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The effects of adventure and ecology education programming on participants' wilderness knowledge, attitude, intentions and behavior

Hanna, Glenda Marie, Ph.D.
The Ohio State University, 1988

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THE EFFECTS OF ADVENTURE AND ECOLOGY EDUCATION PROGRAMMING ON PARTICIPANTS' WILDERNESS KNOWLEDGE, ATTITUDE, INTENTIONS AND BEHAVIOR

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy in the Graduate School of The Ohio State University

By
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THE OHIO STATE UNIVERSITY
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Glenda Marie Hanna
1988
To my mother, Pearl,

for her boundless love, generosity and understanding,
and especially for all of those magical walks
through the valley of my childhood.
ACKNOWLEDGEMENTS

I would like to express appreciation to my committee for the time and assistance they gave in the completion of this dissertation. Sincere gratitude is extended to Dr. Alan Ewert (formerly of the School of Health, Physical Education and Recreation) for his insistence on excellence and for his teaching, advising and encouragement in helping me work towards it. Many thanks to Dr. Charles Mand (School of Health, Physical Education and Recreation) for stepping in to co-chair my committee following Dr. Ewert's departure from the faculty. I also gratefully acknowledge Dr. Robert Roth (School of Natural Resources) who provided much appreciated feedback and assistance with the development of the review of literature and Dr. Emmalou Van Tilburg (School of Agricultural Education) who was especially helpful in the evolution of the quantitative instruments and qualitative methods used in the study. Dr. Seymour Kleinman completed the committee and I am obliged to him for his time, energy and enthusiasm for the research.

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CHAPTER I

INTRODUCTION

Nature of the Problem

Two short decades ago when one used the term “outdoor education”, the listener typically assumed that the speaker was referring to an interest in outdoor educational/recreational pursuits (e.g., hiking, canoeing, etc.) and/or nature study/conservation education. Individuals involved in outdoor education as a profession or paraprofession viewed themselves as outdoor skills instructors, environmental and conservation educators and natural and cultural heritage interpreters, each to varying extents (Hopkins, 1983).

While the definition of outdoor education has remained sufficiently ambiguous so as to permit maximum flexibility, adventure education and environmental education have evolved in complexity and developed individual identities. People now take university degrees with concentrations in outdoor adventure pursuits leadership or in environmental education. Research done and support materials produced are frequently designed with the devoted full time adventure or environmental educator in mind, rarely addressing the needs of the hypothetical outdoor education generalist trying to maintain the middle ground between these two extremes. John Naisbitt, the much quoted futurist, noted as should we, that the era of the specialist is on a downswing and that this creature may soon be left obsolete in favor of the more adaptive generalist (Naisbitt, 1982).
The absolute numbers of individuals of all ages seeking active outdoor educational/recreational experiences will continue to grow, placing additional stresses on our ever diminishing wildland resource base (U.S.D.A., 1982). Research by Ewert (1985) indicates that by the year 2000, North America will experience increased outdoor area use, increased use regulation and an increased emphasis on minimal impact camping. The outdoor education leader must be granted the responsibility and concomitant knowledge and skills needed to enhance environmental awareness, to instill an appreciation and understanding of our natural and cultural heritage and to facilitate development of a strong sense of responsibility for the conservation of our remaining natural areas.

Experiential outdoor education, consistent with L.B. Sharp's widely held ideal of that which "can best be learned out-of-doors", should "there be learned" (Sharp, 1947) has lead to a great diversity of interpretations and applications. Building on this fundamental premise, leaders in the field have evolved one of the most universally recognized definitions of outdoor education. It says that outdoor education encompasses all teaching and learning which occurs in, for and about the outdoors (Donaldson et al., 1958). According to this definition, outdoor education occurs primarily in the natural environment, utilizing forests, rivers and mountains to enrich our learning and our lives. It strives to provide us with the knowledges, skills and appreciations we need for maximizing our participation and our enjoyment in the outdoors. And it includes educational components about the outdoor environment, concerning concepts, relationships and phenomena encountered there. This definition was intended to include both adventure and environmental aspects, but it was actually more relevant to adventure recreation education. Lucas (1972) adapted the definition to the term "environmental education", differentiating the for component to represent efforts directed at increasing students' environmental activism motivation and skills.
In analyzing education in, for and about the outdoors, Ford (1981) contends that most outdoor programming organizations and agencies have traditionally started with skills for the outdoors, only gradually infusing elements taught about the outdoors. She believes that this trend is changing and that we are moving toward a return to the more holistic approach long advocated and practiced by our early leaders, W.G. Vinal and L.B. Sharp. This writer would agree and would add that this trend is part of a greater contemporary societal need to stress the relationship of the parts to the whole and to see the interconnections among disparate facts.

Priest (1986) provided further direction to this redefinition and stated that outdoor education is an experiential process which takes place primarily outdoors in the natural environment and which emphasizes relationships between people and natural resources. The six key elements of this definition include: 1) outdoor education is a method of learning, 2) it involves an exponential process, 3) it occurs primarily, but not exclusively outdoors, 4) it involves use of any or all six primary senses (including intuition), 5) it is interdisciplinary in its subject matter, and 6) it stresses relationships which may be intrapersonal (self-awareness), interpersonal (involving two or more people), ecosystemic (occurring between elements in the natural world) or ekistic (involving interactions between man and his surroundings). He comments that in recent years, adventure education has emphasized intrapersonal and interpersonal relationships and environmental education has stressed ecosystemic and ekistic (man-environment) relationships. However, if adventure education/recreation is to survive, individuals must be trained who are concerned with and skilled in the preservation of the wilderness environment, the environment upon which the outdoor adventure experience depends. If environmental educators are to be effective in solving environmental problems, they must work to develop confident individuals and groups capable of making sound judgments. Hence, the ideal outdoor education program will blend existing adventure and environmental education approaches in accepting the challenge to view the system as a whole and then learn to act in ways that maintain its integrity (Elkin, 1982).
Fishbein and Ajzen (1975) contend that beliefs about an activity or phenomenon are formulated through past experience and situational/social influences. These theorists purport that an individual's beliefs affect the development of attitudes toward the phenomenon which in turn determine that individual's intentions to act in regard to the factor of interest. While the study of beliefs and attitudes can help us understand behavior outcomes, it is intentions which are ultimately predictive of overt behavior. This theory of reasoned action will be considered foundational in the work at hand.

Ford (1981) supports the need for outdoor education to develop the learner along all three learning planes: cognitive (knowledge), affective (attitudes) and behavioral (psychomotor). It has long been intuitively accepted that outdoor educational or recreational experiences facilitate environmental and conservation attitudinal learning outcomes, seemingly incidentally. There is a small but significant body of research which quantifiably supports this supposition (Spracht, 1980; Hartung, 1973; Tanner, 1979).

In addition, a number of writers have reported interest on the part of outdoor program participants to see increased environmental components in existing outdoor adventure (Matthai, 1973) and resident programs (Swan, 1981). Outdoor education/recreation administrators (Mand, 1985) and programmers have realized their duty to develop responsible outdoor recreationists. In a survey of attendees at the 11th Annual Conference of the Association for Experiential Education, Priest found that these practitioners placed environmental protection as their second major concern, just behind reduction of wilderness accidents. This adventure education oriented group actually placed ecosystemic and ekistic relationship interests above their concern for assuring that participants realize their potential as individuals and group members. When asked to identify their level of agreement with ten stated leadership competencies (on a five point Likert scale), this same group placed “convey the importance of environmental harmony” second, behind “possess important traits necessary to succeed” and ahead of “be capable of instructing the adventure activity” (Priest, 1984).
In a survey of 120 selected active leaders, Buell found similar results. His respondents identified "outdoor education and environmental education" as the third most important program area for outdoor leaders, behind "group building" and "challenge/adventure activities, with "nature oriented activities" and "environmental interpretation" falling fifth and sixth respectively behind "outing sports" (Buell, 1983). This select sample obviously placed a slightly higher priority on inter and intrapersonal relationship related items than Priest's respondents did, perhaps reflecting a different survey population.

Unfortunately, environmental specific skills seem to be noticeably absent from the lists of prioritized leadership competencies generated in a number of other studies (Ewert, 1985). This may simply be the result of semantics and related skills and strategies may have been absorbed under items such as "outdoor techniques" or "outdoor skills".

In light of the relatively high priority given to environmental related programming by Priest and Buell's surveys, outdoor leaders as a whole are not meeting their potential in this area. While performing moderately well in teaching isolated facts, they have not accepted much responsibility for teaching values and have thus been ineffective in precipitating appropriate behavioral changes toward ecologically sound lifestyles, in and out of the outdoor recreationist context (Yambert, 1980).

This is likely due to a lack of sufficient emphasis in outdoor leadership training programs. The need for more and better environmental content and process related training has been identified by Canadian outdoor leaders (Henschell, 1985). According to a number of studies, environmental education specialists in schools share the outdoor generalist's lack of competence and perceived competence and desire increased pre-service and in-service training (Wilke and Leatherman, 1983; Peyton and Hungerford, 1983).

The variety of sources reviewed to this point seem to indicate that experiential outdoor leaders, including adventure/challenge programmers, should and do have an important role to play in the development of an environmentally literate and active citizenry, particularly with regard
to outdoor recreational ethics and conservation of wildlands for aesthetical and recreational purposes. Before a truly appropriate leadership development model can be identified, however, research must be done to determine whether programs which have been designed to promote environmental cognitive, affective and behavioral changes in participants do in fact achieve these outcomes to a significantly greater extent than outdoor education experiences which make no special efforts in this direction. It is in this type of research endeavor that this particular study was designed to address.

Problem Statement

This study addressed the following research question: What are the similarities and differences between adventure and ecology education programming in relation to participants' wilderness knowledge, attitude, intentions and behavior?

In addition to a general identification of environmentally related personal changes, this study involved detailed observation of each program in order to attempt to discover the factors which may have influenced the observed shifts in participants in the dependent variables. In terms of the quantitative data collected, the independent variable in this study is the type of outdoor education program taken (i.e., outdoor adventure or field ecology). The dependent variables are the participants' achievement and attitude scores on test instruments designed to measure wilderness knowledge, attitude, intentions and behavior. Finally, qualitative data was collected and analyzed to study respective instructor orientations and program content and pedagogies. Participant responses and interpretations of meaning with regard to wilderness related facts and issues was also studied through naturalistic inquiry approaches.
Purposes of the Study

The purposes of this study were to:

1. Determine the sociodemographic and past experience similarities and differences between the outdoor adventure and field ecology programs studied.

2. Assess whether either or both of the programs studied (outdoor adventure, field ecology) produce significant gains in participants' knowledge of basic ecological concepts.

3. Determine whether either or both of the programs studied produce significant gains in participants' knowledge of minimal impact backcountry technology.

4. Assess whether either or both of the programs studied produce significant shifts in attitudes toward wilderness and wilderness-related issues.

5. Determine whether either or both of the programs studied produce intentions to act in and/or for wilderness.

6. Determine whether either or both of the programs studied produce significant increases in environmentally sound wilderness recreational behavior (e.g., a) minimal impact during outdoor travel, b) low impact camping skills, c) appropriate behavior to minimize conflict with wildlife).

7. Determine which of the two programs studied is more effective in changing participants' wilderness knowledge, attitude, intentions and/or behavior, separately and collectively. Identify and discuss areas of strength and weakness in each approach in facilitating these wilderness-related outcomes.

8. Identify how each program is organized and operated and how the structure and methodologies used interact with participants of varying initial wilderness knowledge, attitude, intentions and behaviors in effecting changes where these in fact, occur.

9. Make recommendations regarding outdoor education programming based on the results noted.
Research Hypotheses

The researcher made the following hypotheses:

1. **Predisposing Factors** - the populations will be very similar demographically and in terms of past outdoor recreation and wilderness experience. The Audubon group will have more past environmental related experience.

2. **Knowledge** - Audubon will result in greater ecology factual knowledge gains, but Outward Bound will facilitate more gains in knowledge of minimal impact techniques.

3. **Attitude** - The Audubon group will increase more in wilderness preservation attitude (ecocentric), while the Outward Bound group becomes more recreational utilization oriented (anthropocentric).

4. ** Intentions** - The Outward Bound group will exhibit more intentions related to the pursuit of wilderness recreation following their program. The Audubon group will demonstrate a higher number of intentions related to general environmental involvement (i.e., activism).

5. **Behavior** - The intentions in hypothesis 3 will be demonstrated through actual relevant behavior following the respective program.

Definition of Terms

For the purposes of this study, the following education related definitions were adopted:

*Adventure Education* - Adventure education involves educational endeavors which utilize outdoor adventure pursuits (e.g., backpacking, rock climbing, canoeing, skiing, etc.) and occur primarily in the natural environment. It contains elements of real or apparent danger (risk), in which the educational outcomes, while often uncertain, are contingent on the actions of the participant interacting with circumstance (Ewert, 1985). In addition to teaching activity skills, adventure education has been concerned primarily with increasing the individual's intrapersonal knowledge (e.g., self concept, perceived competence and self-determination) and interpersonal skills (e.g., communications, group relations).
Ecology Education - Ecology education is a component of environmental education (see below) emphasizing the interrelationships among all elements of the environment. It focuses on facts and concepts related to the biophysical environment, of which man is a part, but it clearly centers more around interactions among factors such as climate, topography, geology, flora and fauna, etc. (Priest, 1986). The basic principles of ecology (e.g., interconnectedness and interdependence, etc.) may be applied to any physiographic region of the earth, recognizing that while the players may be different, the types of interactions are consistent. For the purposes of this study, the ecology of the Rocky Mountain subalpine and alpine environments were of particular interest.

