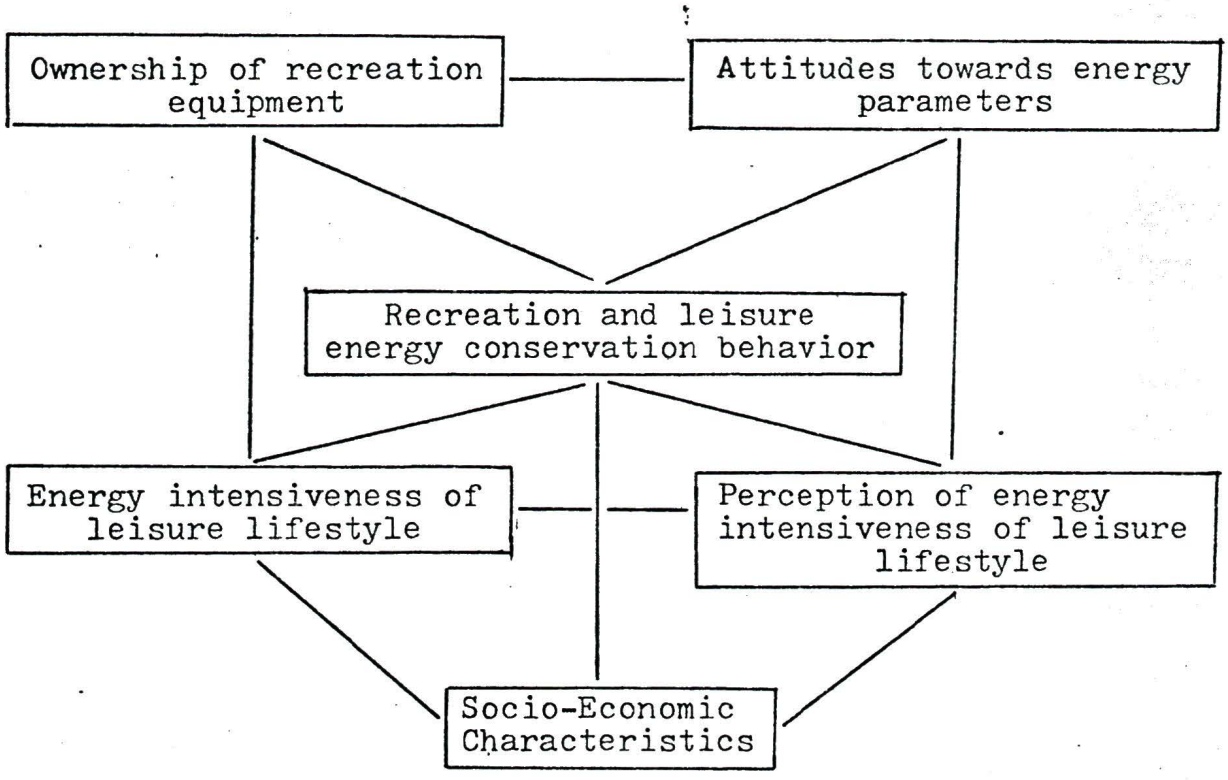
5.3 Hypotheses

There are several hypotheses which might explain these results. First, it has already been shown that many individuals believe that leisure is an important part of their lifestyle and should not be changed merely to effect energy conservation (Table 5.2). Second, the socio-economic characteristics of the respondents may influence their decision of whether or not to adopt energy conservation measures. For example, it may be that high income groups can afford to pay price increases associated with energy scarcity, while older people may participate only in low energy intensive activities. Third, respondents' attitudes and concerns about energy may not be conducive to their adoption of energy conservation measures. Fourth, respondents who own expensive energy intensive recreation equipment may be unwilling to give up the use of such equipment. Fifth, individuals may underestimate, or not be aware of the energy intensiveness of their recreation and leisure pursuits and hence do not perceive the need to modify these activities to conserve energy. And sixth, leisure activities may not be energy intensive and therefore little change is possible.

Thus, there are five major hypotheses which will be examined in order to gain more understanding between the relationships between energy consumption and recreation and leisure behavior (Figure 5.1). For the purposes of exploring

Figure 5.1

Factors Affecting the Adoption of Recreation and Leisure Energy Conservation Measures



Note: This figure shows the interrelationships between five factors hypothesized as having some affect on individuals' adoption of recreation and leisure energy conservation practices. In reality, the interrelationships are much more complex and include many more variables.

Table 5.4

Relationship Between the Adoption of Energy Conservation Measures and Socio-Economic Characteristics

Conservation Practices	Age	House-hold size	Number under 17	Occu-[a] pancy	Edu-cation	Income	Sex[b]
Drive less							
Drive slower	+		-	+			-
Walk more	+				+		
Purchase small car							
Use less hot water							
Lower thermostat							
Recycle materials	+			+	+	+	
Turn lights off				+			
Use appliances less							
Wear more clothing		+	+				
Increase insulation				+			
Install weather stripping				+			

Table 5.4 (cont.)

Conservation Practices	Age	Household size	Number under 17	Occupancy[a]	Education	Income	Sex[b]
Install storm doors/ windows	+			+			
Install thermostat control			+				-
Purchase more per trip			+				
Shop less frequently							
Shop closer to home							
Shop on the way to or from work	-	+				+	
Vacation closer to home							
Reduce recreation and leisure travel	+						
Less energy intensive recreation activities							
Fewer vacations							
More home-based activities							

Table 5.4 (cont.)

Conservation Practices	Age	House-hold size	Number under 17	Occu-[a] pancy	Edu-cation	Income	Sex[b]
Vacation at one time and place			+	+			
Use public transit for recrea-tion and leisure travel	+					-	

\+ positive relationship; significant at $p < 0.05$

\- negative relationship; significant at $p < 0.05$

a positive relationship indicates owners adopted the practice more than renters

b positive relationship indicates females adopted the practice more than males

these hypotheses, analysis will be confined primarily to those reported recreation and leisure behavior changes shown in Table 5.1. The following section which examines the socio-economic characteristics of the sample, however, will focus on all 25 of the energy conservation practices presented in Table 5.1. The intent here is to discern the importance of the socio-economic characteristics to energy conservation behavior in general as they are frequently given prominence in much of the literature on this subject.

5.4 Socio-Economic Factors

5.4.1 Results

To establish sources of variation between the adoption of energy conservation practices and socio-economic factors, crosstabulation (X^2) analyses were undertaken. As presented in Table 5.4 twenty-eight of the one hundred and seventy-five tests were statistically significant at the 0.05 level of probability (approximately 15% of the tests). Although these results are somewhat disappointing and contrary to what was expected, the number of statistically significant relationships was three times that which would be expected in chance occurrence.

No one socio-economic variable was consistently significant with all the energy conservation variables under investigation although some consistent results emerged within some of the major energy conservation categories. For example, the variable "occupancy" was significantly correlated with the practices of increasing insulation, installing weather stripping and installing storm doors and windows. In all cases home owners adopted these practices to a much greater extent than did renters.

With respect to the energy conservation variables related to recreation and leisure behavior, only five significant relationships resulted with the forty-nine tests undertaken (approximately 10%). In fact, no statistically

significant relationships were evident between the conservation practices of vacationing closer to home, undertaking recreation and leisure activities which are less energy intensive, undertaking more home-based recreation and leisure activities and taking fewer vacations. The variable age, however, was significant with the practices of reducing recreation and leisure travel and using public transportation for recreation and leisure travel: in both cases, respondents in the older age groups adopted these measures most frequently. Home owners were found to have adopted the practice of vacationing at one time and place more than those who rented their dwellings as did families with more than one child. Finally, respondents with low incomes indicated they had adopted the use of public transportation for recreation and leisure purposes more than did respondents with higher incomes.

5.4.2 Summary

Based on the above discussion, the hypothesis stated earlier with respect to the relationship between socio-economic factors and the adoption of leisure energy conservation measures must be rejected. It was thought, for example, that high income groups may be immune to price increases resulting from shortages of energy. The results obtained here, by and large, run counter to most other published results, particularily the importance of income in "explaining" the adoption of energy conservation measures (Jackson & Foster, 1982; Farhar et al., 1980; Newman & Day, 1975). In fact, the only result achieved here which corresponds to other published results is that family status was important in explaining the adoption of vacationing at one time and place rather than taking numerous short vacations. This suggests the importance of stage in the family life cycle; a factor noted by Corsi and Harvey (1978).

Due to the paucity of statistically significant findings

reported above, tests were also conducted between the total number of recreation and leisure energy conservation practices adopted variable and the respondents' socio-economic characteristics. Three new categories were formulated as follows:

1. Adopting no leisure energy conservation measures
2. Adopting one to four measures
3. Adopting five to seven measures

Crosstabulation analyses were conducted but no statistically significant results were obtained. The socio-economic characteristics of the respondents do not seem to play a major role in the adoption or non-adoption of leisure-related energy conservation practices.

A conclusion based on the above analysis and an addition to the conclusion to the first hypothesis (5.3) is that leisure activities are an important part of peoples' lifestyles, satisfying important needs, that they are unwilling to change at present because of energy considerations regardless of their age, income, sex, household size and status and level of formal education. Furthermore, it may be that energy shortages and price increases have not been sufficiently dramatic to warrant changes in leisure behavior.

5.5 Energy Attitudes and Concerns

A series of questions dealing with specific attitudes towards energy issues were asked. First, respondents were requested to indicate their level of concern with ten issues presently facing the people of British Columbia (Table 5.5). The issues which generated the most concern were inflation, energy costs, interest rates and taxation. Each of these issues have a strong economic component. Next in importance was unemployment followed by pollution, strikes, housing, energy shortages and resource ownership. Clearly, in a comparitive sense, energy scarcity is not viewed with a high level of concern.

Table 5.5
Issue Concern

Issue	Mean Score	Rank
Inflation	4.708	1
Energy Costs	4.496	2
Interest Rates	4.458	3
Taxation	4.447	4
Unemployment	4.389	5
Pollution	4.029	6
Strikes	3.906	7
Housing	3.759	8
Energy Shortages	3.739	9
Resource Ownership	3.460	10

Table 5.6
Perception of Shortages of Selected Energy Sources (%)

Energy Source	At Present	By 1985	By 1990	By 2000	Beyond 2000	Never	Don't Know
Coal	0.4	3.0	6.0	8.5	37.2	9.8	35.0
Heating Oil	3.0	8.0	17.7	24.9	16.5	3.4	26.6
Hydro Power	1.3	4.7	5.5	11.4	26.3	26.7	24.2
Natural Gas	2.5	3.0	7.2	13.6	34.3	11.4	28.0
Gasoline	3.0	8.5	17.9	23.8	17.0	4.3	25.5
Wood	1.7	3.8	8.1	17.9	22.2	23.1	23.1

This rather optimistic outlook regarding energy availability is also reflected in the respondents' perception of when energy shortages may occur. The questionnaire requested respondents to indicated when they thought British Columbia would face shortages of the following energy sources: coal, heating oil, hydro power, natural gas, gasoline and wood. As shown in Table 5.6, a significant number of respondents felt there would be ample supplies of energy until at least the year 2000 and less than a quarter of the sample felt that there was any overall serious threat to coal, hydro power, natural gas and wood supplies in the Province. Heating oil and gasoline supplies were perceived as being the most likely energy sources to be scarce with 28.7% and 29.4% of the sample respectively believing they would be in short supply by the year 1990. Furthermore, only 16.5% and 17.0% of the sample felt that heating oil and gasoline would not be scarce beyond the year 2000 compared to an average of 30.0% for coal, hydro power, natural gas and wood supplies.

A series of thirteen attitude statements were included in the questionnaire. Four of these statements were directly concerned with recreation and leisure as it affects and is affected by energy considerations and have been presented earlier (see Table 5.2). The remaining nine statements asked the respondents to indicate their level of agreement with the roles of government, individual action as well as with environmental issues and renewable energy (Table 5.7).

Collectively, these attitude statements provide a good summary of the respondents' perceptions and attitudes towards energy. Generally, respondents are not in favour of government action in terms of blanket taxation measures but seem to be more supportive of "user pay" policies. The general health and well-being of the environment still seems to be an important ideal even at the risk of energy scarcity; if energy extraction operations do upset the ecological balance in some way, the damage must be repaired on technology

Table 5.7
Attitude Statements

Statement	% Agree	Neutral	Disagree
Any energy problems B.C. faces can be met by appropriate government action	52.2	16.4	31.4
The provincial government should discourage high energy consumption by imposing taxes	14.5	15.4	70.0
B.C. should commit itself to developing renewable sources of energy such as, wood, solar and wind	87.4	9.1	3.5
Moderation in consumption at the individual level can contribute significantly to energy conservation	86.4	6.8	6.8
A drop in personal energy consumption will cause a reduction in the standard of living	28.1	10.5	61.4
There is no threat of an energy shortage, only a shortage of known and identified sources	49.6	22.8	27.6
Environmental quality may have to be sacrificed to guarantee adequate supplies of energy	25.9	16.1	58.0
The price of energy should reflect the cost of repairing environmental damage associated with energy extraction	61.9	27.8	10.3
Technology alone will provide solutions to energy and environmental issues	22.2	20.8	57.0

alone to solve energy dilemnas is not accepted as the majority of respondents believe individual action can make significant contributions to conserving energy without detrimentally affecting their lifestyles. As far as the future availability of energy is concerned, people in Victoria are generally optimistic and are more concerned about energy costs.

It was hypothesized earlier (5.3) that respondents' attitudes and concerns about energy may not be conducive to their adoption of energy conservation measures with respect to recreation and leisure activities. For example, one may expect respondents who believe that a drop in personal energy consumption would cause a reduction in their standard of living would adopt few, if any, recreation and leisure energy conservation measures. In order to determine statistically if associates between respondents' attitudes and perceptions toward energy were significant in explaining their adoption cr non-adoption of recreation and leisure energy conservation measures, crosstabulation analysis were undertaken.

None of the issue concern variables were statistically significant with the adoption of recreation and leisure conservation measures. Of particular surprise were the variables "energy cost concern" and "energy shortage concern". One might logically expect those respondents who were very concerned about energy shortages and costs to have adopted significantly more energy conservation measures. Furthermore, and again surprisingly, none of the "perception of shortages" variables were significant in a statistical sense with the recreation and leisure conservation practices. These results lend further support to our earlier assertion that leisure and recreation are important parts of peoples' lifestyles and should not be changed merely to affect energy conservation.

Of the seventy-two X^2 tests undertaken with the attitude statements presented in Table 5.7 and the recreation and

Table 5.8

The Adoption of Recreation and Leisure Energy Conservation Practices and Attitudes

	Vacation closer to home	Reduce recreation travel	Less energy intensive activities	Home based activities
If energy shortages occur, recreation travel should be severely limited		+		
An additional tax on high energy consuming recreation vehicles should be implemented to curtail their use				
Leisure activities are an important part of peoples' lifestyles and such acts should not be changed merely for energy purposes			+	
People should reduce vacation travel to conserve energy		+		

Table 5.8 (cont.)

	Fewer Vacations	Vacation 1 time and place	Public Transit	Total Adopted
If energy shortages occur, recreation travel should be severely limited				
An additional tax on high energy consuming recreation vehicles should be implemented to curtail their use				
Leisure activities are an important part of peoples' lifestyles and such acts should not be changed merely for energy purposes				
People should reduce vacation travel to conserve energy	+			+

+ significant at $p < 0.05$

Table 5.9

Attitudes Toward Leisure and the Total Number of Recreation and Leisure Energy Conservation Measures Adopted (%)

Statement	Number of Recreation and Leisure Practices Adopted		
Leisure activities are an important part of peoples' lifestyles and such acts should not be changed merely for energy conservation purposes	0	1-4	5-7
Disagree	13.8	30.0	56.3
Neutral	16.7	21.4	61.9
Agree	17.5	42.3	40.2

p = 0.0790

leisure energy conservation practices, only six resulted in statistically significant findings. In other words, only 8% of the test were significant which is too close to the "chance level" to allow substantive statements to be made.

The four attitude statements regarding recreation and leisure and energy use (see Table 5.2) were also crosstabulated with the recreation and leisure energy conservation practices. As shown in Table 5.8, five significant relationships emerged. The conservation practices of vacationing closer to home, undertaking more home-based activities, vacationing at one place and time and using public transit for recreation and leisure travel were not significant with any of the recreation and leisure attitude statements. Some of the statistically significant relationships which did emerge were contrary to what was expected. For example, a relationship was found between the statement that leisure activities are an important part of peoples' lifestyle and such acts should not be changed merely for energy conservation purposes and the conservation practice of changing to less energy intensive recreation activities. Just over half of those respondents disagreeing with the statement did not adopt the conservation practice compared to almost 70% who were in agreement. One may have presumed that respondents who believe that leisure activities are too important to be affected by energy considerations would adopt few, if any, recreation and leisure energy measures. Although when crosstabulated with the "total adoption variable" results did seem to indicate this trend may be prevalent, the results were not significant in a statistical sense (Table 5.9).

The results also show that the conservation practice of reducing recreation leisure travel and the attitude statement "if energy shortages occur recreation travel should be severely limited" were statistically significant. As may be expected, respondents who agreed with the statement adopted the conservation practice more than did the dissenters. And

finally, the attitude statement asking respondents if they agreed or disagreed that people should reduce vacation travel to conserve energy was significant with two conservation variables. First, respondents in favour of reducing recreation and leisure travel did in fact reduce their travel with respect to vacations and recreation. And second, the attitude statement was significant with the total recreation and leisure measures adopted variable: those believing that vacation travel should be reduced adopted more conservation measures than those who felt vacation travel should not be affected by energy considerations (Table 5.10).

5.6 Leisure Equipment Ownership

It was hypothesized earlier (5.3) that respondents who own expensive energy intensive recreation equipment may be unwilling to give up use of such equipment in order to conserve energy. To test this hypothesis, the questionnaire asked the respondents to indicate if they owned any of the following recreation equipment: snowmobile, sailboat with motor, motor boat, pick-up truck with camper, trail bike/dirt bike, fourwheel drive/all terrain vehicle, other recreational vehicle, cottage, and heated swimming pool.

As shown in Table 5.11, 54.0% of the respondents did not own any of this equipment while approximately 30% owned at least one item. The most popular equipment owned was "other recreational vehicle" (21.7%) followed by motor boats (16.6%). In order to evaluate if ownership was important in determining leisure behavior modifications, crosstabulation analysis were undertaken with the reported conservation practices adopted by the respondents (see Table 5.1). Instead of comparing each individual ownership variable with each leisure energy conservation practice, a "total equipment ownership" variable was created which grouped respondents into three categories:

(1) do not own;

Table 5.10

Attitudes Toward Vacation Travel and the Total Number of Recreation and Leisure Conservation Measures Adopted (%)

Statement: People should reduce vacation travel to conserve energy	Number of Recreation and Leisure Practices Adopted		
	0	1-4	5-7
Disagree	18.2	45.5	36.4
Neutral	15.8	29.8	54.4
Agree	13.6	22.7	63.6

p = 0.0096

Table 5.11

Ownership of Recreation Equipment

	%
Own no equipment	54.0
Snowmobile	0.4
Sailboat with motor	3.0
Motorboat	16.6
Pick-up Truck with Camper	5.1
Trailbike/Dirt bike	5.5
4-Wheel Drive/ATV	5.1
Other recreational vehicle	21.7
Cottage	8.5
Heated Swimming Pool	0.9

(2) own one piece of equipment;

(3) own two or more pieces of equipment.