Environmental Education - Environmental education is a broader form of education aimed at increasing understanding and appreciation of the ecological interaction of all elements of the environment, the condition of the natural environment, present and potential environmental issues and how the individual may effectively become involved in solving those identified problems.

Environmental education is the process of developing a citizenry that is:

1. **Knowledgeable** of the interrelated biophysical and sociocultural environments of which man is a part.
2. **Aware** of environmental problems and management alternatives of use in solving these problems, and
3. **Motivated** to work toward the development of diverse environments that are optimum for living (Roth, 1969).

Unless specified, the term "environmental education" will include the concepts of nature study, conservation education and interpretation.
Outdoor Education - In this study, the term outdoor education will include educational or recreational programs which occur primarily outdoors in a natural environment and which attempt to experientially expose people in an interdisciplinary manner to one or more types of relationships (i.e., intrapersonal, interpersonal, ecosystemic and ekistic) (Priest, 1986). As an experiential education approach, outdoor education will be considered an umbrella term including adventure education and environmental education components. Such programs may involve participants in any age range or a broad cross section, separately or at the same time. Because of the residential or decentralized camping emphasis, participants will typically be adolescents or adults. The natural environment of interest may range from municipal parkland to true, trackless wilderness (if this entity still exists). The emphasis, however, will be placed on wildland as opposed to urban environments. Wildlands may be private as in the case of some resident camps or public as in national, provincial/state parks, recreation areas, rivers and lakes and forest reserves.

Following is a taxonomic figure suggesting the education relationships among the above terms, as applied in the study at hand:
Wilderness - In the researcher's mind, wilderness environments are outdoor environments where man's influence is not readily perceivable, and where the environment is affected primarily by the forces of nature (Wilderness Act, 1964). Many outdoor education programs occur in wilderness environments and affect participants' beliefs, attitude, intentions and behavior in relation to that environment. For the purposes of data collection for the study at hand, participants were free to determine their own definition of wilderness in categorizing the land in which their outdoor education program occurred; the researcher's definition was not imposed on them.
Psychological constructs of interest in the study at hand include:

**Attitude** - An attitude is a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object (Fishbein and Ajzen, 1975, p. 6). Attitudes consist of affective or emotive feelings toward an object or activity.

**Behavior** - Behavior is the overt, observable psychomotor responses or actions of an individual (Fishbein et al., op cit., p. 13).

**Belief** - A belief is a person's subjective probability judgments concerning some discriminable aspect of his world (Fishbein et al., op cit., p. 131).

**Intention** - An intention is the subjective probability that the individual will perform some behavior (Fishbein et al., op cit., p. 288).

**Limitations of the Study**

1. The two programs studied have different content, approaches and perhaps instructor quality. In addition, the Audubon camp was three days longer than the Outward Bound program. Any or all of these factors may have affected participant outcomes differently, making comparisons and generalizations difficult beyond the programs studied. Detailed descriptions will be provided in Chapter IV to facilitate reader analyses and applications.

2. Each of the programs studied may not be entirely representative of the type of program for which it has been selected an an example. The researcher's generalizations will be restricted to the programs studied. Readers will be provided substantial thick (detailed) descriptions of program content and processes in order to facilitate their own transferences.
3. The subjects tested all have self-selected the programs studied and the lack of randomized samples may result in a systematic bias which affects both validity and reliability. In addition, while encouraged by the sponsoring agencies, participation in the study was not required and the element of volunteerism may result in another bias. Selection/maturation is an inherent threat to internal validity in the research design. In this case, it was dealt with through the collection of demographic and past experience data and in-depth qualitative study of a number of participants in each program.

Delimitations of the Study

1. The accessible populations in the study consisted of those individuals enrolled in the July 6-18, 1987 Audubon Field Ecology Camp in Wyoming and those attending the July 24-August 2 Colorado Outward Bound School Mountain program.

2. While outdoor education programs, both adventure and environmental, are operated in virtually all physiographic regions on the continent, this study focused on two similar mountain wilderness areas; the Wind River range (Audubon) and the Sawatch (Outward Bound), about 200 miles south in the same Rocky Mountain belt.

3. Quantitative instruments were administered on the first and last days of each program and at a six month follow-up period. This data was computer analyzed and interpreted by the researcher over the summer of 1988. Qualitative data synthesis and analysis began during the data collection period coinciding with the program and continued over subsequent months until the data had been appropriately integrated with the quantitative data findings. Inferences were drawn and conclusions and recommendations made and the document was completed by September of 1988.
Basic Assumptions

1. The programs studied result in change or impact on the participants in the domains studied (i.e., cognitive, affective, intentional and behavioral).

2. Participants responding to questionnaire items and/or interview questions did so honestly, according to their actual knowledge, attitude, intentions and behavior.

3. The instruments selected or developed accurately measure the intended phenomena.
I. References


CHAPTER II

REVIEW OF LITERATURE

THEORY OF REASONED WILDERNESS BEHAVIOR

The amount of research and writing performed annually in the area of attitude and attitude development is almost staggering. Many social science researchers devote their entire lives to the study of a particular attitude or attitude set. A quick scanning of a cross-section of this body of research suggests that most of these researchers have adopted the notion of attitude as the central construct of interest with attention to cognitive, affective and behavioral components of a given attitude (Sampson, 1971; Gray, 1985).

While this is all well and good, attitudes are not observable phenomena and they do not directly affect the social and physical environment. Behaviors do. As previously defined, behaviors are the observable psychomotor actions of an individual. One research team, Fishbein and Ajzen (1975), took a different tack and developed a behavioral theory which attempted to explain the causal links between attitude and behavior, as well as other intervening influences. The theory of reasoned behavior and its associated model have been tested and verified in a variety of studies of direct relevance to outdoor recreation and/or environmental conservation behavior. A number of these will be described and discussed in this review of relevant literature. The accumulated evidence suggest the theory may be useful in helping us understand factors which influence behavior and in suggesting ways in which we may more accurately predict future behavior.
This dissertation will involve an application of this general theory in studying the specific environmentally related outcomes of two outdoor education programs. The wilderness behavioral objectives held by educators, environmentalists and resource managers generally fall into two categories 1) low impact recreational behavior or 2) wilderness preservation activism. The researcher will attempt to illustrate how an adaptation of Fishbein and Ajzen’s theory can bind and enhance the description and explanation of these outcomes of outdoor education programs.

In this introductory section, the researcher will begin with a description of Fishbein and Ajzen’s basic conceptual model. Second, and while many other variations exist, one interesting and very relevant adaptation of this model to outdoor adventure recreation by Ewert (1986) will be presented. Finally, the researcher will present her own adaptation of these two models in an explanation of wilderness behavior. The theory presented will be foundational in synthesizing and assimilating the research subsequently reviewed and in the orientation and design of the study at hand.

**Fishbein and Ajzen’s Theory of Reasoned Behavior**

The basic conceptual framework of Fishbein and Ajzen’s model suggests a causal linkage between an individual’s beliefs, attitude, intentions and behavior with respect to the object of interest. The model takes on a cyclic form as both attitudes and behavior feeds back reinforcement or disconfirmation to the belief structure about the object.
Fishbein and Ajzen's (1975) theory of reasoned behavior or action evolved as a modification of Dulaney's (1968) theory of propositional control. Dulaney proposed that behavior follows the formation of a specific related behavioral intentions in a well-defined situation. Fishbein and Ajzen agreed with Dulaney in recognizing that man is generally a rational being; one who uses information acquired to make decisions and act upon them. They extended Dulaney's theory to include the notion that an individual's belief set serves as the information base which ultimately determines his/her attitudes, intentions and behaviors. These beliefs are based on subjective perceptions created through the internal assimilation of information acquired through external sources and direct observation. They are not necessarily based on truth. Cognitive educational objectives are typically designed to provide individuals with sufficient accurate information that the belief structures they form about various phenomena will be based in truth as the educational institution and/or society at large accepts it.

As defined earlier, an attitude is a learned predisposition to respond favorably or unfavorably to the attitude object. An attitude is an affective or evaluative reaction determined by
the individual's salient beliefs about the attitude object. As people typically have positive and negative beliefs about a given object, their attitude direction and strength will be based on the total affect associated with these beliefs.

Similarly, this overall attitude will determine the individual's tendency to form intentions to act toward the object in a favorable or unfavorable manner, if at all. Fishbein and Ajzen's theory suggests that the individual will form a set of intentions which will, in general, be consistent with his/her overall attitude about the object.

Each intention formed will have the potential to result in a corresponding behavior. The relationship between these two components distinguishes Fishbein and Ajzen's theory from most other attitudinal theories which typically draw direct linkages between attitudes and behaviors.

**Ewert's Model of Outdoor Adventure Participation**

Ewert (1986) built on Fishbein and Ajzen's substantiated foundation, incorporated elements of Iso Ahola's (1980) application to leisure participation, Allen's (1980) risk recreation paradigm, Bandura's (1977) self-efficacy model and Shore (1977) and Ewert's (1983) outcome findings to develop a conceptual model explaining participation in outdoor adventure activities. His model included Iso Ahola's important element of antecedent predisposing factors which frequently serve as the sources of information or influence the individual's perceived credibility of later sources of information used in establishing beliefs about an activity.
Throughout his model, Ewert substitutes Fishbein and Ajzen's term "object" (e.g., belief object, attitude object, etc.) with the word "activity" (i.e., beliefs about activity, attitudes toward activity, intentions for activity). Also, as evidenced in figure 3., the adventure activity participation model includes several interrelationships and feedback loops not shared in Fishbein and Ajzen's schematic. In Ewert's model, predisposing factors influence beliefs and attitudes directly and are also directly affected by these factors. Beliefs can affect predisposing factors, attitudes and intentions directly. Attitudes may work through intentions, or they may bypass these to affect behavior directly and may in turn be modified by the experience gained following participation (i.e., behavior).

While the addition of predisposing factors is a very valuable and well supported concept, this researcher fails to understand a number of the interrelationships suggested in this model. For example, few situations exist where beliefs would bypass attitudes to directly affect behavior. People are rarely totally ambivalent about any phenomena with which they have enough information or experience to form a belief set. It is also unlikely that attitudes would result in participation or non-participation without some formation of intentions, even if these are somewhat general in nature.
Finally, Ewert suggests behavior feeds back to attitude. A participant who has an enjoyable rock climbing experience and feels good about it is likely to foster an even more favorable attitude toward rock climbing resulting in more intentions to engage in the activity. However, this researcher would argue that it is the individual's belief set about the activity which is disconfirmed, modified or added to and that it is changes at this level which result in attitudinal and subsequent intention and behavior development concerning the activity. Because the paper presenting the model did not explain any of these relationships or cite specific examples to illustrate them, the reader is left trying to interpret the writer's intention.

Theory of Reasoned Wilderness Behavior

The purpose of this dissertation is to describe and explain the levels at which participation in an adventure education and a field ecology program change with regard to their behavior in (outdoor recreation behavior) and for (environmental activist behavior) the wilderness environment. The researcher is interested in identifying predisposing factors to describe the two populations studied in order that commonalities and differences may be noted and considered in interpretations. These predisposing factors will be considered as antecedents to the development of beliefs about an activity. As belief sets form, they in turn function as internal information sources in the development of belief sets regarding related phenomena. Belief sets result in the formation of a general attitude (favorable or unfavorable) which results in the development of any number of general or specific intentions. Study of predisposing factors, beliefs and attitudes is important in understanding the underlying reasons for observed behavior. Iso Ahola (op cit.) suggests however, that only through the study of intentions can researchers reach a level of understanding conducive to predicting future behavior. Unfortunately, there has been very little research conducted concerning general environmental intentions and that related specifically to wilderness behavior following cognitive or affective educational treatment.
This researcher concurs with the existence of the two feedback loops identified by Fishbein and Ajzen (op cit.), those occurring between attitudes and beliefs and between behavior and beliefs. These interrelationships are illustrated in the model in figure 4.

This model recognizes the potential effect of attitude on beliefs. An individual who undergoes an affective educational or recreational experience (e.g., acclimatization exercise, photographing alpenglow in a mountain sunset) may very easily change his/her beliefs about the environment in which those activities were experienced. Similarly, many individuals grow up thinking wilderness is scary, dangerous and evil and of no value except through resource extraction and development. When these people are taken out, as for example on a required school field trip, and they experience the natural environment, their belief set may be radically altered to one with many more pro-wilderness elements than previously. Conversely, an adolescent who "knows" wilderness only through the reading of romantic adventure novels may significantly change a positive belief set to a negative after a bad experience (e.g., getting lost and spending a few days cold, wet and scared).
Table 1. Framework relating predisposing factors, beliefs, attitude, intentions and behavior related to wilderness.

<table>
<thead>
<tr>
<th>PREDISPOSING FACTORS</th>
<th>BELIEFS ABOUT WILDERNESS</th>
<th>ATTITUDE TOWARD WILDERNESS</th>
<th>INTENTIONS IN AND FOR WILDERNESS</th>
<th>BEHAVIORS IN AND FOR WILDERNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Experience - wilderness - outdoor rec. - environmental</td>
<td>Knowledge About Wilderness - low impact - wilderness mgt. principles - natural enviro</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 illustrates some of the elements included in the major components of the model.

There is a reasonably substantial body of research supporting the outline presented regarding predisposing factors, beliefs (cognitive components), and attitude. While a number of outdoor recreation researchers have looked at factors encouraging outdoor recreation participation behavior, relatively little has been studied or written regarding wilderness preservation intentions or behavior. The study at hand is an effort at verifying and explaining the existence of some elements of each of the major components identified.