This step was undertaken because the number of respondents indicating ownership was not sufficiently large to satisfy the prerequisites of crosstabulation analysis.

The results indicate that those who own leisure-related equipment tend to adopt fewer leisure conservation practices than non-owners, but the only statistically significant result showed that owners of equipment were less likely to adopt the practice of using public transportation for recreation and leisure travel: 27.4% of owners had adopted this practice compared to 41.7% of non-owners; $p = 0.0244$. The "total equipment ownership" variable was also crosstabulated against the issue concern variables, the attitude statements and the socio-economic characteristics of the sample. The only statistically significant result which emerged was one of the issue concern variables: owners of equipment were significantly less concerned about energy shortages (38.3%) while 47.2% of non-owners were very concerned ($p = 0.0546$).

While it may be concluded that there is some evidence which suggests that those who have purchased expensive leisure-related equipment are unwilling to give up its use merely for energy conservation purposes this conclusion is tenuous as, by and large, differences between owners and non-owners are not significant in a statistical sense.

5.7 Summary

The results presented here confirm some of those found in an earlier survey on Vancouver Island (Foster & Kuhn, 1981); namely that leisure behavior is relatively unresponsive to perceived current levels of energy supply. Evidence for this conclusion is based on the fact that individuals indicate that they have <u>not</u> changed leisure behavior in response to energy scarcity or price increases and that they are <u>unlikely</u> to make major changes if future shortages

materialize or energy prices increase.

Several hypotheses were generated to explain the reluctance to modify behavior. Evidence indicates that people see leisure as an integral part of their lifestyle and therefore, like occupation, should not be changed merely to effect energy conservation. Indeed, most respondents believe energy conservation can be achieved without affecting their lifestyle and standard of living. A second reason why individuals appear reluctant to change leisure behavior in response to energy scarcity/price increases is related to their level of concern expressed about energy issues. Although respondents expressed some concern about energy shortages, they are generally optimistic about future energy supplies. It is thus unlikely that individuals will modify leisure behavior in response to shortages which they do not believe will happen. Changes which have been made in areas such as household structures, shopping and travel behavior have likely been made in response to price increases and intensive advertising by government and utilities. With leisure, however, people generally seem willing to pay increased prices, especially if they own expensive leisure equipment. Furthermore, the "good life" advertising tends to stress the importance of leisure. Despite this conclusion, however, income was not significant, nor, with the exception of household status, were other socio-economic factors, in differientiating between individuals who had made leisure behavior changes and those who had not. This lends more weight to the important role which leisure plays in individuals' lifestyles, satisfying important needs.

CHAPTER VI

REVIEW OF FINDINGS: PART II

6.1 Introduction

The aim of this chapter is to explain the relative reluctance of respondents to alter their recreation and leisure behavior in response to energy conservation. As may be recalled, the adoption of these conservation practices was significantly lower than those relating to travel, shopping and household behavioral changes (see Table 5.1). Therefore, attention will now be directed to the final two hypotheses posited earlier. They are:

(1) individuals may underestimate, or not be aware of, the energy intensiveness of their recreation and leisure pursuits and hence do not perceive the need to modify these activities to conserve energy; and

(2) leisure activities participated in by individuals may not be energy intensive and therefore little change is possible.

This chapter will also discuss the formation and use of the Energy Leisure Lifestyle Index (ELLI) alluded to earlier (see Chapter 3.5).

6.2 Energy Leisure Lifestyle

This section will examine the hypothesis that individuals may underestimate, or not be aware of, the energy intensiveness of their recreation and leisure pursuits and hence do not perceive the need to modify these activities to conserve energy. To obtain the necessary information to test this hypothesis, the sample was asked to indicate their frequency of participation in 25 different recreation and leisure pursuits over the past 12 months (i.e. frequently, occasionally

Table 6.1

Frequency of Participation in Selected Leisure Activities

Activity	Frequently	Occasionally	Rarely	Never
Golf	4.2	11.7	11.7	72.4
Jogging	7.2	16.5	16.9	59.3
Tennis	3.0	13.6	7.2	76.3
Alpine Skiing	3.0	8.1	6.0	83.0
Outdoor Swimming	12.3	29.7	11.9	46.2
Movies/Concerts/ Theatre	16.5	36.9	23.3	23.3
Camping	10.5	23.6	14.8	51.1
X-Country Skiing	2.1	4.2	8.1	85.6
Gardening	52.5	27.7	8.0	11.8
Attend Cultural Events/Fairs	10.5	35.0	21.5	32.9
Motor Boating	5.0	12.6	16.0	66.4
Bicycle Riding	20.6	25.2	9.7	44.5
Driving for Pleasure	13.9	35.4	24.1	26.6
Attend Sports Events	14.8	19.4	20.7	45.1
Indoor Swimming	16.5	32.6	11.9	39.0
Sailing/Yachting	4.2	5.9	12.6	77.3
Skating/Curling	6.3	10.1	17.3	66.2
Hiking	14.3	22.4	13.9	49.4
Playing Team Sports	9.2	7.6	12.6	70.6
Squash/Handball	5.1	8.1	7.7	79.1
Watching Television	55.0	21.8	9.7	13.4
Fishing/Hunting	8.4	16.0	11.4	64.1
Socializing/ Visiting	54.6	35.3	2.9	7.1
Arts & Crafts/ Hobbies	34.3	30.1	12.3	23.3
Reading	65.0	27.0	5.9	2.1

rarely or never). The most popular activities engaged in frequently were reading (65.0%), watching television (55.0%) and gardening (52.5%) and the least popular activities in terms of non-participation were cross-country skiing (85.0%), alpine skiing (83.0%) and squash (79.1%) (Table 6.1).

While these data undoubtedly reflect recreation opportunities in the Victoria area, when used in conjunction with information on the energy intensiveness of specific activities, it is possible to develop an Energy Leisure Lifestyle Index (ELLI) for each respondent. By assigning values to reflect both the energy intensiveness of leisure activities and the frequency of participation in these same activities, a composite score can be developed to indicate, in a comparative sense, the energy used by an individual for any activity during the last twelve months. The calculation is provided in Table 6.2. High, medium and low energy intensive activities are given the subjectively derived values, of 3,2, and 1 respectively and activities participated in frequently, occasionally, rarely or never are given values of 5, 3, 1 and 0 respectively. A high energy intensive activity (i.e. motorboating) participated in frequently would be assigned a score of 15 (3x5), while a low energy intensive activity (i.e jogging) participated in occasionally would be assigned a score of 3 (1x3).

Using this matrix, activity specific scores can be established, which, if added together, give a total score which represents the Energy Leisure Lifestyle Index (ELLI) for each individual:

i.e. $ELLI = \sum E_i P_i$;

where E_i denotes Energy Intensiveness of activity "i"

and P_i denotes Frequency of Participation in activity "i".

While this index is somewhat arbitrary in terms of values allocated to its different components, it does allow general comparisons to be made among individuals in terms of energy leisure lifestyle. The maximum value that can be achieved is

Table 6.2

Matrix for Computing Energy Leisure Lifestyle Index (ELLI)

			Energy Intensiveness Values		
			High (3)	Medium (2)	Low (1)
Frequency of Participation Values	Frequently	(5)	15	10	5
	Occasionally	(3)	9	6	3
	Rarely	(1)	3	2	1
	Never	(0)	0	0	0

Note: The values derived from this matrix are for comparative purposes and reflect the "objective intensiveness" of recreation and leisure activities only insofar as the development of ELLI is based on experts' judgemental decisions of the energy inputs required to participate in various activities.

260 (frequent participation in all 25 activities) and the minimum value is 0 (no participation in any of the 25 activities). In reality, however, the actual range was 16 - 180 (Figure 6.1).

A second subjective index was developed in a similar manner using "perceived energy intensiveness of leisure activities". Each respondent was asked to rate the total energy intensiveness of the 25 activities in terms of high, medium and low. The results of this exercise are given in Table 6.3 which compares perceived with objective energy intensiveness by specific activity. These results indicate that the respondents tend to underestimate the energy intensiveness of all activities, especially those in the objectively high energy category. For example, only 24.3% of the sample rated "fishing and hunting" as high energy intensive activities while 28.4% rated these activities as moderate with the remainder (47.3%) rating, them as low, Similarly, almost half of the respondents (47.8%) rated indoor swimming as a low energy intensive activity while according to the objective index, it is a medium energy intensive activity.

By comparing the objective ELLI with the subjective ELLI, it can be clearly seen that respondents consistently underestimate the energy intensiveness of all activities and not just those in the objectively high energy category. For this analysis, ELLI scores of less than 51 were rated low and scores greater than 100 were rated high for both the objective and subjective indices. Figure 6.2 compares the two indices which are significantly different ($X^2 = 8.01$, $p<0.05$). In fact, 84.4% of the respondents underestimated the energy intensiveness of their leisure lifestyle. These results provide empirical support for the hypothesis that individuals do not modify leisure behavior in response to energy scarcity because they underestimate the energy intensiveness of their leisure activities.