In sum, this model will serve as the integrative structure bonding the research summarized in the review of literature and the original research undertaken in this dissertation. While some
components (e.g., cognitive beliefs, affective attitudes) have been quite well supported with an accumulated body of research, other areas (actual behavior and especially intentions) will require more research attention before any conclusions can be drawn.
I. References


PREDISPOSING FACTORS AFFECTING ENVIRONMENTAL BEHAVIOR

In this section, research pertaining to sociodemographic, psychosociological and experiential variables which may serve as predictors of environmental behavior will be reviewed. In reviewing the literature in this area, the writer was surprised by the variance in predictors studied and found valid as precursors to environmental behavior. While some studies concentrated on demographics, formative influences, communications and/or overt behaviors, others dealt with the personal perceptions of values and skills held by the individual and still others with a combination of the above. Personal perceptions will be considered a belief-related factor and will therefore be discussed in the following review of cognitive related research. Also, the special case of the environmental activist will be discussed in this and the next section to seek clues concerning ways outdoor leaders and/or their participants may be influenced to become more active in environmental issues of relevance to them.

Sociodemographic Factors

In studies of adult populations, the most frequently noted predisposing sociodemographic variables affecting environmental attitudes and behavior include age, income, occupation, education and place of residency. Interestingly, the patterns of these predisposing factors and environmental interest and activity are the same as those noted by researchers studying adult outdoor recreationist characteristics. A brief review of relevant environmental and outdoor recreation research will serve to illustrate these commonalities.

After performing a systematic review of the empirical research generalizations dealing with the relationships between environmental concern and activism and a variety of such factors, Larson (1980) set out to replicate identified relationships to distinguish which generalizations were sound and which were not. To do this, Larson drew a random sample of 548 Wisconsin adults and compared those who were considered environmentally active to those who were non-
active (as distinguished by responses to five behaviorally oriented questionnaire items related to environmental activism). He also surveyed a select sample of 164 known Madison, Wisconsin environmental activists in order to compare them to the statewide sample and to facilitate replication of other earlier studies which employed such select samples. Larson cited a positive relationship between activism and white collar social class, higher education, age (younger than non-activists) and membership in community action and political organizations. He also found positive relationships between environmental activism and the reading of environmentally oriented literature (e.g., magazines, science/technical reports, etc.) and mass-media consumption of environmentally oriented programming. The age, education and social class variables noted by Larson were the same as those identified by Tognacci et al. (1976) in their study of ideological and demographic characteristics related to environmental concern.

These same variables have also repeatedly surfaced in the outdoor recreation literature. For example, Sessoms (1963) identified age (younger), income (higher), occupation (professional, technical), residency (urban) and family structure (no young children) as the most important social correlates of outdoor recreation behavior. These findings were supported by Lucas (1980) in a study of the characteristics of wilderness area users. Kelly (1980) found that gender and family life cycle accounted for most of the variance in forest-based and water-based activities and Young's (1983) findings supported the importance of gender as a variable in explaining who would use wilderness.

Studies involving populations of children have also yielded some interesting factors of note. Fraser (1983) studied the relationship between a variety of sociocultural factors and the environmental attitudes of high school students. He found significant positive associations between environmental attitudes and participation in clubs like scouts or 4-H, camping experiences, participation in life science course(s) and taking outdoor magazines. Perhaps more interestingly for the point at hand, he did not find ethnic group, sex, year in school, school grades or family income to be significant factors related to environmental attitudes. This should be
encouraging news for educators and will be discussed further in the section pertaining to experiential factors.

While Fraser's findings suggest little relationship with sociodemographic variables, a number of other studies have not supported this conclusion. For example, Shepard et al. (1966) performed a study on the attitudinal changes of campers in a 4-H summer residence program in Ohio and found that program length (longer gained more), previous camp experience (novices gained more), camper age (younger gained more) and place of residence (urban gained more) all correlated with the development of environmental attitudes observed. Chappel's (1977) study of the effect of a four-week primitive camping experience on inner-city 9-16 year old girls' perceptions of the natural environment yielded conclusions supporting Shepard's. She found that the girls studied significantly improved their environmental perceptions, but that the results were really indicative of the substantial improvements of the younger girls and those with less previous camping experience. Older girls and experienced campers made no significant improvements.

Gender appears to be a relatively understudied factor affecting environmental attitudes and behavior. Burris-Bammel and Bammel (1986) recently performed a study on gender differences in various parameters with three years of data from a week long environmental camp. They performed pre-post tests measuring participants' knowledge and expectations, attitudes, perceptions of amount learned, camp organization and enjoyability of the experience. Females were consistently lower on pre-test knowledge and made greater gains between the two knowledge tests. The researchers attribute this difference to the sexist structure of American society and the education system and challenge schools and other organizations to give females equal opportunity and support in their programs. While these researchers did not mention brain hemispheric research specifically, their results may provide further evidence of the problem of traditionally left brain dominated teaching methodologies (e.g., names and numbers) which typically favor the male brain.
Psychosociological Factors

The research relating psychological constructs such as self-concept, self-efficacy and locus of control to environmental attitudes and behavior appears quite scant. The Larson study (op cit., 1980) described above did suggest a relationship between locus of control and acceptance of personal responsibility for dealing with perceived environmental problems. In Larson's study, environmental activists consistently perceived the seriousness of local environmental problems more than non-activists, they doubted the ability of technology to solve environmental problems and placed responsibility with themselves for this onerous task.

The relationship between self-concept and environmental attitudes may provide a very valuable avenue for future study. Such research should ideally involve triangulation of a variety of quantitative and qualitative methods and sources in demonstrating and explaining the link suggested. Shifts in self-concept and environmental attitudes could be simultaneously studied over outdoor adventure and environmental education programs.

The Influence of Past Experiences

Perhaps the largest body of research in predisposing factors has related previous significant life experiences with current environmental attitudes and/or behavior. Again, an interesting common pattern between childhood experiences and adult environmental and outdoor recreation behavior was identified.

As noted, Fraser (op cit.) found high school students' environmental attitudes to be significantly related to past and present participation in clubs like scouts and 4-H, to camping experiences, participation in life science course(s) and to outdoor magazine subscriptions.

Some research supports carryover values of such experiences into adult environmental behavior. In a study of significant life influences as predictors of career commitment in environmentalism, Tanner (1970) surveyed members of several environmental organizations to
determine what factors in their lives were instrumental in their selection of an environmentally oriented occupation. He identified the major formative influences as:

1) youthful experiences in the out-of-doors
2) experiences with pristine environments
3) parental influences
4) teacher influences
5) negative experiences with habitat alterations
6) solitude

Results of a study of the environmental concern and activism of 637 grade seven students performed by Dyar (1981) complement Tanner's findings. She found that access and exposure to wilderness and other relatively pure environments was positively correlated with higher levels of environmental concern and behavior. Both of these studies support a very positive relationship between outdoor education/recreation experience and environmental concern and activism, an important correlation for outdoor educators to consider. Unfortunately, while the results remain impressive and attractive to the cause of outdoor education, the lack of a control group in Tanner's study may influence the considered reliability of the work. However, Sia et al. (1986) provided additional support for these two studies, finding that a high environmental behavior group studied was more involved in outdoor recreation activities such as family outings/vacations, hiking and/or walking and individual and/or group camping.

This environmental research is complimented by work in outdoor recreation which suggests that youthful participation in outdoor recreation activities is highly predictive of adult participation in such activities. For example, Burch et al. (1967) found that adults who had hiked or auto camped as children were more likely to become involved in remote wilderness travel and adults without this youthful socialization were most likely to stick to easy access camping in their adult lives. A number of other leisure researchers have noted similar patterns of involvement (Christensen et al., 1978; Kelly, 1974).

As the research reviewed indicates, outdoor educational and recreational experiences play an important role in influencing higher levels of environmental concern and activism and this
relationship should be exploited to the fullest. It may also be interesting to replicate Tanner's and Dyar's studies to assess the level of environmental activism of outdoor leaders and the significant life influences which have affected their level of environmental concern and involvement. This type of research may yield valuable information regarding the types of experiences and exposures leadership developers should ensure leader candidates receive prior to entering the field or during inservice training.
II. References


Dyar, N., see Louis lozzi et. al. (1981). Research in Environmental Education:1971-80. ERIC.


OUTDOOR EDUCATION AND ENVIRONMENTAL COGNITIVE DEVELOPMENT

This section will deal primarily with a review of the literature pertinent to the effects of outdoor education on the belief development of participants along ecological and environmental measurement scales. But first, a brief look at educational and recreational expectations and perceptions which may affect wilderness attitudes will be presented. In addition, a number of studies will be reviewed which indicate that cognitive knowledge is a prerequisite to attitudinal development in related areas. Finally, the importance of considering the content as well as the form of delivery of factual information will be noted.

Cognitive Expectations and Perceptions of Wilderness

While the research in this area is rather scant, it does indicate the need for purposeful educational efforts directed at facilitating participants' knowledge of wilderness issues and appropriate behavior. If the individual is not informed regarding the rationale and skills implied in environmentally conscientious wilderness behavior, even the well intentioned user will ignorantly create unnecessary impacts.

Robertson (1982) studied the knowledge of low-impact camping techniques of visitors to the Three Sisters Wilderness Area in Oregon. He found knowledge to have a strong effect on behavior, with cognition explaining 35% of the variance in low-impact camping practices.

Unfortunately, many if not most wilderness area visitors are poorly educated regarding wilderness use and conservation. In a study of visitors to the Selway-Bitterroot Wilderness Area in Idaho, Fazio (1979) found respondents only averaged about 50% on a cognitive test of wilderness use and management principles. However, the researcher noted significant differences among types of respondents, type of knowledge, and the accuracy of various sources of information. Fazio used these findings to make recommendations for ways in which
wilderness information and education programs could be most effectively channeled for recreational users.

Yet another study, this one dealing with a random sample of the general public, has also concluded that the more knowledge an individual has regarding wilderness, the more positive his attitudes will be toward issues related to wilderness. Young (1980) performed 503 telephone interviews in Illinois to determine the relationship between public knowledge of wilderness and attitudes toward its preservation. He found that there was indeed a direct relationship between an individual's knowledge of wilderness and his approval of wilderness preservation. He concluded that a more informed public would be more strongly in favor of wilderness preservation, especially among those whose knowledge was initially low.

Recreation visitors tend to define wilderness areas in terms of recreational values and uses rather than as natural areas for preservation (Merriam et al. 1972). However, while the public cites "enjoying nature, escaping civilization" as their strongest motivation for outdoor recreation engagement (Crandall, 1980), these users also demonstrate a tendency to ignore the deteriorated site conditions (e.g., campsite and trail destruction, wildlife disturbance, water pollution, etc.). Lucas (1979) found wildland users tended to accept virtually all forms of environmental degradation except litter, and to rate all sites and trails quite positively. In comparison to the urban environment from which most of these users originate, even a rather heavily impacted wildland site appears to be a desirable alternative. This finding, however, was contradicted in a later study by Anderson (1980) in which the researcher applied Fishbein and Ajzen's (1975) theory of reasoned behavior to a study of changing visitor use patterns in the Boundary Waters Canoe Area. Anderson found that almost all of her respondents had made one or more kinds of changes in their use of the area over time citing evidence of depreciative behavior, signs of overuse in the area and/or encounters with other visitors as the primary reasons for their displacement. Evidence of depreciative use or behavior was the most oft-cited factor in use changes.
The Impact of Outdoor Education on Environmental Cognitive Learning

Backman and Crompton (1985) reviewed a number of empirical studies and found that, in relation to environmental education, outdoor education is uniquely suited to facilitating cognitive improvement in participants. The majority of research they reviewed indicated that students learned more environmental information per unit of time spent on a given subject and that they understood the material better than control groups. These reviewers do caution that some of the evidence is tenuous due to poor research designs and implementation.

Most of the research in this area has been performed using school curriculum oriented programs and so will not be reviewed in detail in this study. However, a brief report of two such efforts will be helpful in identifying the types of research designs, variables, instruments, statistical tools used and results obtained and so may be of some use in designing future studies of this nature.

Cancilla (1983) assessed the ecological knowledge gains of eighteen classroom groups of fifth and sixth grade students (423 in total) resulting from their participation in a five-day resident environmental education program. The experimental group was pre and post-tested on a multiple choice test instrument and their scores were compared to a control group of 97 non-participating students using independent and dependent t-tests. Results indicated significant cognitive improvements beyond the .05 level in all participating groups as well as significantly greater absolute ecological knowledge in the experimental group than the control group on the post-test, also at the .05 level of significance. Cancilla recommended research on teacher effectiveness in the program as well as attitudinal comparisons of participating and non-participating students and the development of additional valid and reliable instruments to measure the cognitive effectiveness of similar programs.

Fortner (1978) measured the oceanic knowledge and attitudes of 787 tenth grade students and related these to the marine experience of the students. Half the sample of thirty schools were from coastal Virginia locations and other half were from inland Virginia sites. When demographic
variables were considered, it was found that cognitive levels were affected by race, residence and interaction between residence and sex. While the researcher recommended that inclusion of more marine information in existing curricula would foster improved marine literacy, it should also have been noted that increasing experience (as indicated by the influence of residence) may be a more valuable methodological strategy than simply increasing book-learned curricular content. If marine curricular content was assumed constant due to randomization, then it was not the factor that resulted in differential knowledge. Residence, or perhaps more appropriately, experience in the environment of interest, was more strongly correlated with greater knowledge.

This is not to suggest that outdoor education programs need not include cognitively oriented information and processes. As noted above, this is essential to the reduction of wilderness recreational impacts and to increasing public favorableness toward wilderness. At least two studies have addressed the inclusion of environmental concept dissemination in outdoor education programs.

In a comparison of an environmental versus an outdoor pursuits oriented resident outdoor education program for fourth to sixth graders, Williams (1975) found the environmental program to be superior in developing favorable environmental attitudes in participants. Notably, the environmental program studied was the National Environmental Education Development program and the outdoor pursuits program was one of many sponsored by the Y.W.C.A.

In a direct application to an experiential stress-challenge program, Hartung (1973) studied the environmental cognitive gains of college students. In this study, 17 participants (ten female and seven male) engaged in a month long adventure/pursuit program (e.g., winter wilderness canoeing) which also consciously included presentations in the areas of resource conservation, cultural awareness, planning, human dynamics and environmental perspectives. In addition to an assessment of the content of the students' logbooks, the participants were pre and post-tested using three cognitive and affective instruments: the Environmental Preference Survey (67 items on four subscales), the Test of Environmental Comprehension (36 items) and the Personal
Orientation Inventory. In reviewing the cognition relevant test, Hartung's results indicated an F statistic for the experimental group in the Test of Environmental Comprehension which was significant at the .05 level of alpha. These results indicated distinctive cognitive learning as a result of participation in the program. Unfortunately, the pre-post-test design without a control group raises external validity questions caused by the effects of the pre-test. Additional research with similar programs is needed and preferably using more stringent research designs.

Cognitive Knowledge and Related Environmental Attitudes

Cognitive knowledge regarding ecological and/or ekistic relationships, in and of itself, is relatively useless unless it affects the attitudes and values of the individual and leads him/her to behave in an environmentally responsible manner. Factors other than the individual's value of a clean environment will influence one's propensity to develop a positive belief structure and subsequent attitudes. For example, Tichenor et al. (1971) found that increased knowledge does not necessarily mean more favorable attitudes toward enforcement of environmental controls of various sorts. In this study, self-interest was in fact the key determinant influencing an individual's attitude toward environmental controls. Where regulations are perceived likely to interfere with the individual's intended activities or cause inconvenience, they are unlikely to be favorably viewed by the majority asked.

No studies were found which correlated attitudinal changes with cognitive improvements made following participation in an outdoor education program. While the Hartung study above tested both cognitive and affective changes as a result of participation in a college outdoor adventure program, there was no attempt made to determine if the attitudinal improvements noted were the result of the participants' increased knowledge. Due to the research design and the effects of testing sensitization and maturation, it is doubtful that this particular study could have made such a comparison. What is needed is research in the same type of program comparing one group of participants who receive environmental, interpretive and conservation
treatments (e.g., lectures, exercises, etc. designed to improve environmental cognition) and a control group exposed to all other elements of the adventure program except these environmental education aspects.

In a somewhat better designed study, Aird (1985) used 50 sixth grade students in a pre-post, control group design to determine the effects of a unit on water conservation in cognitive and affective learning concerning water issues. He evaluated the students using a content valid written, open-ended phenomenological instrument which tested both cognitive and attitudinal parameters. Using multiple linear regression, the experimental group demonstrated significantly greater knowledge of threats to water supplies. After comparing the number of differing responses on the post-test as compared to the pre-test responses, the experimental group demonstrated significantly greater value shifts, traceable directly to participation in the program. Aird concluded that values can be changed as a result of cognitive oriented instruction and that the level of conceptual knowledge an individual has influences the attitudes and values held related to issues associated with that knowledge.

Moore (1981) performed a descriptive study of 219 college science and non-science students. He found a slight positive correlation between their level of knowledge regarding energy and their attitudes toward energy.

In a single group pre-post-test study of 58 sixth grade students exposed to the Outdoor Biology Instructional Strategies (O.B.I.S.) program, Andrews (1978) found a significant positive relationship between knowledge of the ecological principles emphasized and attitudinal changes. In addition, he also found a significant positive correlation between classroom academic aptitude and environmental attitudes.

From this rather scant collection of studies, it becomes quickly apparent that more research is needed in this area. Environmental education has passed through one transition in which it emphasized cognition to the exclusion of affectational instruction. Then it moved into the values clarification period where "touchy-feely" affective oriented leadership dominated. It is now
hopefully being moved by the realization that "appreciation begins with knowledge" and sensitivity training and contemplative exercises can be more effective when they are built on pre-existing knowledge (Cacek, 1973).

What Is Taught and How

Charles Hopkins (1983), a well respected Canadian outdoor educator, believes that outdoor education resident programs must concentrate on basic ecology, not just on the taxonomic identification of various disparate items in nature. He feels program content must include: cognitive knowledge of the environment, enjoyable outdoor adventure activities, aesthetic activities (e.g., arts, observations) and encounter strategies (i.e., activism in environmental issues).

The problem of avoiding titles in favor of relationships applies to adult populations as well. This fact was recently stressed by Van Matre (1985) when he commented on the poor level of environmental interpretation commonly given the public. He noted a Midwest survey asking people how they preferred to get in touch with nature. He was appalled, but hardly surprised at the findings which showed that an overwhelming majority favored nature best on television. Van Matre commented, "And why not? Many who attend our live nature programs yearn for M and M's (magic and meaning) and get N and N's (names and numbers) instead." All ecosystemic and ekistic programming must involve good communication as well as good content.

In conclusion, while additional research is definitely needed before any absolute relationships can be established, it does appear that outdoor education experiences can help foster improved cognition of environmental information and that increased knowledge can lead to improved environmental and conservation attitudes in related issues. It is important to consider the medium of the message as well as the content as this may also affect the actual cognitive gains made.
III. References


OUTDOOR EDUCATION AND ENVIRONMENTAL ATTITUDE DEVELOPMENT

It appears that of all research and writing done on the impacts of outdoor education on environmental learning, more has been written about its strengths and weaknesses in the affective learning domain than in either the cognitive or the behavioral. Studies have typically fallen into one of two distinct categories and these will be considered individually in this review. The research area most often studied involves attempts to determine if outdoor education programs are indeed effective in influencing participant attitudes toward the environmental variables of interest. Second, while there appears to have been less academic experimentation undertaken, the important issue of environmental ethics elements in outdoor education programs has remained a very popular item of debate and rhetoric. Finally, accepting that the objectives of environmental ethics education are meritorious, and assuming that there exists potential for success from pursuit of values education in outdoor education programs, a number of writers have discussed the different leadership approaches which may be beneficial in this effort.

The Effects of Outdoor Education on Environmental Attitudes

The Hartung (1973) study described in the previous section dealt with attitudinal changes as a result of participation in an extended outdoor adventure program with environmental content. Hartung used two instruments to evaluate students' attitudes. An Environmental Preference Survey was designed, consisting of four subscales: Environmental Problems - General, Environmental Problems - Individual Practices, Environmental Problems - Effective Measures and General Condition of the Environment. The second instrument used was composed of four subscales selected from Shostrum's Personal Orientation Inventory.

Results indicated that participants made significant (.05 level of alpha) improvements between the pre and post-tests on all scales of the Environmental Preference Survey. Students only demonstrated statistically significant increases on the Inner Support subscale of the Personal
Orientation inventory. However, overall the researcher was able to conclude that participants developed a more positive ecological relationship awareness as a result of the program. Again, the absence of a control group leaves these results tenuous.

Spacht (1980) used Wergel and Wergel's Environmental Concern Scale on a pre-posttest basis with 92 high school students who participated in a one week adventure education program at Southern Illinois University Field Campus. Like Hartung, Spacht also found a positive shift in environmental attitudes associated with participation in an outdoor adventure education program.

While most pertinent research suggests intentional educational cognitive and/or affective efforts are important in achieving these outcomes, Meyers (1978) found that such outcomes may be incidental to the resident outdoor education situation. This researcher studied components of resident outdoor education with self-concept, interpersonal effects and environmental attitudes. He surveyed 100 program staff and 122, 10-14 year old campers at seven resident outdoor education centers in the Northeastern United States. While self-concept was found to increase, it was more interesting to note that environmental attitudes, a low priority goal, showed the strongest positive changes of any of the dependent variables studied.

Becker (1977) studied the attitude changes of a stratified random sample of 180 sixth grade students toward environmental issues resulting from participation in a five day resident school camp experience. A parallel control group received normal classroom instruction. All subjects were pre and post-tested using a semantic differential instrument and data was analyzed using an analysis of covariance. The experimental group demonstrated significantly (.05 level of alpha) greater changes of attitude concept blocks pertaining to conservation of natural resources and impact on the environment. There were no significant differences in the changes of attitude noted in the concept areas of environment, interdependence or pollution. Becker concluded that the residence experience was a worthwhile supplement to the school curriculum.

Other studies which used school groups in residence camp situations and found improvements in environmental attitudes as a result of the outdoor experience include those by
Millard (1975), and Regan and Fazio (1982). These latter researchers found that the positive correlation between attitudes and related behavior was strongest when the attitude had been formed or altered as a direct result of experience with the object of the attitude. This finding is consistent with the common belief that one must visit and experience wilderness if one is to truly love it and act on its behalf.

Not all studies done in this area have been as favorable in their conclusions. As noted earlier, Shepard et al. (1986) performed a study on the attitudinal changes of campers in a 4-H summer residence program in Ohio and found that program length, previous camp experience, camper age and place of residence (urban/rural) all correlated with the development of environmental attitudes observed.

Chappel's (1977) study of the effect of a four-week primitive camping experience on inner-city 9-16 year old girls' perceptions of the natural environment yielded conclusions which were somewhat contradictory to Shepard's. She found that the girls studied significantly improved their environmental perceptions, but that the results were really indicative of the substantial improvements of the younger girls and those with less previous camping experience. Older girls and experienced campers made no significant improvements.

Perdue and Warder (1981) found significant environmental attitude changes as a result of a seventeen day wilderness survival course taken by undergraduates of the University of Wyoming. However, this shift did not appear until a follow-up assessment six weeks after the trip. This indicates that attitudes improve during the recollection phase of the recreation experience, when many negative elements of the trip have been mellowed in the participant's memory by the passage of time. This is an important point because few researchers take the time to do follow-up evaluations, and a strong favorable attitudinal change coming after time is certainly worth working for. More research of this type needs to be undertaken. Other researchers have found support for long term (6 week to one year) maintenance of environmental attitude shifts following outdoor education treatments (Burris-Bammel, 1978; Ebeling, 1978).
Simpson (1985) recently wrote that he doubted if short term outdoor experiences could be very effective in changing environmental attitudes. He felt that leaders who attempt to do this are up against a lifetime of values education from family, peers, school and other sources. He perceived the greatest potential for attitudinal change was with frequent and continuous excursions.

All things considered, the jury is still out. There has not been enough quality research done to indisputably establish that there are consistent, predictable correlations between outdoor education experiences and attitudinal shifts in environmental perceptions. Most groups tested have been self-selected to treatment programs and there have been perpetual problems with reactivity in most designs and instruments. Almost all relevant instruments have been developed over the last decade, with the result that most have not been tested with more than one or two populations or settings.

However, designs are improving and we are seeing a better integration of measuring instruments with research designs, combined with more sophisticated data analysis procedures. It is encouraging to note that the results of most of the studies done, despite their inherent methodological weaknesses, do appear to indicate some positive benefits in affective learning as a result of outdoor education experiences. But again, more research is needed. If more researchers were to utilize one of the better inventories rather than developing their own, more conclusive and consistent results would be realized (Swan, 1986).

The Question of Environmental Ethics Education

In a recent projection of expected changes in Outdoor Adventure by the Year 2000, Ewert (1985) noted that use levels of outdoor areas would increase, there would be a decrease in available land/water adventure areas, outdoor area users would face more regulations and there would be an increased emphasis on minimum impact camping. Outdoor educators have identified
the need for active involvement in developing in people, environmentally acceptable attitudes, values and skills (Vogl et al., 1981; McRae, 1985). Given these ever-increasing pressures on treasured environmental resources and the perceived readiness of many outdoor education leaders to involve themselves in values education, it appears that the answer to part one of the dual question is yes, if outdoor leaders can have a noticeable affect, they definitely should try.

Part two is not quite as cut and dried. Knapp has been the leader in the pro values education camp for many years now. He believes that if values can be learned, they can be taught. When an appropriate experiential learning climate is created, environmental values can and will be learned by participants. Some of the values Knapp (1980) believes can be affected include:

1. concern for the needs of others
2. concern for a positive self image and health
3. care for non-living physical objects and environments
4. reverence and respect for living things
5. efficient use of food and other environmental resources
6. appreciation for ecological interrelatedness, and
7. enjoyment of outdoor activities

Yambert (1980) agrees with Knapp's arguments for ethics education, and while he credits outdoor educators with reasonable success in teaching disparate and integrated environmental facts, he thinks they have failed to accept responsibility and have lacked the necessary pedagogical skills for teaching ethics. One major problem he sees with outdoor stress-challenge programs is that they have tended to cast nature in the role of a powerful and dispassionate adversary. Another is the fact that while outdoor leaders may speak of environmental interrelatedness to their participants, they often appear hypocritical when one even superficially looks at their transportation, menus, and other outdoor program elements. Other concerns include nature education which focuses on identification rather than problems and a failure to go beyond sensory awareness approaches into more sophisticated issues discussions.
which would have greater potential to promote changes in attitudes and behavior. Yambert sees this as the ultimate goal of outdoor educators and says that we must learn more about teaching values if they are to be effective.