Variations in leisure conservation practices adopted,

Figure 6.1
Frequency Distribution of E.L.L.I. Scores

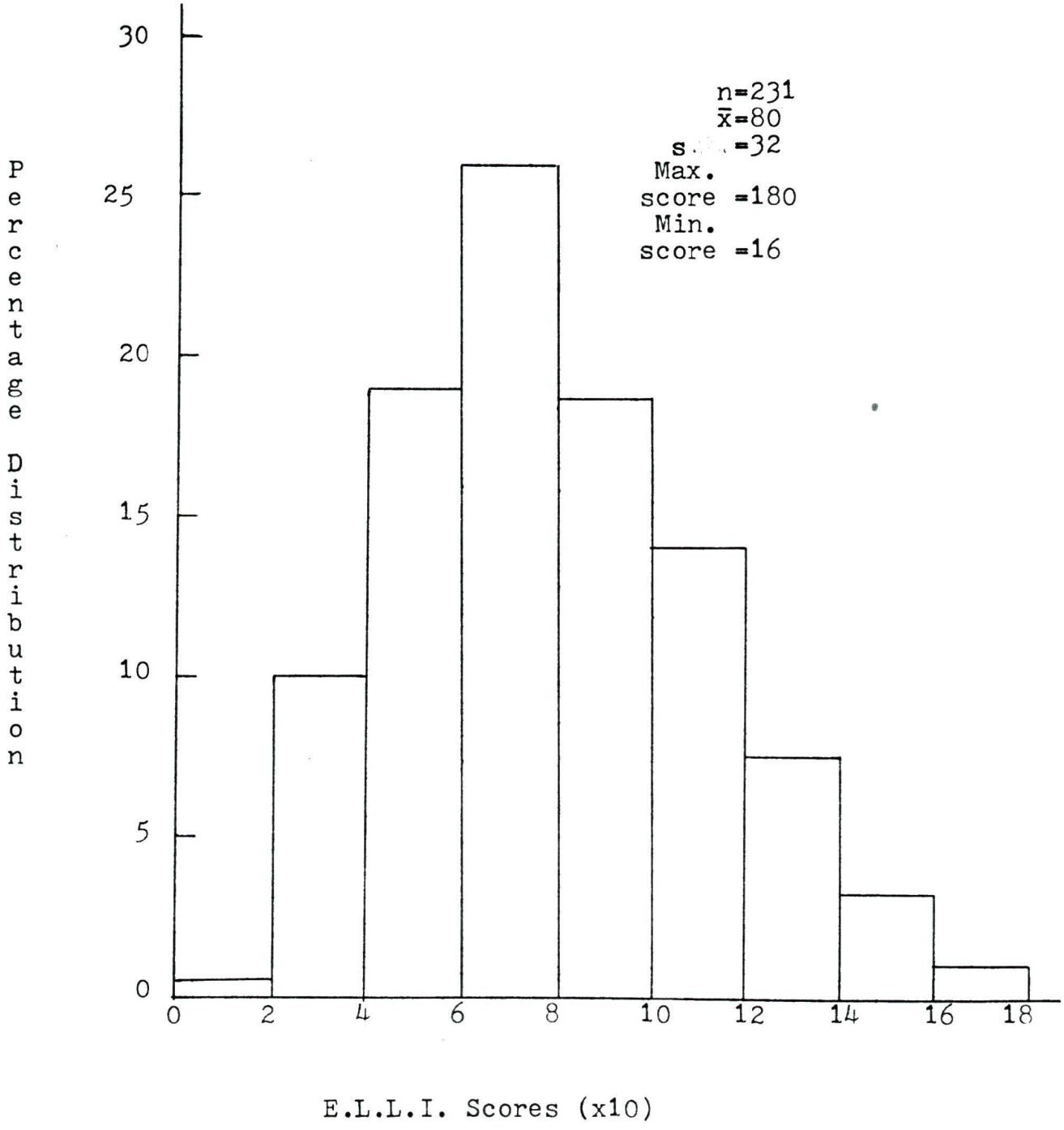
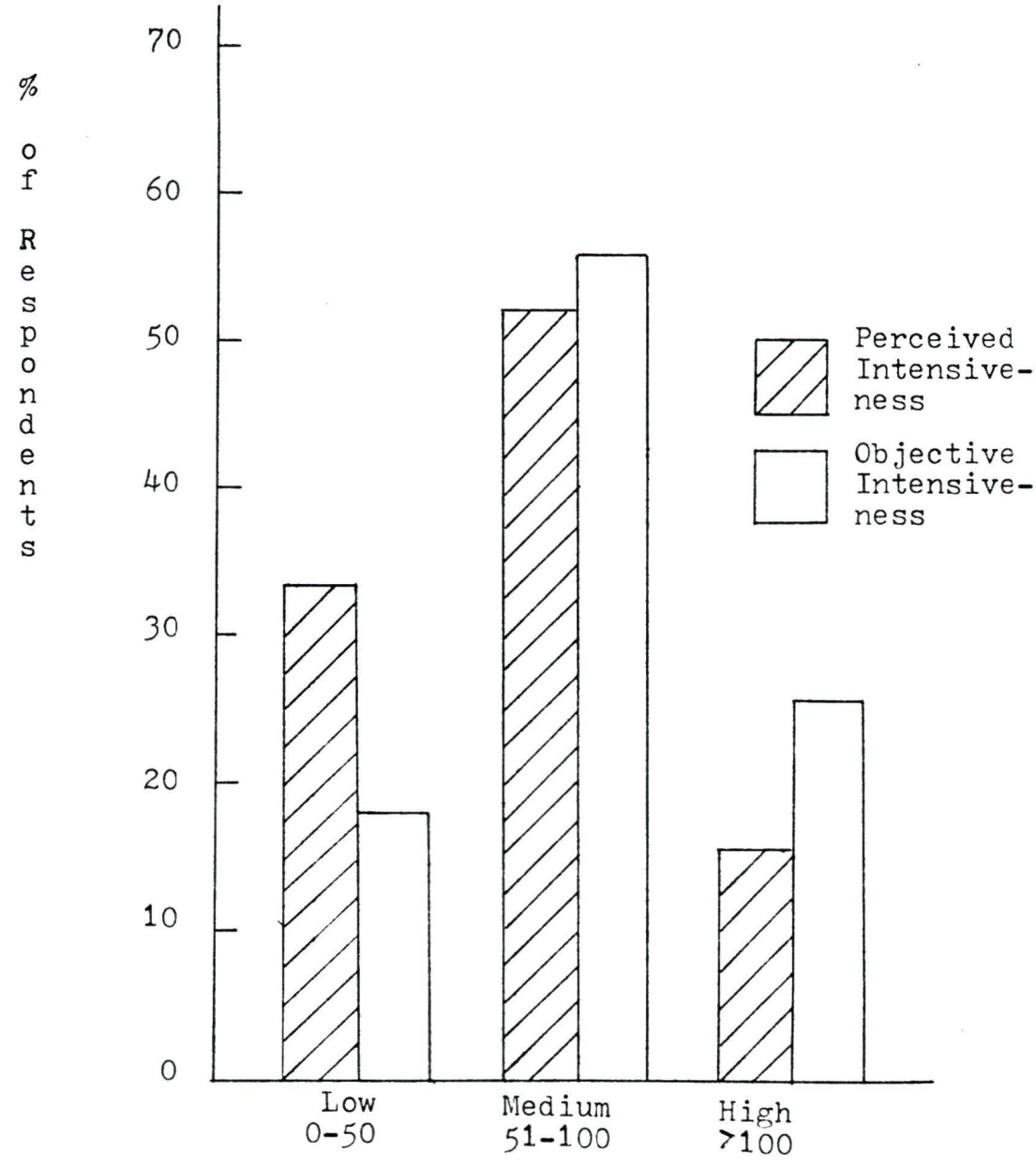


Table 6.3

The Perceived Energy Intensiveness of 25 Recreation and Leisure Pursuits

Energy Intensiveness (Table 3.3)	Activity	Perceived Energy Intensiveness % High	Medium	Low
High	Golfing	2.2	15.5	82.3
	Alpine Skiing	29.8	21.1	49.1
	Camping	21.5	30.5	48.0
	Motor Boating	58.3	14.3	27.4
	Driving	45.4	29.7	24.9
	Sailing	13.7	23.6	62.7
	Fishing/Hunting	24.3	28.4	47.3
Medium	Outdoor Swimming	8.7	11.0	80.3
	Movies, etc.	22.0	28.0	50.0
	X-Country Skiing	16.2	15.6	68.1
	Cultural Events	8.8	31.9	59.3
	Sports Events	17.8	32.2	50.0
	Indoor Swimming	27.8	24.4	47.8
	Skating	20.5	25.9	53.6
	Hiking	5.8	11.0	83.2
	Team Sports	6.0	21.6	72.5
	Squash	11.1	21.0	67.9
	Television	27.1	22.6	50.3
	Socializing	7.9	29.2	62.9
	Reading	3.4	12.3	84.2
Low	Jogging	3.9	2.8	93.3
	Tennis	4.2	5.4	90.4
	Gardening	4.5	9.5	86.0
	Bicycling	6.4	4.6	89.0
	Arts & Crafts	2.7	17.2	80.1

Figure 6.2
Perceived Vs. Objective Energy Leisure Lifestyle Index



attitudes towards energy and perceptions of energy concern and availability, as well as the objective and subjective ELLI scores were measured using X^2. The intent here was to discern if systematic differences were apparent between respondents with high ELLI scores and those on the lower end of the scale.

No statistically significant results emerged with the subjective ELLI scores and the perception, attitudinal or conservation practices adopted variables. As far as the objective ELLI scores were concerned, no statistically significant results emerged with the perception or conservation practices adopted variables. However, two relationships were apparent with the attitudinal statements. First, respondents whose ELLI score was low were generally in favour of limiting recreation travel in the event of energy scarcity while those with a high ELLI score voiced stronger objection ($p = 0.0034$; Table 6.4). The second significant relationship involved the attitude statement: a drop in personal energy consumption will cause a reduction in the standard of living. Results show that respondents with high ELLI scores disagreed with this statement more than respondents with low scores (62.5% compared to 37.1%; $p = 0.0149$; Table 6.5). These results lend support to the argument that individuals do not modify leisure behavior because they underestimate the energy intensiveness of their activities. Respondents with high ELLI scores disagree with the latter statement because they are not aware of the fact that their leisure activities are highly energy intensive and, as previously noted, almost all of the respondents (84.4%) underestimated the energy intensiveness of their leisure lifestyle. Furthermore, respondents with low ELLI scores agree with the statement that less energy consumption will cause a reduction in their standard of living because they may participate in only a few, low energy intensive activities. As even these activities are perceived as consuming less energy than they actually do (i.e. perceived vs. objective ELLI scores, Figure 6.2), a drop in energy

Table 6.4

Attitudes Towards Recreation Travel and ELLI Scores (%)

Statement: If energy shortages occur, recreation travel should be severely limited	ELLI Scores Low	Medium	High
Agree	51.4	26.2	33.9
Neutral	25.7	27.8	10.7
Disagree	22.9	46.0	55.4

p = 0.0034

Table 6.5

Attitudes Towards Personal Energy Consumption and ELLI Scores (%)

Statement: A drop in personal energy consumption will cause a reduction in the standard of living	ELLI Scores Low	Medium	High
Agree	48.6	22.0	25.0
Neutral	14.3	9.4	12.5
Disagree	37.1	68.5	62.5

p = 0.0149

consumption would mean that these respondents would have to participate in even fewer low energy activities.