While Yambert has certainly been right on many counts, this reviewer believes he has perhaps erred in expecting a bit too much from people like environmental interpreters and outdoor adventure leaders. While it is certainly important for these professionals to discuss environmental problems as they are relevant to the particular environment being visited, they do have other worthy items on their agendas and so cannot, nor should they be expected to be full time environmental and conservation educators.

In terms of adventure education, Yambert makes a valid point about the frequent, perhaps unintentional identification of the mountain or the river as the enemy to be overcome and dominated in many of our outdoor pursuits. While this metaphor has been used so often that most simply have not bothered to think about the implications of its use, and many may easily be convinced to change their focus, there are certainly many peak baggers and white water jocks in outdoor education leadership ranks who have internalized this value beyond redemption. We are fighting history on this issue. While North Americans have come a long way to appreciating the inherent good in wilderness, we are not far enough removed from our pioneering forefathers who viewed it as a formidable opponent to be fought, conquered and domesticated. Education in both academic and outdoor recreation situations is needed to alter this value (Hammond, 1977).

In thinking about Yambert's expectation that adventure leaders must be able to not only affect peoples' knowledge, attitudes and behaviors in terms of their recreational ethics, but must be able to extend the underlying values to their participants' everyday lives, this expectation is somewhat unreasonable. While outdoor leaders should certainly strive for consistency in their words and behaviors in order to create positive role models, there just isn't time, opportunity or participant interest in most outdoor education programs to achieve this general goal. A more
reasonable expectation would be to attempt to do a good job of teaching people environmentally sound outdoor recreational ethics and skills. This endeavor alone would frequently take program elements beyond mere ecological discussions into stewardship issues and action strategies, but it would do so in context with other program parameters and objectives.

More research is needed in the area of the effectiveness of the various values education approaches. One study actually found that students taught ecology attitudes using a number of values clarification techniques exhibited significantly less attitudinal gains than did a control group taught by traditional classroom methods (Simmons, 1974).

More research is also needed to identify the specific skills outdoor leaders need to have to be able to effectively teach values. At this point in time, Simpson (op cit.) doubts that wilderness leaders have the necessary skills to instill ethics. He believes more training is needed in the areas of nature literacy, ecology, philosophy, values education and psychology. He adds that in addition to a background in environmental studies, moral development and curriculum development, the outdoor leader needs a clear understanding of his/her own ethic. Existing and future directions for leadership development in this area will be discussed further in a later section of this review.

How Values are Taught

A few writers have addressed the different approaches which may be used in delivering values education. Wade (1975) described the destruction of many prime wilderness recreation areas by thoughtless users. There is no such thing as no trace outdoor recreation and many environmental impacts are not even realized by the perpetrators. Examples abound. The garbage left by climbers on Everest is a well known example, but climbers and rapellers everywhere unintentionally scrape plants and lichens off rock faces. Thoughtless backpackers create multiple trails which become erosion channels when they try to avoid getting their boots
wet or muddy. Canoeists ignorantly wash their dinner dishes in the clear trout stream flowing along their camp.

Kiely (1979) found that it was important for National Park interpreters to consider the distribution of visitor attitude scores before attempting to develop interpretive messages designed to influence their attitudes. In employing Fishbein and Ajzen's (1975) theory to study visitor knowledge about and attitudes toward resource use and management in Shenendoah National Park, Kiely's results suggested different interpretive messages about resource use and management were appropriate for visitors involved in each of three camping styles - lodge, campground and backcountry users.

Wade (op cit.) suggests adventure leaders must attempt to use more intellectual questioning to open participants' minds to exploration of ethical, aesthetic and intellectual inputs. He believes these techniques should not be ends in themselves, but tools to use on the way to developing an ecological conscience.

Knapp (op cit.) has identified a variety of value teaching methods, including:

a) modelling
b) making and enforcing rules
c) coercion; punishment
d) propagandizing through books, stories, songs and other media
e) limiting exposure to only desired values
f) providing facts which support the desired value
g) structuring value-focused activities to study the issue

Upon even superficial analysis, it becomes readily apparent that a number of strategies can be used over a program to deliver the same value and that different strategies will be appropriate with different sized groups, different age groups and in programs with different key objectives. For example, while rules, coercion and propagandizing may work with large groups of children, adults will likely respond much better to appropriate modelling, the provision of supportive facts and structured value-focused discussions or activities (time permitting).

At least two separate works have found the last method mentioned, creation of structured activities which focus on values, to be effective (Kirstenbaum, 1977; Biasaga, 1975).
second of these, Biasaga used 17 fifth graders and 33 eighth graders in a pre-post, no control group design to study the effects of independent environmental issues research on values shifts. Data analysis indicated that values did change as reflected in differences between pre and post-test responses on the phenomenological measuring instrument. The researcher concluded that the knowledge generated by autonomous research contributed significantly to the process of values clarification.

While the time and support materials required to engage in this type of exercise is substantial and therefore reduces its applicability in outdoor education situations, this method is certainly not irrelevant to the values clarification of leader candidates in our college and university programs and may be of great benefit in helping them clarify their own values.

In conclusion, it appears that outdoor leaders can and should become involved in values education, at least as far as these pertain to educating the individual in the appropriate use of the environment during future outdoor pursuits and in the ways and means of protecting those resources of importance to them. In the next section of this review, the literature relevant to the effects of outdoor education on the elicitation of such appropriate behaviors will be presented. Affecting attitudes alone, as Yambert reminds us, is insufficient. Behavior must change before we can attest to the presence of any real learning.
IV. References


INTENTIONS IN AND FOR WILDERNESS

Intentions are by far the least studied and written about aspect of the model presented. As noted earlier, most researchers have made a direct connection between attitude and behavior without even attempting to measure whether the behavior was a planned occurrence. As a result, some of the material presented in this section is based on untested and unverified interpretations. More research is needed to determine the inherent value of this aspect of the model in predicting wilderness behavior.

Connections have been shown to exist between beliefs, attitudes and the formation of related intentions. Fedler (1981) applied Fishbein and Ajzen's (1975) model in his study of water-based activities and found that attitudes toward participating in water-skiing, pleasure cruising and fishing and subjective-normative beliefs surrounding these three activities were strongly related to intentions to participate in each activity. Both attitude and normative components were also found to be good predictors of overt behavior (frequency of participation).

In another application of Fishbein and Ajzen's (op cit.) theory of reasoned action, Young and Kent (1985) found a high correlation (r = .77) between the intentions of mid-western urban residents to camp and their reported camping behavior. Standardized regression coefficients suggested that intentions were most influenced by the respondents' attitudes about camping. Together with subjective norms, attitude accurately predicted intentions to camp (R = .74). Interestingly, these researchers attempted to maximize the validity of reported beliefs about the specific behavior of camping by defining their study behavior to their respondents generally as "going camping". This was done intentionally to allow the respondents to define camping in a variety of ways, appreciating that many would not understand more specific camping terms (e.g., wilderness camping, auto-camping, R.V. camping, etc.). Second, the researchers also felt that it was unlikely that participation rates in any of the specific camping styles would be small, resulting
in a sample of non-participants, a condition which would tend to reduce the ability of the model to predict intentions. However, "since the behavioral criteria used in the survey agreed in action, context, target and time between behavior, attitude and beliefs, the construct validity between these measures was perceived to be high" (p. 91).

While Young and Kent appear to have been successful in keeping their intention/behavior definition broad, other researchers and theorists (Fishbein and Ajzen, 1980; Rollins and Bradley, 1987) have noted the importance of dealing with intentions as they relate to specific behaviors. For example, in reference to environmental behavior, Larson et al., (1981) discovered a distinction between pro-environmental activism in the political process (e.g., voting behavior) and pro-environmental behavior in the household (e.g., energy consumption). The politically oriented behavior was, not surprisingly, found to be a more accurate indicator of environmental commitment than was home behavior, which was plagued by spurious influences. Convenience, saving money, habit, and other factors were all found to be valid reasons for various pro-environment behaviors in the household; environmental concern was often not even considered in the decisions made. The researchers noted the need for others studying such behavior to control for such extraneous independent variables. These findings were supported in a study by Becker et al., (1981) where factors such as comfort, family finances, health and savings emerged as the dominant considerations in predicting gas consumption behavior.

Fishbein and Ajzen (1975) maintain that intention must be measured at the same level as behavior and that the more specific the intention and the greater its temporal proximity to the behavior of interest, the more predictive the intention is. This researcher would add that the greater the salience of the behavior object, the less specificity in time/location/operation of related intentions is necessary. An individual planning a month long wilderness expedition, even if it is months into the future, is likely to carry out this intention. However, weekend outings may not be as important to the individual and may be engaged in more spontaneously; i.e. with less intention.
Ewert (1986) identified some of the intentions of outdoor adventure recreationists. He noted types of intentions related to recreationist's decisions to participate, not to participate, the extent of any participation, time/location of participation and willingness to assume costs (financial, time, opportunity). Each of these factors could be studied as intentions and then verified through behavior analysis later.

In sum, if the degree to which intentions are related to behavior could be ascertained, prediction of behavior could be improved. In considering behavior in (outdoor recreation) and for (preservation/conservation oriented) wilderness, the study of intentions may yield useful information and support for cognitive and affective programming which influences the development of such intentions.
V. References


A number of studies carried on by governmental resource management agencies have clearly illustrated the significant impacts outdoor recreationists have on fragile, and even not so fragile wildland environments (Cole, 1982; Ittner et al., 1984). As we have increasing numbers of adventure recreationists and a declining land/water resource base to look forward to in the next decade, it is crucial that we attempt to educate existing and potential users concerning their environmental impacts. As noted, changes must not be simply cognitive and/or attitudinal, but must affect the way people do things outdoors, the way they behave toward the environment.

If outdoor leaders can influence recreationists sufficiently that these people carry over the behavioral patterns learned into other aspects of their life (e.g., fuel consumption, water usage, consumerism, etc.), then that will be a bonus. But, given the results of the research we have to date, this is not all that likely, at least not initially. However, appropriate leadership in the development of an outdoor recreational environmental ethic will be a tall bill in and of itself. This task will involve taking people all the way along the continuum from awareness, understanding and appreciation of the natural environment to teaching them specific actions and behavior necessary for its conservation. Environmental educators alone have not been overly successful in bringing the general public to the action end of the environmental issues scale (Wiesenmeyer et al., 1984); it would be interesting to discover the potential for success if outdoor educators set this as a serious objective.

In this discussion, the writer will briefly review past research which is relevant to alterations in environmental behavior as a result of participation in an outdoor education program. The review will of necessity be exceedingly brief, because there has been very little research done in this area to date. This may be due, at least in part, to experimental difficulties associated with trying to observe the overt behavior of selected subjects instead of relying on their responses on a delayed survey. Because of the paucity of reported research of specific relevance, some
observations from environmental education program research will be included to illustrate how such studies have been undertaken and the results they have obtained.

**The Effects of Outdoor Education on Environmental Behavior**

As noted above, there is not much specifically applicable literature to review on this particular subject. However, the reviewer did locate one recent study of a resident outdoor education camp and two environmental education program studies which may help to illustrate the types of research which could and should be undertaken during and following outdoor education interventions.

Beaver et al. (1985) studied a five day residential outdoor education camp with grade six students. An attitude scale used was designed to assess whether change occurred and on what levels, cognitive to behavioral. The researchers concluded that their scale did function efficiently as an assessment tool in an attitude change situation. Positive environmental attitude shifts were noted, especially on the "actual behavior" level, and this shift was most evident with academically gifted and novice campers.

In a study of junior high school students, Gangloff (1975) developed an environmental education course in which the student community selected the issues studied during the classes. She also invented a behavior survey instrument to determine if actual behavior changes followed the attitudinal changes which resulted from participation in the program. The survey was completed during classtime in four classes; two experimental and two comparable control classes. Pre and posttests were given, before and after the seven month program. Results indicated significantly positive experimental program effects on the environmentally related behavior of the students receiving the new program.

While this study supports the need to deal with environmental issues of interest and relevance to the participants, the long duration of the program reduces its applicability to most outdoor education programs which are typically shorter in length. It may be experimentally difficult
to account for maturation effects in such a long program without the design used, but the pretest posttest design so commonly used in social science research may introduce problems related to external validity. Use of a Solomon four-group or even of a posttest only design would eliminate these concerns.

While the research has been at best, inconclusive, Gangloff is not unlike other researchers who perceive that behavioral changes are preceded by relevant attitudinal changes (Perdue et al., 1981). However, a study by Horsley (1974) revealed results which contradict this popular assumption. He took 96 freshman geography students in an initial experiment and 89 in a replicative study to determine the effects of a brief "change-agent role-playing" procedure on the students attitudes and behavior toward environmental conservation. The students in the experimental group each role-played a change-agent whose responsibility it was to attempt to change the environmental behavior of two other people. Horsley randomly assigned groups to the Solomon four-group design which he used in both experiments and used a validated Likert-type seventy-item inventory and self-report form as the criterion instrument to measure attitudinal and behavioral changes in the students. The instrument was administered as a pretest, posttest and a delayed posttest was given seven weeks after the exercise. Additional power was added to the students' reported environmental behavior through the use of unobtrusively measured observations of their reported behavior. Using the Multiple Linear Regression statistical method and setting a .01 level of significance, Horsley found that while there were no statistically significant changes in the experimental groups' attitudes toward environmental conservation issues following the experimental treatment, there were significant differences between posttest comparisons and between delayed posttest comparisons of behavioral change.

Horsley was not particularly surprised by these results because the social learning theory, upon which the model followed in the study was based, focused on behavior change and so one would expect greater shifts in behavior than in attitude. Social learning theory also postulates that a newly established behavior will be translatable to other related issues. This point is most
encouraging for educators who hope participants may be able to generalize ethics learned during participation in various affectively oriented programs.

Horsley's study has been described in some detail here because it was one of the most methodically rigorous ones found in all of the literature and because its results may have some important applications to outdoor education leadership development and program delivery. The experimental treatment itself was relatively short in duration (only a few hours); certainly adaptable to many college, university and other outdoor leadership development situations. Modifications on the theme could be used in a variety of youth and adult outdoor education programs to help bring participants closer to the ideal of the environmentally aware and action skilled citizen.

There certainly exists a great need for more research of this caliber in studying the relationship between environmental attitudes and related behavior patterns using a variety of affective teaching methods.
VI. References


CHAPTER III

METHODOLOGY

The purpose of this study is to compare the effects of adventure and field ecology training on the wilderness related knowledge, attitude, intentions and behavior of program participants. Following is a description of the research design and methodology used to study this question. Both quantitative and qualitative methods were employed as was appropriate.

1. Programs

There are a wide variety of programs in outdoor adventure and environmental education offered throughout North America. One of each of these two types of programs was selected based upon three criteria:

a) Both programs were based in wilderness environments in the Rocky Mountains: Audubon in the Wind River Range in Wyoming and Outward Bound in the Sawatch Range in Colorado. Both programs occurred primarily at and above 8000' elevation. This allows reasonable comparisons of ecological concepts, attitudinal and behavioral development with similar content and environmental stimuli.

b) The Audubon Field Ecology camp studied was scheduled over 13 days (July 5-17), but actually ran closer to 11 days as the group did not arrive till dinner the first day and left right after breakfast on the last day. The Outward Bound program ran for 10 days (July 24-August 2), noon on day one to noon on day 10. Therefore the two programs were similar in location, season and duration, facilitating content and process comparisons.
c) Permission to collect data was obtained from both sponsoring agencies.

Detailed descriptions of the programs studied are presented in Chapter IV.

2. Population and Sampling

Sixty-four adult participants were officially enrolled in the Audubon program. Fifty-four of these were registered in the resident field ecology camp program. Eight teaching staff lead this group in a wide variety of natural and cultural history sessions as well as facilitating recreational opportunities involving hiking, canoeing, rafting, square dancing and campfire sing songs.

The remaining ten Audubon participants were registered in a Wilderness Research Backpacking Program (W.R.B.P.) option. The two leadership staff and one assistant instructor led this group on an eight-day expedition into the adjacent Fitzpatrick Wilderness Area. Here the group backpacked, hiked and collected census data on the flora and fauna of the area studied. The remaining program days were spent cleaning up and categorizing and summarizing the inventory samples taken while on the outtrip.

All sixty-four Audubon participants were asked to participate in the study and the researcher spent her time between pre and post testing alternating between the base camp program and the backpackers.

The Colorado Outward Bound program had thirty-three adult participants enrolled, but within an hour of arriving at the bus terminus, these people were placed in patrols of seven to eight with one or two staff leaders each. Other than occasional passings, these patrols remained totally independent of each other while in the field until the second-last day when they met for the evening meal and prepared to run out together (five mile marathon) to the base camp the last morning.

The researcher conducted pre and posttests with the entire population and lived and travelled with one particular patrol of eight, including the leader Sam and herself. It was discovered
on the last evening that the patrol studied in depth had received unique relevant instruction in the form of an extended one and a half day visit by the program director, Rob. In addition to providing a strong wilderness purist role model, Rob also gave the group a two hour evening talk on the historical/philosophical perspectives of wilderness. Due to the perception of differences in the treatment of this patrol from all others, the researcher decided to analyze their data separately.

Therefore, while two main populations were studied, Audubon and Outward Bound, four subpopulations actually emerged:

a) Audubon resident camp
b) Audubon wilderness research backpacking option
c) Colorado Outward Bound participants in Sam’s patrol
d) Colorado Outward Bound participants other than those in c) above

The subjects enrolled in The Audubon Resident, Audubon Wilderness Research Backpack and Outward Bound programs self-selected these programs. Participants enrolled in the Outward Bound Program were placed in heterogeneous groups by the school director and staff according to factors such as age, gender, place of residence, occupation and past outdoor experience. Registrants in all programs met the programming agency’s prerequisites with regards to age, health and fitness. The researcher had no control over the age and sex of the participants studied the groups as they existed.

All participants enrolled in the two major selected programs (i.e., Audubon, Outward Bound) at the time of data collection were asked to participate in the quantitative data collection. Inspite of the volunteer participation element, the participation rates were very close to 100% on both sets of pre and post tests.

3. Research Design

Due to the lack of randomization between groups, this study would be classified as involving a quasi-experimental nonequivalent group design (Campbell and Stanley, 1966). Each
of the two selected primary groups was pretested, posttested and then delayed posttested (6 month) on a series of instruments which was described later in this chapter. These instruments were developed for their ability to measure demographic and past experience data, wilderness ecological and minimal impact knowledge, attitude and self-reported intentions and behavior in and for wilderness.

In addition, qualitative data (i.e., fieldnotes, interview data, slides, written materials, etc.) were collected over the course of each program in an effort to identify program content and methodologies. A small sample of participants (4/program) were interviewed for more detailed information and interpretations. The researcher used the participant introduction exercises conducted by leadership staff (i.e., where everyone takes a turn telling a bit about themselves, their related experience and their objectives for the program) to purposely select individuals to approach for interviews. Past experience in and for wilderness was the primary criteria for selection (maximum variance), with gender (2 of each) and age (2 under 35 and 2 over 35) also being considered. It was not difficult to identify participants on either end of the experience continuum and then to ensure that both sexes were represented as well as younger and older adults.

Attention was paid to how the participants perceived their evolving knowledge and impressions of wilderness and wilderness related issues over their respective programs. Such data collection was buried in general expectations and evaluations questions to reduce reactivity.

The researcher was introduced as a program project person and leader intern helping conduct general evaluation research sponsored by the programming agency and The Ohio State University. The specific nature of the research question was not identified. In playing this role, the researcher was free to ask a variety of related and distractor questions (e.g., about leadership, safety, social processes, etc). Due to time constraints during the programs, there were limits on the depth of questioning the researcher could engage in. However, a sufficient number of participant interpretations (4/program = 8) were accessed in order to help confirm or disconfirm the researcher's exogenous constructions of meaning.
The socio-demographic data collected included factors such as age, gender, place of residence (urban/rural), educational level and past outdoor adventure and/or environmental experience. This information was used herein (see Chapter V) to describe the samples and to determine if the samples tested were derived from the same population. Where systematic differences existed between participants enrolled in each program, these variations were used as covariates in analyzing other data.

4. Instrument Development

The acquisition and development of appropriate quantitative instruments to study the problem has involved the following process:

1. Copies of a variety of existing relevant instruments were reviewed. The following instruments were reviewed for potential application and used in the construction of the instruments developed:

Knowledge -
- multiple-choice test of ecological knowledge (Cancilla, 1983)
- visitor knowledge of low impact camping techniques (Robertson, 1982)
- test of visitors' knowledge of wilderness use and management practices (Fazio, 1979)
- Test of Environmental Comprehension (Hartung, 1973)
- Environmental Preference Survey (Hartung, 1973)

Attitude -
- semantic differential test used to study the effect of a residential outdoor experience on attitudinal change toward environmental issues (Becker, 1977)
- Environmental Preference Survey (Hartung, 1973)
- Personal Orientation Inventory (Shostrum, used by Hartung, 1973)
- Four Mountain Parks Planning Scenario Instrument (Parks Canada, 1986)
- Questionnaire of backpackers' preferences for wilderness management (Buttena et al., 1981).

Behavior -

- Environmental Preference Survey (Hartung, 1973)

In addition, socio-demographic, past experience in and for wilderness, and intentions and post-program involvement in and for wilderness were studied through instruments developed by the researcher. Due to the variety of factors being considered and the time restrictions placed on quantitative data collection by the sponsoring agencies (30 minutes pre and post program), each instrument was of necessity kept quite short.

2. Instruments have been written, formulated and the layout generally designed (Sudman et al., 1986). These instruments include:

- Instrument to record personal data
  - Demographics
  - Past relevant experience

- Test of wilderness related knowledge
  - Basic ecology test instrument
  - Minimal impact test instrument

- Instrument to record attitude toward wilderness
  - Instrument to record intentions in and for wilderness
  - Instrument to record post-program behavior in and for wilderness

(See the Appendix A for these instruments).

Remaining steps in the instrument development process included:

4. Evaluation of the instrument's validity by a panel of experts (A. Ewert, R. Roth, E. Van Tilburg, Agr. Educ 888 class at The Ohio State University).

5. Modification of the instruments according to recommendations of the panel.
6. Pilot testing of the instruments. The researcher used participants in two outdoor education courses (total n=16) run at the Blue Lake Center in the foothills of Alberta. These participants were approached as they arrived the evening before their program started (June 26, 1987) and asked to complete the questionnaire as part of general evaluative research being conducted by the sponsoring Provincial Government and the University of Alberta. Following completion of the questionnaire, these respondents were asked to read over the instruments again, placing any questions or comments on any question items which they found vague, confusing or otherwise troublesome and adding any questions they felt should have been asked.

7. Modification of the instruments as indicated by the pilot test.

- No significant changes were made to the personal data, intentions or behavior instruments. Few editorial comments were made on these instruments by the respondents and all questions were responded to, suggesting that no major problems were posed.

- Item analysis was conducted on the two multiple choice knowledge instruments to identify questions which were either too easy (pi>0.7) or too difficult (pi<0.3) (Ferguson, 1977). As a result of this analysis, 5 of the 20 knowledge items were modified. Item analysis was also used to identify weak distractors (those selected by less than 10% of respondents; i.e., one person or none). The intent and/or wording of approximately one distractor per question was altered at least slightly as a result of this analysis.

- The attitude instrument was also subjected to item analysis to ensure that the wording of each item elicited a reasonable range of responses. In every case, at least three response categories received attention by the respondents and in the absence of overwhelming directional preferences and/or editorial comments by the respondents, no significant changes were made in this instrument.

8. Editing and preparation of the final version of the instruments.
This included mixing of question and response ordering of the knowledge and attitude instruments for post and delayed posttests to reduce potential ordering effect. Keys were made for each version of the knowledge instrument (See Appendix A).

The questionnaires were reduced, printed and collated by the University of Alberta Printing Services. They were trimmed to 7" by 5", stapled and packaged by the researcher.

5. Validity and Reliability of Quantitative Instruments

Content and face validity of the knowledge instruments used was derived through the review by a panel of experts. The panel decided that both the basic ecological knowledge and the minimal impact knowledge items did in fact measure the content of interest. This panel was also responsible for helping the researcher determine whether the attitude instrument had construct validity; that is, was the specific trait or construct of ecocentric-anthropocentric attitude toward wilderness measured. As new instruments were developed, it was impossible to determine criterion validity for any of the instruments.

Reliability of the instruments was assessed using the data collected over the pilot test conducted at Blue Lake Center. The reliability of the personal data, intentions and behavior instruments could not be calculated statistically. Attempts were made to determine statistically the reliability of the remaining three instruments.

Reliability of the multiple choice and Likert scale instruments was enhanced through the application of precise scoring procedures. As the researcher had only one administration of the instruments and relatively short test instruments with which to work, the Kuder-Richardson 20 reliability estimate was calculated for the two multiple choice knowledge instruments. This relatively conservative estimate of the coefficient of equivalence (Isaac and Michael, 1985) yielded alpha values for the basic ecological and minimal impact instruments of .37 and .52 respectively. The moderate alpha for the minimal impact test was adequate (Nunnally, 1978). However, the relatively low reliability of the basic ecology instrument indicated the need for a closer look at these
items. In viewing the covariance matrix, a number of the covariances were negative. These items were identified and the "alphas if item deleted" were cross-checked. All were between .3 and .45 for these questionable items, suggesting that the items needed to be eliminated or revised. The shortness of the instrument precluded elimination due to the concern of reduced validity, but a number of revisions were made in the weak items.

In part, the low reliability of the basic ecological knowledge instrument in comparison to the minimal impact knowledge test was to be expected given the relatively homogenous (according to the personal data collected) outdoor pursuit orientation of the pilot test pool of respondents. In addition, the small n (16), combined with the limited number of items in each domain (10) made it unlikely that high alphas would be obtained on either of the knowledge or attitude instruments.

Cronbach's Alpha was calculated for the summated Likert scale attitude instrument and an alpha of .42 (standardized item alpha of .46) was obtained. Upon reviewing the items creating the negative values on the covariance matrix and checking the alphas with these items deleted, two items were revised significantly and a number of others were modified slightly.