From the above analysis, we may conclude that the hypothesis initiated earlier that individuals may not modify their leisure behavior in order to conserve energy because they underestimate, or are not aware of, the energy intensiveness of their leisure lifestyle, is valid. As we have seen, the vast majority of respondents underestimated the energy requirements needed to fulfill their leisure lifestyle. The fact that no significant relationships resulted with the energy conservation behavior variables runs counter to what was expected. This rather anomolous result necessitates that further analysis be undertaken, namely, that the characteristics of the respondents for each energy category must be examined in detail as well as the number of activities each group participates in. Hence, the following section will examine the final hypothesis: leisure activities participated in by individuals may not be energy intensive and therefore little change is possible.

6.3 Respondents' Characteristics and ELLI Scores

6.3.1 Introduction

Before we proceed with our analysis of the final hypothesis, a new classification of respondents according to their Energy Leisure Lifestyle Index will be introduced. As noted earlier, categorization of individuals into high, medium and low is based on the somewhat arbitrary division using the range of ELLI scores. This method was employed in order that both the objective and subjective indices could be classified and compared based on the same criterion. However, our present investigation is not concerned with the subjective index and a more mathematically rigorous method of classifying respondents into various energy intensive categories will be undertaken.

The observed range of ELLI scores is 16 - 180 with a total

of 228 valid cases making up the sample, The mean of this distribution is 79.96 and the standard deviation 32.50. The distribution appears normal (Figure 6.1) so it is practical to use the mean as a base; one standard deviation on each side of the mean will represent the two middle classes of energy intensiveness while the remainder at each extremity will represent the low and high categories. The four new categories will thus be:

	Low	Low/Medium	Medium/High	High
ELLI scores	16-48	49-80	81-112	113-180
	n=36	n=89	n=65	n=37

This mode of taxonomy will be utilized for the remainder of this paper as it allows more precise analysis to be made.

6.3.2 Participation Rates

The hypothesis we wish to test is that leisure activities participated in by individuals may not be energy intensive and therefore little change, in terms of energy conservation, is possible. The first step in the analysis, therefore, is to determine if there is a distinct pattern of participation among the four classes of respondents according to their ELLI scores. This was accomplished by crosstabulating the ELLI categories by each recreation and leisure pursuit. Respondents who indicated they undertook an activity frequently, occasionally or rarely were designated as participants. The results of this exercise are presented in Table 6.6. Respondents in the low and low/medium ELLI groups participate mainly in the low and medium energy intensive activities whereas those in the medium/high and high categories have a much more diverse pattern of participation. Only the activities reading and gardening had high rates of participation for all ELLI groups (i.e. greater than 75%). A more succinct representation of participation rates by ELLI scores is given in Table 6.7 which provides the average rate of participation per

Table 6.6
Activity Participation and ELLI Scores

Energy Intensiveness (Table 3.3)	Activity	ELLI Score Category % Low	Low/Medium	Medium/High	High
High	Golfing	18.9	13.5	36.8	59.5
	Alpine Skiing	5.6	9.0	19.1	47.2
	Camping	13.9	37.1	67.6	86.5
	Motor Boating	5.4	25.8	42.6	70.3
	Driving	27.8	79.8	89.7	86.5
	Sailing	2.7	11.2	33.8	54.1
	Fishing/Hunting	13.9	28.1	47.1	62.2
Medium	Outdoor Swimming	13.9	40.4	77.9	89.2
	Movies, etc.	47.2	72.7	94.1	97.3
	X-Country Skiing	5.7	10.1	16.2	32.4
	Cultural Activities	27.8	69.7	79.4	89.2
	Sports Events	10.8	48.3	74.6	89.2
	Indoor Swimming	16.7	52.8	82.1	97.3
	Skating	0.0	21.3	51.5	70.3
	Hiking	8.1	41.6	69.1	91.7
	Team Sports	2.7	13.5	47.1	67.6
	Squash	2.8	10.1	25.8	59.5
	Television	70.3	87.6	91.2	94.6
	Socializing	73.0	94.4	100.0	100.0
	Reading	97.3	96.1	100.0	100.0
Low	Jogging	2.8	28.1	61.8	76.7
	Tennis	0.0	16.9	30.9	54.1
	Gardening	78.4	86.5	95.6	97.3
	Bicycling	21.6	47.2	72.1	89.2
	Arts & Crafts	65.7	96.4	80.9	89.2

objectively high, medium and low energy intensive activity. This table clearly demonstrates that respondents with low ELLI scores participate, on average, in very few high energy intensive activities (12.6% participation rate) and their rate of participation increases as the energy intensiveness of the activities decreases. Furthermore, the Table reveals that as respondents' ELLI scores increase, their rate of participation in all activities increases. For example, 83% of respondents with high ELLI scores participate in medium energy intensive activities compared with only 29% of respondents with low ELLI scores ($p = 0.0000$).

The above analysis indicates that a relationship between participation and ELLI scores is apparent. In order to determine the strength of this relationship crosstabulation analysis was undertaken. The twenty-five recreation and leisure activities presented in the questionnaire were divided into five equal categories. As presented in Table 6.8, a strong correlation does in fact exist ($p = 0.0000$). None of the respondents who participated in less than five activities are in the medium/high of high ELLI range. In fact, the vast majority (87.5%) of these respondents are in the low ELLI category. Conversely, 95.8% of respondents participating in 21 to 25 activities have ELLI scores in the medium/high and high range.

It can now be stated that leisure activities participated in by some individuals are not energy intensive and therefore little change is possible: thus verifying the hypothesis proposed earlier. Having determined this, analysis must proceed towards identifying the characteristics of respondents in the various ELLI and participation rate categories. This information will allow us to distinguish the attributes of individuals and households whose leisure lifestyle is energy intensive (i.e. those in the medium/high and high ELLI range).

Table 6.7
Activity Participation and ELLI Scores (Averages)

Activity Energy Intensiveness	ELLI Scores Low	Low/Medium	Medium/High	High
High	12.6	29.3	48.1	66.7
Medium	29.0	50.7	70.0	83.0
Low	33.7	55.0	73.3	81.1

p = 0.0000

Table 6.8
Relationship Between Number of Activities and ELLI Scores (%)

Number of Activities	ELLI Scores Low	Low/Medium	Medium/High	High
0 - 5	87.5	12.5	0	0
6 - 10	46.2	53.8	0	0
11 - 15	5.3	60.0	30.7	4.0
16 - 20	0	20.0	51.5	27.9
21 - 25	0	4.2	37.5	58.3

p = 0.0000

6.3.3 Participation and Socio-Economic Characteristics

Crosstabulation analysis was undertaken with the four ELLI categories and the eight socio-economic variables presented in the questionnaire. As can be seen from Table 6.9, the variables age, household size, employment, education and income were all statistically significant at the $p < 0.01$ level. A profile of respondents with low ELLI scores reveals that the majority are greater than 55 years of age (61%), have less than 3 members in their household (60%) and almost half (47%) are retired. Also, the majority of respondents in this category do not have more than a secondary education (60%) and have annual incomes of less than 20,000 dollars (86%). In contrast, respondents with high ELLI scores tend to be younger (46% are less than 34 years of age), have larger households, and 64% have children. Furthermore, 60% of these respondents have some university education or have graduated from university and have annual incomes of more than 30,000 dollars (52%).

The same analysis was undertaken but this time the number of activities respondents participated in was crosstabulated with their socio-economic characteristics. The results (Table 6.10) are similar to those presented above. This time, however, the socio-economic variable "number of children under the age of 17" was significant at the $p < 0.01$ level in addition to the variables age, household size, employment, education and income. Also, as the number of activities were broken down into five categories, a more precise classification of respondents emerged. For example, respondents who participated in five or less activities (i.e. with low ELLI scores) are generally older than 55 (79%), have small households (62% with less than 2 members), have no children (77%), are retired (54%), have low levels of formal education (64% with secondary of less) and earn less than 20,000 dollars annually (91%).