It should be noted that, while none of the alphas determined was very high, the coefficients obtained are adequate for research purposes and/or for making decisions affecting groups. They would not be satisfactory if the objective involved making decisions regarding individuals (Ayr et al., 1985). Low reliability coefficients do not necessarily invalidate a technique as a tool for drawing valid inferences. Given the sample sizes expected in the study populations prior to actual data collection (n=40+ for Audubon and Outward Bound), the researcher felt confident that instrument reliability was adequate. Low reliability combined with small sample size (i.e., n=16 in this case) is likely to result in Type II errors (failing to reject the null hypothesis when it is false) (Ferguson, 1977). This relationship must be kept in mind when analyzing the data comparing the results of the subpopulations identified.
6. **Quantitative Data Collection**

The researcher accepted sole responsibility for all data collection to avoid any implementation discrepancies. Due to the great threat of reactivity related to the research question (environmental issues tend to be socially value laden), students were told that the researcher is a program project person and leader intern assigned the task of administering instruments the agency is using in its conduct of a general evaluative research project. They were informed of the three administrations of the quantitative instruments, ensured total confidentiality in all responses and encouraged to participate for personal, agency and social benefit. The volunteer nature of participation was duly noted along with assurance of the participant’s right to withdraw from involvement at any point in the process.

In order to allow the researcher to analyze the data for change on an individual basis, participants were asked to provide a four digit data code number (e.g., last four digits of social insurance number, driver’s licence, etc.), placing the same code number on each questionnaire over the three administrations (see Appendix A for data code number form included in pretest questionnaire).

Participants were also requested to complete a locator card stapled loosely into the center of the pretest questionnaire and to hand it in separately from that questionnaire. Completion of this contact form was essential to allow the researcher to mail out the delayed posttest questionnaire. Space was also allotted for respondents to express their interest in being sent an executive summary of the results of the study. Over 95% did express this desire (see Appendix A for sample locator card).

The test instruments were administered as close to the same point in the timeframe of each program as possible (i.e., first and last days) and participants were mailed the 6 month follow-up instrument in late January (Audubon) and early February (Outward Bound). The response rate on the delayed posttest was 73%, including 4 questionnaire packages returned undeliverable. Five percent of non-respondants (one person per program = 4 people) were contacted by phone.
and completed the follow-up questionnaire in this manner. The instruments were administered in the following order:

- Pretest - knowledge (ecology and minimal impact), predisposing factors (demographics and past experience), and attitude.
- Posttest - knowledge, attitude and intentions.
- Delayed Posttest - knowledge, attitude, behavior and intentions.

7. Analysis of Quantitative Data

A .05 level of significance was established a priori.

The program populations were analyzed and described using frequency data and Chi-square cross-tabulations. Where significant differences were identified on any variable(s), this/these were considered as covariates in remaining statistical analyses.

Analysis of covariance was performed on the pre, post and delayed posttest written tests to determine if participants within each program underwent significant shifts in wilderness knowledge (ecological and minimal impact), attitude, intentions and behavior. Analysis of covariance procedures were used to compare the outcomes of the two programs studied on each domain. Intention and behavioral data was summarized according to the frequency, intensity and type of intentions and behaviors reported to allow comparisons between the populations. Results of the statistical analyses were presented according to each of the research hypotheses of the study. Finally, Lisrel path analysis procedures were applied to the data to verify or disconfirm the model of wilderness behavior proposed earlier by the researcher.
8. Qualitative Data Collection

This study combines quantitative and qualitative research approaches to learn more about wilderness oriented responses over and following participation in an adventure or field ecology program. Wilderness attitude, intentions and behavior are not developed or manifest on the basis of predetermined responses to predefined objects, but rather as the individual interprets, defines and symbolically represents his/her construction of meaning. Such perceptions can only be studied and understood by having the researcher enter into the defining process through such methods as participant observation (Bogden and Biklen, 1982). Understanding requires a systematic process requiring triangulation of a number of methods and sources, all of which recognize that the researcher is the main instrument of data collection (Burgess, 1982). McCall (1969, p. 4-5) notes that there are several methods of data collection from which the participant observer may choose, including: direct observation, direct participation, respondent interviewing, and document analysis. All of these methods were applied in the study at hand. The researcher utilized the following types of data:

- **Written interview transcripts** from taped interviews with 4 purposefully selected participants per program conducted early and late in the program (i.e., second and second last days). Participants were asked a variety of relevant and distractor questions (i.e., regarding instructor quality, safety, social factors) in an effort to reduce the incidence of socially desirable responses (see interview schedules in Appendix B).

- **Fieldnotes**: consisting of separate sections dealing with event chronologies, notes and quotations addressing the research question or subquestions, formative and summative researcher evaluations and reflections, and evolving methodological and analysis considerations (see list of behaviors observed in the field in Appendix C).

- **Slides** taken by the researcher over the program.

The researcher collected data from each session, interview and expedition. A “Day in the Life” chronology for each session or outing was provided (see Chapter IV), along with
comprehensive personal observations and perceptions in view of the research question and specific related subquestions (see Chapter V). Extensive fieldnotes were taken over the course of the programs, including event outlines, participant quotes and researcher evaluations and reflections. The bulk of these notes was taken early in the program and as the research focus narrowed, irrelevant data was ignored and fewer factors were given greater attention. The concept of participant observation in this type of research is of critical import and requires additional elaboration.

**Participant Observation**

Participant observation is used in studies that involve the collection of data through repeated, genuine social interaction on the scene with the subjects themselves (McCall, 1969). As the name implies, the participant observer has a dual role; to appropriately participate in the activity and to observe the social situation (the actors, activities and location). The degree of involvement or direct participation of the observer may vary. Spradley (1980) describes a continuum of participation which ranges from complete participation (researcher considered an ordinary participant) to non-participation (researcher doesn't interact with subjects). Between these two extremes lie researchers who are active participants, moderate participants and passive participants. The key in taking any of these researcher/participant roles is that the participant observer must be able not only to play the roles, but also to evaluate them, to evaluate their relationships with their informants and the influence that their role performance may have on the data collected (Burgess, 1982).

In this study, the researcher studied the groups while acting as a participant observer. The researcher acted as an intern instructor interested in learning how to become a more effective leader while helping conduct the research. This role allowed the researcher to balance time spent participating, asking questions and observing participants, and both of the programs studied were quite amenable to this approach. This role was most easily applied in the Audubon program, where the researcher had only a moderate level of knowledge. The Outward Bound program was
somewhat more challenging, as the researcher had to constantly fight her natural tendency to "lead". However, the researcher has ten years of experience facilitating adventure programs, was very comfortable working in the natural setting with this type of group and feels she was quite successful in playing the role as intended.

The strength of the selected researcher role in this situation was that the group was allowed to function normally. More importantly, the researcher minimized her impact on the ways in which wilderness attitudes, intentions and behavior emerged within the unit. In addition, the prolonged period of observation and interaction contributed to enhancing the credibility or "truth value" of the study. However, the researcher's familiarity with the programs may also be a source of potential concern. The more one knows about a situation as a participant and the longer the period of involvement, the more difficult it is to maintain sufficient intellectual and emotional distance to observe and recognize the tacit cultural rules emerging (Spradley, 1980). The researcher was aware of this potential interference factor and worked to minimize its effect.

As students made ongoing notes and journal entries themselves, the taking of fieldnotes by the researcher was not as obtrusive as it may be in situations where no one takes notes. Similarly, a number of participants carried a camera and photographing various participants, activities and settings did not appear unnatural. While interviews of participants was obtrusive, almost all of the remaining qualitative data collection methods appeared to have minimal interference potential.

9. The Verification of Qualitative Data Collected

While engaged in quantitative research, the researcher must be concerned with the validity and reliability of the data collection effort. The qualitative research equivalents are concerned with verifying the trustworthiness of the data collected. The four factors of primary interest are truth value (validity), applicability (generalizability), consistency (reliability) and neutrality (objectivity) (Lincoln and Guba, 1985).
As noted above, truth value is enhanced through triangulation and cross-referencing of the variety of sources of data collected. It is also supported through the use of member checking, reconfirming things said and done by participants and/or staff. A number of member checks were conducted in order to verify data and interpretations and enhance emic validity. The extended presence of and prolonged observation by the researcher is a third way in which truth value is enhanced.

Naturalistic inquirers do not make themselves responsible for the generalizability of their findings to other program situations. Instead, they provide detailed "thick" descriptions of the study environment and allow the readers to decide applicability for themselves. In addition to providing such program descriptions in Chapter IV, this researcher also attempted to promote applicability by selecting well-known programs, often considered leaders in their respective areas (i.e., environmental and adventure education). Each program had a 25 year history and literally dozens of other programs cloned on the basis of its content and process.

Consistency or reliability is enhanced in the same ways in which truth value is encouraged. Triangulation of sources, prolonged observation and member checking all served to improve the reader's confidence in the consistency of data collected.

Finally, neutrality is an important issue in naturalistic inquiry. Value-free psychological research is a worthy objective, but largely unattainable in either naturalistic or rationalistic approaches. In qualitative research, because of the extended period of exposure, the researcher must take steps to ensure that the presence of personal biases, motivations, interests and perspectives while not easy to eliminate, are at least taken into account. A reflexive (self-evaluative) journal was kept in order to help the researcher identify potential biases and rectify these before they became problematic (Lincoln and Guba, 1985).

In sum, the researcher took steps in the field and will continue to attend to factors affecting the trustworthiness of the research effort in the remaining chapters of this study. The methods of data analysis selected described below will help illustrate some of these efforts.
10. Qualitative Data Analysis

Analysis of qualitative data involves the systematic searching and organizing of fieldnotes, interview transcripts and other materials into manageable units to facilitate presentation and interpretation. With the variety of qualitative data forms collected in this study, data analysis began early in the study and eventually occurred simultaneously with data collection.

The data was analyzed using a conceptual analysis approach. This inductive approach is useful in discovering the emic (participants') and etic (researcher's) meanings of the facts and in interpreting evolving themes in relation to the original question. The process included the collection of observations relevant to the research question and subquestions, identification of themes and patterns and interpretation of these patterns. The data was summarized by frequency, itemization and/or description as appropriate and is presented in Chapter V.

A micro computer was used to record, synthesize and present the data. The researcher set up coded computer files addressing each of the subquestions identified (cognitive, attitudinal, behavioral, expectations and evaluations) and computer analysis facilitated triangulation and cross-referencing between these files. All entries were coded for relocation in original sources and to facilitate cross-referencing among files. Each entry was set up with a split page method permitting easy visual association between fieldnotes/quotes/other actual data and the researcher's observations/evaluations/interpretations/evolving questions. The computer was also useful in displaying the data in tabular form.

In sum, the qualitative data was collected and reduced into manageable portions, displayed in a manner conducive to scrutiny by the reader, and analyzed and interpreted in relation to the answering of the research question and subquestions. The qualitative data related to program itineraries and process resulted in a descriptive chapter (IV). The remaining relevant qualitative data was summarized, analyzed and presented in Chapter V. In Chapter VI, the results of the qualitative data analysis are discussed in conjunction with the quantitative data collected in attempting to explain the outcomes and trends identified in each program.
III. References


CHAPTER IV

PROGRAM DESCRIPTIONS

In this chapter, the researcher provides descriptive outlines of the programs studied. This review of the content and process of each program is important for the analysis of the quantitative and qualitative results presented in Chapter V and discussed in Chapter VI of this study. In addition, this description is essential for the reader who may be attempting to ascertain the generalizability of the study findings to other program situations.

The programs are presented in the following order:

A. Audubon Resident Field Ecology Camp

B. Audubon Wilderness Research Backpack Program

C. Colorado Outward Bound School (one patrol's experience)

As the researcher was only able to travel with one Outward Bound patrol, no effort has been made to describe the experience of any other groups. The one known exception in treatment mentioned (the visitation by the school director) is duly noted as an exception in this group's program. For each program, an outline of the program chronology is presented to show the scope and depth of the itinerary. A "Day in the Life" detailed description is also provided in order to illustrate the teaching/leading methods and styles adopted and the participants' involvement and responses. This account is not meant to suggest a "typical" day, as in most cases in such short programs, every day is quite different from the others.
A. Audubon Resident Field Ecology Camp

The National Audubon Society is recognized worldwide as one of the foremost leaders in environmental research, education and lobbying. In its 25th year of operation in 1987, the Audubon Field Ecology Camp in the West is directed out of the University of Wyoming’s Trail Lake Ranch. Adjacent to Shoshone National Forest (the first National Forest in the U.S.), the ranch lies in the glaciated Torrey Creek Valley. The camp itself consists of a number of buildings. The main structure contains a dining area, office, laboratory, library and lounge area. There is a large program lodge and a large teepee which is also occasionally used for programming. Living quarters include a number of separate rustic cabins for staff and campers with washrooms and laundry facilities located in outbuildings. A dirt access road runs along the creek side of the camp, leading up the valley to a trailhead area used extensively by hikers and backpackers to access the Fitzpatrick Wilderness Area, less than two miles from the camp.

Resident campers are treated to wholesome country style meals served up by the cook staff. Camp staff also take care of laundering bedding linen on a weekly basis. These supports minimize time spent in subsistence activities and allow resident campers more time to participate in sessions and recreational activities.

Recreationally, a number of horses are kept at the ranch for staff and program use (e.g., taking food drops into the Wilderness Research Backpacking Program). A fleet of Grummans is kept on a canoe trailer ready for early morning canoe explorations down winding Torrey Creek from the furthest upstream cabin down to Trail Lake (about 1 1/2 miles). At about 7800’, the camp also boasts possession of the world’s most scenic volleyball court.

The participants in the session studied were adults from all corners of the States (e.g., California, New Mexico, New York, Pennsylvania, Minnesota, Washington, etc.). There were 16 schoolteachers (of the 54 resident campers), but many other walks of life were represented.
Among the varied professions represented, there was a pediatrician, a horticulturist and an engineer. There was also a nun, a lawyer and a woman who worked as an interpreter for the United Nations. When given an opportunity to introduce themselves the first evening, most revealed that they had had some environmental and/or outdoor education/recreation experience, but a few openly admitted having precious little of either. At least half a dozen noted that they were or had been actively involved in environmental issues in their states.