A summary of Tables 6.9 and 6.10 reveals that respondents who

Table 6.9

Characteristics of Respondents by ELLI Scores[1]

ELLI Scores	Age*	House-hold* Size	Number under* 17 years of age	Home Ownership
Low	61% greater than 55	60% 2 or less	67% no children	47% rent
Low/Medium	Even	49% 2 or less	56% no children	33% rent
Medium/ High	54% greater than 34	47% with 3-4	50% no children	33% rent
High	56% greater than 34	50% with 3-4	36% no children	36% rent

ELLI Scores	Employment*	Education*	Income*	Sex
Low	47% retired	60%second-ary or less	86% less than 20,000	68% Female
Low/ Medium	28% retired	Even	34% less than 20,000	51% Female
Medium/ High	12% retired 26% profe-ssional 34% other	Even	21% less than 20,000	46% Female
High	6% retired 25% profe-ssional 36% other	33% some univer-sity 27% univer-sity graduates	52% more than 30,000	45% Female

1 Figures rounded to nearest while number

* Chi Square Significant at $p < 0.01$

Table 6.10

Characteristics of Respondents By Number of Activities[1]

Number of Activities	Age*	House-hold* Size	Number under* 17 years of age	Home Ownership
0 - 5	79% greater than 55	62% less than 2	77% with no children	29% rent
6 - 10	72% greater than 55	61% with 1-2	72% with no children	36% rent
11 - 15	56% greater than 34	49% with 1-2 11% with more than 5	59% with no children	35% rent
16 - 20	54% less than 34	50% with 3-4	34% with no children 44% with more than one child	35% rent
21 - 25	71% less than 34	50% with 3-4 34% with more than 5	25% with one child 34% with more than one child	42% rent

Number of Activities	Employment*	Education*	Income*	Sex
0 - 5	54% retired	64% second-ary or less	9% less than 20,000	68% Female
6 - 10	60% retired	48% second-ary or less	68% less than 20,000	55% Female
11 - 15	19% retired	Even	72% more than 20,000	49% Female
16 - 20	3% retired	Even	78% more than 20,000	50% Female

Table 6.10 (cont.)

Number of Activities	Employment*	Education*	Income*	Sex
21 - 25	4% retired 18% students 18% home-makers	21% some university 29% university graduates	50% more than 30,000	52% Female

1 Figures rounded to nearest whole number

* Chi Square significant at $p < 0.01$

participated in many activities and have high ELLI scores are, by and large, young, have active families, are well educated and have relatively high annual incomes, whereas respondents with low participation rates and low ELLI scores are older, generally retired, less formally educated and earn less than 20,000 dollars annually.

From the above analysis the hypothesis initiated earlier may be accepted: leisure activities participated in by individuals may not be energy intensive and therefore little change is possible with respect to conserving energy. However, this is only valid for part of the sample; namely those with low and low/medium ELLI scores and low participation rates (less than 10 activities). Respondents in the medium/high and high categories not only participate in high, medium and low energy intensive activities, but they participate much more frequently in these activities than do respondents in the low ELLI groups. Therefore, if energy conservation in the area of recreation and leisure is to be effected, it will have to be undertaken by selected segments of society (i.e. young individuals and families, etc.). However, as Table 6.11 indicates, recreation and leisure energy conservation practices have been adopted by respondents in all ELLI classes at approximately the same rate. In other words, no statistically significant differences were found between the adoption of these conservation practices and respondents' ELLI scores.

6.4 Summary

The results indicate that the adoption of energy conservation measures with respect to recreation and leisure is not viable for a specific segment of the population of Victoria, namely those older respondents with lower incomes. Further, cuts in energy consumption may be possible, and perhaps eventually necessary, for younger individuals and families with high incomes. Even though this latter group has adopted some leisure energy conservation practices, they still consume

Table 6.11

Adoption of Recreation and Leisure Energy Conservation Practices by ELLI Scores

Conservation Practices	ELLI Scores			
	Low	Low/Medium	Medium/High	High
Vacation closer to home	34.4	54.0	56.7	55.6
Reduce recreation travel	46.9	46.0	42.4	40.5
Change to less energy intensive recreation activities	20.0	41.4	39.1	50.0
Undertake more home-based leisure activities	56.7	60.9	60.8	62.3
Take fewer vacation trips	53.1	55.2	58.5	48.6
Vacation at one time and place	29.0	33.3	36.9	37.8
Use public transportation for recreation and leisure travel	48.5	31.0	23.9	45.9

relatively high amounts of energy to satisfy their leisure lifestyle. The work already undertaken by Ritchie (1981) in the area of motivation, satisfaction and substitutability of leisure pursuits may perhaps provide important insights into the reduction of energy useage for recreation and leisure pursuits. Ritchie has suggested that leisure behavior changes may not be possible because of other motivational factors or because satisfactions can not be readily substituted. Motivations for and satisfactions gained from motor boating, for example, may be entirely different than those associated with a low energy activity such as bicycling. In this instance individuals are unlikely to substitute the low energy activity for the high energy activity and as we have seen earlier, respondents are reluctant to modify their leisure lifestyle generally, and even less so to effect energy conservation.

Results from the analysis presented in this chapter indicate that individuals particularily underestimate the amount of energy used in pursuing high energy intensive leisure activities. Furthermore, a comparison of the objective and perceived Energy Leisure Lifestyle Indices shows that the energy component of leisure activities is consistently underestimated for all leisure activities. Given this result, it is hardly surprising that relatively few changes in leisure behavior have occurred and that individuals feel that future energy price increases will not drastically affect their leisure lifestyle. However, there was no significant variation between reported leisure behavior change and energy intensiveness of leisure lifestyle, either perceived or objective. Logically, one might expect that individuals with a low index score would be more likely to have changed recreation behavior for energy considerations than those with high index scores. The insignifance of this relationship is related to the characteristics of low index score individuals who tend to be older and retired on fixed incomes. Therefore, many of their leisure activities are already low in energy use and leisure behavior changes

would be unlikely to lower the index score.

It must be noted that the Energy Leisure Lifestyle Index, as developed, is limited in several respects. First, the energy intensiveness of recreation and leisure activities is based on other authors' classification schemes which were derived, in part, on a judgemental basis. Thus, what is referred herein as the "objective index" must be viewed in this context. The index is objective only insofar as it is based on "experts" subjective assessments of the energy requirements used in pursuing various activities. Second, arbitrary scores are given for energy intensiveness and frequency of participation used in developing the indices for this thesis. The values used are intended to provide a basis for comparison only and are not grounded in rigorous mathematical principles. Third, since only twenty-five activities were included in the questionnaire many important activities that may be peculiar to Victoria may have been omitted and the energy intensiveness of activities such as golf or sailing may have been overestimated because of the numerous local opportunities available. Furthermore, the mild climate of Victoria may reduce energy consumption involved in the maintenance and operation of certain facilities such as golf courses and swimming pools. The problem of allocating energy consumption requirements to an individual activity in a non-specific context has already been mentioned (see Chapter III).

Despite the problems encountered, the Energy Leisure Lifestyle Index is a useful concept. What is needed is a better method of calibration. This could be achieved by undertaking longitudinal case studies of individuals and attempting to measure actual or relative energy consumed in all leisure pursuits. At the same time, more research is required into measuring individuals' perceptions of energy consumed by different leisure activities. For example, given the consistent underestimation of the relative energy intensiveness of all activities, it is quite possible that

only the most obvious phases of an activity, i.e. travel and on-site, are considered by individuals as contributing to energy consumption for any particular activity. Facility operation and maintenance, for example, are probably not included as energy consumed is hidden or indirect.

CHAPTER VII

CONCLUSION

7.1 Summary and Discussion

This study was undertaken as a continuation of earlier research conducted by the author. In particular, the studies done in Ladysmith, British Columbia and the Cowichan Valley Regional District on the adoption of energy conservation practices of individuals and households produced results which could not be explained from the data collected at that time (Foster & Kuhn, 1981). Specifically, the reason for the relatively low rate of adoption of recreation and leisure energy conservation practices compared to other general areas of conservation could not be accounted for. This thesis, therefore, attempted to replicate part of the earlier study to determine if the pattern of energy conservation behavior would be consistent with that of Ladysmith and to explain this pattern. As we have seen earlier (Table 5.1), the adoption rate of energy conservation practices was almost identical in both studies, the only difference being the average adoption rates in the Victoria Survey were slightly higher in each case. The major aim of this paper, therefore, is to study the interrelationships between attitudes, perceptions and behaviors towards energy consumption/conservation and recreation and leisure pursuits.

The methodological framework used in this study is an extension of that initially developed in the field of natural hazard research. As was reviewed in chapter II, the behavioral tradition developed early in hazard studies and the theory of decision making propounded by H. Simon (1975) and the model developed by R. Kates (1962) are still useful. It may be recalled that Simon argued that the decision-maker's model of the world encompasses only a portion of all the relevant characteristics of the real environment and

his inferences extract only a minute fraction of all the information that is present even in his model. In other words, individuals are not viewed as "rational" decision makers, aware of all possible choices but rather, information will not be perfect and given but must be actively sought. Robert Kates (1962) expanded Simon's theory and developed a model which has wide applicability to resource management studies. His model is particularly useful as a basis for arguing that the behavioral methodology as employed in hazard research can be useful for studies dealing with energy conservation (chapter 3.2). This latter argument is well developed by Jackson (1978, 1980a) who points out the conceptual similarities between natural hazards and energy scarcity: both of which may be viewed as "negative resources". Furthermore, behavior toward these negative resources will depend on the decision-makers' perceptions and attitudes toward the resource specifically and the environment generally as well as myriad other factors. As a result of these similarities it is possible to generate hypotheses with respect to energy conservation studies which are derived from conclusions reached from hazard research. This is what the present study has attempted.

Research into the interrelationships between leisure and energy consumption is at an early stage. Most attention to date has focused on the travel component of recreation and leisure behavior (chapter 3.4). However, some useful research is emerging, particularly in terms of developing an index of energy intensiveness for a variety of leisure activities. This thesis has not only attempted to improve on the formulation of an index, but has also attempted to empirically test it and in a sense, base it on actual data (i.e. respondents' participation rates and perceptions of energy intensiveness).

As a result of reviewing the relevant literature with respect to natural hazards and energy conservation, and the

earlier study undertaken by the author, six hypotheses were generated and tested in order to gain insight into the relationships between leisure activities and energy consumption. These will now be reviewed in detail.

(1) Leisure is an important part of peoples' lifestyle and should not be changed merely to effect energy conservation.

This hypothesis was accepted based on a number of results. First, the adoption of recreation and leisure energy conservation practices was consistently lower than conservation measures pertaining to travel, household and shopping behavior. Second, a quarter of the sample indicated they would not alter their leisure behavior even if the price of energy were to double. The majority of respondents also agreed with the attitude statement that leisure activities should not be altered for energy conservation purposes. Furthermore, the majority of respondents did not believe that recreation travel should be limited in the event of energy shortages nor should people reduce vacation travel to conserve energy.

These results provide some insights into the interrelationships between energy consumption and leisure activities. Even though the pursuit of leisure-time activities may be viewed as being discretionary, the determination of respondents not to alter them to effect energy conservation is apparent.

(2) Socio-economic factors may predispose respondents to be immune to leisure changes because of energy scarcity.

The socio-economic characteristics of the sample, by and large, did not appear to affect the adoption or non-adoption rates of leisure energy conservation practices. This conclusion runs counter to what was expected. For example higher income groups have been consistently shown to be less affected by energy price changes or scarcity (Corsi & Harvey, 1979, Becker et al., 1976, Jacobs & Foster, 1980). However,

in this study, income was significant with only one leisure conservation practice; increased use of public transportation for recreation and leisure travel. It was also believed that the stage in the family lifestyle would be a significant variable but "household size" was not statistically significant with any leisure conservation practices while the "number of children" variable was significant only with one practice, that of vacationing at one time and place.

With respect to the adoption of travel, household and shopping conservation practices, the results obtained were more in line with what was expected. For example, the variable "occupancy" was significant with the practices of increasing insulation levels, installing weather stripping and installing storm doors and windows. In all cases, homeowners adopted these measures much more frequently than did renters.

The statistical insignificance of socio-economic variables with respect to recreation and leisure conservation practices may be viewed as reinforcing the earlier conclusion that leisure activities are an important part of peoples' lifestyles and will not be changed to effect energy conservation.

(3) Respondents' attitudes and concerns about energy may not be conducive to their adoption of energy conservation measures.

This hypothesis was rejected on the basis of insufficient statistical evidence resulting from the crosstabulation analysis undertaken earlier. Some significant relationships were found; for example, respondents who agreed with the statement that moderation in consumption at the individual level can make significant contributions to energy conservation did adopt more leisure-related practices than those disagreeing. Generally, however, attitudes did not translate into behavior, as measured by the number of conservation practices adopted. The reason for this discrepancy may be due to the

relatively optimistic outlook the respondents had concerning energy availability. Earlier evidence (see Tables 5.5 and 5.6) of concern over energy shortages was ranked ninth out of ten issues. This optimistic outlook was also reflected in the respondents' perception about the future availability of a variety of energy sources; the majority believed that there were adequate supplies of energy until at least the year 2000. Farhar et al (1980) report similar findings. In other words (p.143): "Energy is not viewed as a problem of most or least importance but falls somewhere between relative to all problems of national concern".

The lack of correlation between attitudes and behaviors has been found in other studies (for example: Jackson, 1980c, Jacobs & Foster, 1980, Sadler, 1980, McDougall et al., 1981, O'Riordan 1976a). Nevertheless, the attitude statements are not without value. Collectively, they provide a good summation of the respondents' stated attitudes toward energy resources. Respondents in this study were optimistic over the supply of energy but they also supported individual conservation efforts and believed strongly in the development of renewable resources.

(4) Respondents who own expensive energy intensive recreation equipment may be unwilling to give up its use for energy conservation purposes.

Statistical evidence was not sufficient to allow this hypothesis to be accepted. This result is surprising in that it may be presumed that ownership of energy intensive equipment for discretionary activities would be affected immediately by increased energy costs. The large number of respondents (54%) indicating they did not own any of the pieces of equipment listed in the questionnaire may have affected the outcome.

(5) Individuals may underestimate, or not be aware of, the energy intensiveness of their recreation and pursuits and hence do not perceive the need to modify these activities

to conserve energy.

To test this hypothesis, an Energy Leisure Lifestyle Index (ELLI) was formulated based on the respondents' participation rates and energy intensiveness of the recreation and leisure activities they participated in. The derivation of "energy intensiveness" was obtained from a review of the literature (see chapter 3.5). A second index was developed using the respondents' own assessment of the energy intensiveness of leisure activities. In this way, "objective" and "subjective" measures were made available. A comparison of the indices (Figure 6.2) reveals that respondents consistently underestimate the energy requirements to fulfill their leisure lifestyle. This clearly shows the hypothesis was accepted.

(6) Leisure activities participated in by individuals may not be energy intensive and therefore little change is possible.

This hypothesis was valid for a segment of the population sampled. Namely, respondents with low ELLI scores participated in only a few high energy intensive activities. As respondents' ELLI scores increased, their participation in high, medium and low intensive activities increased. Respondents with low ELLI scores were identified as being older, generally retired, less educated and have relatively low annual incomes. Hence, energy policies designed to reduce consumption with respect to leisure activities, need not address this segment of the population. Rather, conservation policies should be directed toward those in the younger age groups, generally young families with children, who earn more than $30,000 annually.

Some of the limitations and problems encountered with this thesis should be discussed. First, the population sampled for this study does not exactly mirror the characteristics of the entire population of Victoria. For example, adult females are underrepresented and respondents in the higher

income levels are overrepresented as are those with higher levels of formal education. There are at least three factors which may explain this discrepancy. First, it has already been mentioned that some minor points of the sampling method could have been improved (see chapter IV) such as using a more up to date list of Victoria residents and including those households with unlisted telephone numbers. A second reason may have been the relatively small number of households sampled. Only 0.01% of the population of Greater Victoria were included in the sample. The third reason for the discrepancy is related to the fact that individuals under the age of eighteen were not included in the sample and as a result only 70% of the population of Victoria were considered. Thus, the census data must be adjusted in order that a more representative comparison can be made which would reduce the apparent inconsistencies.

A second limitation of this present study is related to a problem encountered with all questionnaire surveys, namely that respondents' stated behavior is being measured rather than their actual behavior. This problem has been discussed earlier (see chapter II and III). As a result, the findings reported here, as in similar research, must be viewed in that context. Generally, this type of research should not be the sole criterion for policy making but should be used in conjunction with other data. Research of this nature is often most useful in mentioning present policy particularly in indicating gaps or weaknesses and offering information which may be useful for its improvement.

Third, there are problems associated with the formation and use of the Energy Leisure Lifestyle Index (see chapters III and VI). As pointed earlier, the index is based on other authors' judgemental and perhaps simplistic assessments of the various energy inputs required to participate in different recreation and leisure pursuits. This study has attempted to empirically test the index and to determine

its validity and usefulness in a general sense. The use and development of the Energy Leisure Lifestyle Index was not intended to be site-specific although Victoria's unique climate and recreation opportunities are reflected in the data. For example, the least popular activities in terms of non-participation reported by the sample were cross-country and alpine skiing. One may not expect this to be the case elsewhere in the country.

And finally, the statistical analyses employed in this thesis should be discussed. The major "statistical tool" used was crosstabulation (X^2) analysis. Numerous tests were carried out but in some instances very few statistically significant results emerged. The paucity of statistical relationships was contrary to what was expected. Furthermore, owing to the large numbers of tests carried out, some statistically significant relationships were bound to occur based on chance. This problem was particularly apparent with respect to the tests conducted between energy attitudes and socio-economic factors and the reported energy conservation practices variables (chapter V). Although the two hypotheses related to these tests were rejected, some statistically significant results did emerge and these must be regarded with caution.

7.2 Conclusion and Suggestions for Future Research

The formation of the Energy Leisure Lifestyle Index was undertaken to test the last two hypotheses. Although some "fine tuning" problems were encountered with the index its overall value is not be underestimated. A better method of calibration is needed. This could begin with a more accurate assessment of the energy intensiveness of various leisure activities. The methods to date are crude and simplistic. Longitudinal studies of individuals' leisure lifestyle and energy consumption may help provide a more rigorous framework. Further, a delphi study of recreation managers and

policy makers, energy analysts as well as the general public, could help elicit a more accurate measure of energy inputs into all phases of recreation and leisure behavior. This idea could also be extended to include individuals' overall lifestyle with respect to energy useage, as Fritsch (1975) has attempted. This type of information would not only allow policy makers to identify those segments of the population who consume large amounts of energy and where this energy is being used, the data could also be utilized to inform the public how and where they use energy. For example, it may be that individuals not only underestimate the amount of energy they use for their leisure lifestyle, as this study reports, but this underestimation may be prevalent for all facets of their lives. If this is the case, educational information should be made available to individuals either from government agencies or public utilities.

The paucity of statistically significant relationships between attitudes, perceptions, and ELLI socres and behaviors are probably related to the assumptions underlying the rationale for their inclusion. It is too simplistic to presume that a one-to-one relationship exists between behavior and attitudes. Respondents' attitudes toward energy are only one of myriad factors accounting for behavioral response.

It may be useful to measure attitudes in the form of general orientations toward the environment and its resources rather than on focusing on specific issues such as energy conservation, hazardous wastes or acid rain. An understanding of the philosophical and ethical concepts relating to the environment and its resources which permeate our society generally and the variations of these concepts as interpreted by different sectors of society, would have to be sought. It may also prove useful to examine gereral political and economic theory as well. For example, the "expansionist-limited world views" framework described by Russell (1979) and the "technocentric-eccentric" framework described by

O'Riordan (1976b) may offer valuable insights for the organization of studies pertaining to resources and the environment. Clearly, this is an area which warrants much more attention. The comprehension of the public's belief, attitudes, perceptions and behavior toward the environment is crucial to many studies undertaken by geographers, either explicitly or implicity. At present levels of knowledge and financial resources the questionnaire-type approach is the best method available. However, the limitations and problems inherent in this approach are known (see chapters 2.5 and 3.3) and improvements are needed.

It was discussed earlier (chapter 3.2) that no new methodological framework was necessary for energy perception research, but rather, the application of concepts from hazard research could be employed. This indeed is the case, at least with the present study. We have seen that individuals underestimate the energy intensiveness of their leisure lifestyle just as individuals underestimate the degree of risk they face in hazard prone areas. Hazard research also concluded that individuals react to hazards only when they reach crisis proportions. We can also infer from this study that leisure conservation practices are not affected by energy shortage or cost concerns because there is still a seemingly plentiful supply. Stringent conservation practices would be enforced if energy costs soar dramatically, although recreation and leisure may be affected the least. The similarities between the findings from this study and those from hazard research suggest that a more rigorous and exacting methodological framework can be achieved which can have a wide application to all studies dealing with resource use. The study of more general environmental beliefs, attitudes and ethics, as outlined above, may be the starting point of developing such a methodology.

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APPENDIX A

VICTORIA ENERGY AND LEISURE SURVEY

1. Please indicate your level of concern with the following issues that face the people of British Columbia today. A score of 5 indicates a very high degree of concern and a score of 1 indicates you are not concerned at all. (Please circle appropriate number.)

Inflation	1	2	3	4	5
Housing Availability	1	2	3	4	5
Unemployment	1	2	3	4	5
Interest Rates	1	2	3	4	5
Energy Shortages	1	2	3	4	5
Strikes	1	2	3	4	5
Pollution	1	2	3	4	5
Energy Costs	1	2	3	4	5
Taxation	1	2	3	4	5
Resource Ownership	1	2	3	4	5

When do you think British Columbia will face shortages of the following energy sources? (Please circle).

	At Present	By 1985	By 1990	By 2000	Beyond 2000	Never	Don't Know
Coal	1	2	3	4	5	6	7
Heating Oil	1	2	3	4	5	6	7
Hydro Electric Power	1	2	3	4	5	6	7
Natural Gas	1	2	3	4	5	6	7
Gasoline	1	2	3	4	5	6	7
Wood	1	2	3	4	5	6	7

2.

Please indicate your level of agreement with the following statements. A score of 5 indicates total agreement and a score of 1 indicates total disagreement. A score of 3 indicates indifference. (Please circle).

		DISAGREE		NEUTRAL		AGREE
3.	Any energy problems B.C. faces can be met by appropriate government action.	1	2	3	4	5
4.	The provincial government should discourage high energy consumption by imposing higher taxes.	1	2	3	4	5
5.	There is no threat of an energy shortage, only a shortage of known and identified sources	1	2	3	4	5
6.	If energy shortages occur, recreation travel should be severely limited.	1	2	3	4	5
7.	B.C. should commit itself to developing renewable sources of energy such as wood, solar and wind.	1	2	3	4	5
8.	The price of energy should reflect the cost of repairing environmental damage associated with energy extraction.	1	2	3	4	5
9.	An additional tax on high energy consuming recreation vehicles (e.g. campers, motor boats) should be implemented to curtail their use.	1	2	3	4	5
10.	A drop in personal energy consumption will cause a reduction in the standard of living.	1	2	3	4	5
11.	Leisure activities are an important part of peoples' lifestyles and such acts should not be changed merely for energy conservation purposes.	1	2	3	4	5
12.	Environmental quality may have to be sacrificed to guarantee adequate supplies of energy.	1	2	3	4	5
13.	Moderation in consumption at the individual level can contribute significantly to energy conservation.	1	2	3	4	5
14.	People should reduce vacation travel to conserve energy.	1	2	3	4	5
15.	Technology alone will provide solutions to energy and environmental issues.	1	2	3	4	5

16. Which of the following energy conservation practices have you adopted? (Please circle).

	Yes	No
Drive Less	1	2
Use less hot water	1	2
Lower thermostat	1	2
Recycle materials e.g. composting	1	2
Shop less frequently	1	2
Turn lights off	1	2
Vacation closer to home	1	2
Drive slower	1	2
Increase insulation	1	2
Reduce leisure and recreation travel	1	2
Shop closer to home	1	2
Install weather stripping	1	2
Install storm doors/windows	1	2
Use appliances less	1	2
Shop on the way to or from work	1	2
Purchase more per trip	1	2
Walk more	1	2
Purchase smaller car	1	2
Change to less energy intensive recreation activities	1	2
Wear more clothing	1	2
Move closer to place of work	1	2
Install thermostat control	1	2
Undertake more home-based leisure activities	1	2
Take fewer vacation trips	1	2
Vacation at one time and place	1	2
Use public transportation for recreation and leisure travel	1	2

17. Compared to 5 years ago, how would you describe your present level of energy consumption. (Circle).

Significantly Higher	Somewhat Higher	About the Same	Somewhat Lower	Significantly Lower
1	2	3	4	5

18. Does your family own any of the following recreation equipment. (Please circle).

	Yes	No
Snowmobile	1	2
Sailboat with motor	1	2
Motor boat	1	2
Pick-up truck with camper	1	2
Trail bike/dirt bike	1	2
4-wheel drive/ATV	1	2
Other recreation vehicle	1	2
Cottage	1	2
Heated swimming pool	1	2

19. If you have taken a major vacation trip in the past 12 months, please indicate the approximate distance you travelled to your furthest destination and the mode of travel you used. (Circle.)

Did not take major vacation 1

Distance		Mode of Travel	
Less than 100 km	1	Car	1
100-300 km	2	Bus	2
300-500 km	3	Plane	3
500-1000 km	4	Camper	4
1000-2000 km	5	Ferry	5
2000-4000 km	6	Own boat	6
Greater than 4000 km	7	Train	7
		Bicycle	8
		Other (please specify) _____	

20. If the price of energy were to double, how do you think it would affect your recreation and leisure activities? (Please circle where appropriate).

No effect	1
Change to less energy intensive recreation and leisure activities	2
Reduce weekend recreation and leisure travel	3
Reduce daily recreation and leisure travel	4
Increase use of public transportation to recreation and leisure facilities	5
Change to more home-based recreation and leisure activities	6
Vacation closer to home	7
Take fewer vacations	8
Other (please specify) _____	

5.

21. Approximately how often have you participated in the following recreation activities in the past 12 months. (please circle).

	Frequently	Occasionally	Rarely	Never
Golf	1	2	3	4
Jogging	1	2	3	4
Tennis	1	2	3	4
Alpine skiing	1	2	3	4
Outdoor swimming	1	2	3	4
Going to movies/theatre/concert	1	2	3	4
Camping	1	2	3	4
Cross country skiing	1	2	3	4
Gardening	1	2	3	4
Attend cultural events	1	2	3	4
Motor boating	1	2	3	4
Bicycle riding	1	2	3	4
Driving for pleasure	1	2	3	4
Attend sports events	1	2	3	4
Indoor swimming	1	2	3	4
Sailing/Yachting	1	2	3	4
Skating/curling	1	2	3	4
Hiking	1	2	3	4
Playing team sports	1	2	3	4
Squash/racquetball/handball	1	2	3	4
Watching T.V.	1	2	3	4
Fishing/hunting	1	2	3	4
Socializing/Visit Friends	1	2	3	4
Arts or craft hobbies	1	2	3	4
Reading	1	2	3	4

22. Different recreation and leisure pursuits require various inputs of non-human energy (e.g. gasoline, electricity). Please indicate the amount of non-human energy used in pursuing the following activities. A score of 1 indicates low energy use and a score of 5 indicates high energy use. (Circle).

	Very Low	Low	Moderate	High	Very High
Golf	1	2	3	4	5
Jogging	1	2	3	4	5
Tennis	1	2	3	4	5
Alpine skiing	1	2	3	4	5
Outdoor swimming	1	2	3	4	5
Attending movies/concerts/ theatre	1	2	3	4	5
Camping	1	2	3	4	5
Cross-country skiing	1	2	3	4	5
Gardening	1	2	3	4	5
Attend cultural events/fairs	1	2	3	4	5
Motor boating	1	2	3	4	5
Bicycle riding	1	2	3	4	5
Driving for pleasure	1	2	3	4	5
Attend sports events	1	2	3	4	5
Indoor swimming	1	2	3	4	5
Sailing/yachting	1	2	3	4	5
Skating/curling	1	2	3	4	5
Hiking	1	2	3	4	5
Playing team sports	1	2	3	4	5
Squash/racquetball/handball	1	2	3	4	5
Watching T.V.	1	2	3	4	5
Fishing/hunting	1	2	3	4	5
Socializing/visit friends	1	2	3	4	5
Arts and craft hobbies	1	2	3	4	5
Reading	1	2	3	4	5

Finally, we would like to know a few facts about you.

23. To which of the following age groups do you belong? (Please circle where appropriate).

18 - 24	1	45 - 54	4
25 - 34	2	55 - 64	5
35 - 44	3	65 & over	6

24. How many people are in your hosehold? _____

25. How many people in your household are under 17 years of age? _____

26. Do you own _____ your residence?

rent _____

lease _____

other _____

27. How would you describe your present employment status?

Student	1.	Labourer	6
Professional	2	Skilled	7
Homemaker	3	Managerial	8
Clerical	4	Retired	9
Unemployed	5	Other (please specify)	_____

28. What is the highest level of formal education you have achieved?

Elementary	1
Secondary	2
Post Secondary/Technical	3
Some University	4
University Graduate	5
Post Graduate	6

29. Please indicate what category comes closest to the total income of all members of your household before taxes and deductions for 1980. (Please circle).

Less than $10,000	1
10,000 - 20,000	2
20,000 - 30,000	3
30,000 - 40,000	4
Greater than 40,000	5

30. Sex: Female 1 Male 2

Thank you very much for taking the time and effort to participate in the survey. Please feel free to make any additional comments about this questionnaire or energy in general.

VITA

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Title of Thesis/Dissertation

The Interrelationships Between Energy Consumption and Leisure Activities: A Case Study of Victoria, British Columbia

Author [redacted]

Richard G. Kuhn

March, 1983