The program staff, each experts in their own respective scientific areas, were easily identified by the big smiles and khaki brown uniform shirts they wore at all times. There were eight teaching staff, resulting in a staff/participant ratio of about one to seven.

The program was designed in five-six day blocks, with a rest/special event day in between. The first week was planned so participants could meet each of the seven instructors while rotating around with the same small study group (about 13 per group). During the second block, individuals were free to sign up for a variety of mini-courses to allow pursuit of personal interest areas. Sign-up sheets were posted with registration limits and everything was run on a first-come first-served basis. Those taking the camp for university credit were expected to attend most sessions while others were free to join in, or to rest or do other activities as they wished. Inspite of the flexibility offered, participation rates for class sessions was always well over 90%.

The general daily schedule of events was:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wake up</td>
<td>6:45 am</td>
</tr>
<tr>
<td>Breakfast</td>
<td>7:15</td>
</tr>
<tr>
<td>Class</td>
<td>8:30-11:15</td>
</tr>
<tr>
<td>Lunch</td>
<td>12:00 noon</td>
</tr>
<tr>
<td>Free time</td>
<td>12:30-2:00 pm</td>
</tr>
<tr>
<td>Class</td>
<td>2:00-4:45</td>
</tr>
<tr>
<td>Dinner</td>
<td>6:00</td>
</tr>
<tr>
<td>Free time</td>
<td>6:30-8:15</td>
</tr>
<tr>
<td>Evening program</td>
<td>8:15-</td>
</tr>
</tbody>
</table>
The entire program schedule was as follows:

Week One

Sunday, July 5 (Day 1)

5:00 pm - bus arrives with participants
6:30   - dinner
8:15   - staff and participant introductions

- welcome, history of camp and camp rules (e.g., leave bones, plants and rocks in place) from Pat Alcott, camp director
- sang "All Along the Great Divide", a song which became the camp theme song (see Appendix D for words)

(Day 2)

8:30 - pretest administration of questionnaire for the study at hand
9:15 - orientation walk - all teaching staff accompanied the group and gave a general introduction to the natural and cultural history of the Torrey Valley. An emphasis was placed on the interrelationships between living and non-living elements (e.g., climate, rocks, soils, insects, birds, mammals) as well as on the impacts of man.

2:00 - over the next four and a half days, with the exception of the afternoon of Day Four, four groups of participants (about 13/group) rotated around the following half day sessions: geology, terrestrial ecology, ornithology, botany, insect ecology, aquatic ecology and human ecology.

- on the afternoon of Day Four, participants were free to choose between three sessions: canoeing (2:00-3:30/4:30-6:00), Waterfall hike (2:00) or Bomber Basin hike (1:30).
6:00 am

(Day 3 and 5) - Bird Walk

(Day 4 and 6) - Canoe

8:15 pm

(Day 2) - Skills Night (Beginning Birding; Insect Pinning; Herbarium Mounting)

(Day 3) - Songs of Wyoming - a guitar/banjo and singing concert presented by Tim Schwarz, one of the teaching staff

(Day 4) - Homesteading in Torrey Valley - a visitation by Charlie Beck, a 90 year old man who settled the valley and still lives there

(Day 5) - Optional hike to the rim (top of valley above camp)

(Day 6) - Square dance

July 11 (Day 7) - Teton Trip (trail ride, picnic and raft float trip) or Free Day

Week Two

8:30 am - participants signed up for half day sessions (with maximum numbers set; first-come first-served). Each session was offered twice over four days (Days 8-10 and Day 12). These sessions included: butterflies and moths; 'dem bones; fossils; pollination ecology; invisible plants; glorified reptiles (mammals); badlands; solar energy; ecology of bird songs; petroglyphs; pond ecology; fruits, nuts and seeds; plant taxonomy, mysteries of the sky and environmental education (see Appendix E for brief course descriptions).

(Day 11) - All day hikes: Whiskey Mountain; Lake Louise or Unicorn Pass

(Day 12) - an optional all day session entitled Balancing on the Rim (human ecology) was offered to help bring together the whole program
8:15 pm

(Day 8) - Visitation from Marshall Case (Audubon Vice President)

(Day 9) - The Greater Yellowstone Ecosystem: Bears and Wolves

(Day 10) - Camper Slide Night: Forest Recreation Management in California

(Day 11) - Stars and Stories: Astronomy and Greek Mythology

(Day 12) - posttest administration of questionnaire for the research at hand

- Graduation Night - songs, skits, certificates handed out

July 17 (Day 13)

- a short closure walk; emphasizing the need to use what we'd learned
- breakfast
- the bus left with participants at 8:00 am.

Over the course of this camp, participants received or were free to take a wide variety of handout materials including but not restricted to: staff biographies; camper address lists; course outlines and descriptions; butterfly, bird, mammal and other life lists of Torrey Valley species; hiking trail guide sheets for local trails; Audubon Journals; environmental education idea sheets; environmental action newspapers and xeroxed articles. The library and lounge were also well stocked with both technical scientific books and deep ecology and environmental education texts.

In order to illustrate more thoroughly the content and process of the program presented, following is a single “Day in the Life” record of events at the Resident Field Ecology Camp.

July 12 (Day 8)

Weather - cool (70 degrees Fahrenheit) and breezy (blowing down the valley); partially overcast in morning, clearing in afternoon.
5:30 am - up for an early morning canoe trip; paddled down to the lake with Kathy (a leader) and the group

7:15 - breakfast - pancakes, ham, orange juice and tea

8:30 - "Dem Bones" Session with Harry

- Harry began outside by showing his climbing equipment (helmet, chalk, chocks, friends, crampons, ice axe, etc.) to illustrate how form is related to function.
- humans not only have their own form, but also develop tools to perform techniques.

It is opposite in the natural world; there things start with form and develop function
(See handout on function/form relationship in Appendix F).

9:00 - Harry moved the session indoors to discuss bones

- Harry apologized for the quantity and technical depth of his session, suggesting that participants just absorb what they can.
- discussed the evolution of teeth - question/answer approach was used to get at the relationship of carnivores, herbivores and omnivores to tooth development
- dentine v. enamel - enamel wears down - geology parallel
- chewing up and down = carnivore; chewing side to side = herbivore
- predator/prey - prey species (eyes on side of head) v. predators (eyes in front);
- humans have eyes in front because of our primate evolution; swinging in trees required ability to see in front
- dog/cat chewing - cats can only slice meat (carnicial)
- Harry had a large box (wooden with shelves) with various skulls which he handed around after discussing each.
- Dog family members kill by eviscerating (belly/anus)
- Cat family members kill by throttle killing (therefore short snout)
- sabre-tooth tigers used their sabre-tooth to stalk prey

10:00
- Harry took us up across the creek to see an elk carcass from last winter
- he asked whether the pile of brown stuff looked like grass, soil or hair (grassy because it was the remains of the animal's guts)
- interestingly, we found a collection of flicker feathers nearby
- Harry moved onto the topic of running
- discussed increased stride length and rate in stereotypical ways
- increased length of leg bones in proportion to size of animal (lower arm/leg bones increase length; not upper)
- relationship of lower limb (including carpals) to upper - if 1.5 = feet (digitigrade); if over two very fast (e.g., cheetah) unguligrad
- shortest proposition implies a digging animal
- 1 = plantigrade; 1 = plantigrade/digger
- scapula shifted to side in fast runners
- reduced or no clavicle also increases stride length
- large supraspinatus, forward extension muscles strong, weak abductors (infraspinatus)
- sheep run on rock, therefore can't have any flexibility laterally; therefore less fore-aft stability than elk, etc. (therefore bigger infraspinatus)
- increase spine flexion to gain stride length (e.g., cheetah) coordinated with leg length
- showed good flex of sheep skeleton spine; elk spine is very stiff by comparison, but the animal is still fast because of limb length; on turning corners would result in instability
- faster animals have muscle attachment closer to get greater angle of rotation (increase speed by decreasing power); fulcrum closer to resistance increases power
- increased stride length also results in increased stride speed
- \( V_0 \) (velocity) \( = V_1 \) (contraction speed) \( \times \) \( L_0 \) (lever arm out)\( /L_i \) (lever arm in)
- faster muscle contraction results from shortness of stride
- close attachment to bone results in increased speed of running, therefore shorter lever arm above fulcrum than below
- push off from hip to begin acceleration resulting in power; also bigger gluteals
- quadruped/bipedal - olecrannon in bipedal is more vertical
- addition of velocities - more joints moving result in increased speed; e.g., plantigrade (slowest), digitigrade, unguligrade (fastest).
- cheetah times spine flexion with leg movement to increase speed
- Harry asked us how we could apply all of this information: e.g., find a bone on north side of valley, look at deepness of groove, length, where on body (e.g., olecrannon v. patellar groove, etc.), trochanter location, etc. to identify animals
- had class try to guess identity of small bones; scapula, tibia and pelvis (fetal sheep)
- on walk back, a number of participants commented that they found the session very technical and found that Harry's fast delivery also made it difficult to follow

12:15
- lunch - vegetable beef soup, ham and cheese bunwiches, cookies, fruit and kool aid

12:45
- 14 of us played volleyball for an hour to work off some lunch

2:00
- Butterflies and Moths session with Boris
- Boris began by talking about the abundance of lepidoptera species
- he noted important biological indicators (marker species) and the ease of working with them versus other insects
- there are 2-300 butterfly species and 3-500 moth (macro) species
- 50' increase in elevation = 100 miles travel north
- butterflies taste with their feet, then sip nectar with their probiscus
- the Rockies are second only to the tropics in number of species they are home to
- viewed slides of various species and of the Wilderness Research Backpack Program
- we walked over to the meadow across the creek
- picked up Cecelia (66 year old) participant who was walking last and stumbled on the uneven terrain
- took our butterfly nets and caught various butterflies and moths which we tried to match to sample cards provided; later Boris identified and interpreted each for us
- in closing, Boris talked about using rare and endangered species to stop various resource development projects and suggested we have to work with developers to find ways to do things more ecologically soundly

5:00
- kayaked down to the lake and back up to my cabin (tough work coming back up)

6:30
- dinner outside - cabbage, potatoes, carrots and sausage in a stew cooked in big milk cans over an open fire, homemade ice cream, kool aid

7:00
- entered into an informal session on Endangered Species, lead by Harry
- Harry began by noting two endangered species in U.S.: condors (4 left) and black-footed ferrets (14 left on a ranch nearby).
- he stimulated discussion by stating that it takes a lot of money to save a few "sexy species"; money which could perhaps be spent elsewhere (e.g., buying land)
- is extinction natural? we have seen habitat destruction effects; what of interactions among biotic and abiotic factors, known and unknown at present?
- should we save all species? what about smallpox? AIDS? who are we to decide?
- AIDS started in monkeys; should we have killed all the monkeys?
- Harry posed lots of questions like these, allowing the group to discuss their answers
- education is crucial; time outdoors and learning ecology are both vital; how much spent how?
- we don't know if the extinction of any one or combination of species will destroy the planet; consider Barry Commoner's example of taking one piece at a time out of a Swiss watch.
- Earth First example (radical environmentalists) - sabotage etc. gives environmentalists a bad name, but makes headlines and makes other more moderate environmentalists' positions seem more reasonable
- the group was optimistic that the old political guard is being replaced with more ecologically conscious blood
- Adlai Stevenson's Spaceship Earth in the 60's (earth as a mechanism). Now we realize that earth is not a mechanism, but an organism.

8:00
- headed over to the lodge for the evening program
- Marshall Case - Vice President of Audubon arrived as a special guest.
- overview of the National Audubon Society; incorporated in 1905; society formed in 1930's
- 100+ staff; 20 in New York headquarters, 25 in D.C.
- 500+ Audubon Societies in U.S. (local chapters)
- public local pressure on congressmen exerted on various issues
- one issue of interest in the National Wildlife Refuge in Alaska - hunting pressure
- another issue is the Audubon energy plan - many interests addressed including oil (National Energy Policy focus).
- Education an important role - Audubon involved since 1910
- Audubon Adventures; 8-12 year olds - new program; 170,000 youth now involved
- up to 200,000 in next few years; ripple effect of teachers becoming involved
- computer programs (software) are being developed through private funding
- National Americans - Director of Education for Indian Affairs taking Audubon Adventure program to native youth; soon 3-5,000 youth reached
- Marshall Case was involved in the Telico Dam fight where the snail darter was lost (it was thought forever), Cherokee lands were flooded and agricultural lands were lost. Case thought the dam could have been prevented if they had had the networking and organization we have today.

9:30 - campfire singsong, popcorn and marshmallows
12:30 - the last few of us wander off to bed

B. Audubon Wilderness Research Backpack Program (W.R.B.P.)

Participants in this option become involved in the extensive, ongoing research efforts of Audubon biologists, while backpacking in the spectacular Wind River Mountains. The group, limited to ten participants, learn and engage in mammal and bird censusing, insect survey and collection, plant identification and herbarium collection. In addition to the adult age stipulation, registrants must be reasonably fit and able to backpack 5-7 miles/day. The wilderness research backpackers studied explored and inventoried in the Fitzpatrick Wilderness Area and lived and hiked between 10 and 14,000' over their eight day trip.
The small unit of three staff (two leaders and one assistant) and ten participants (most with little or no previous field research experience) function as a self-sustaining unit for most of the 11 days they are at the camp. Other than taking meals with the resident campers prior to and upon returning from their expedition, there is little or no contact between these groups.

The schedule followed by the W.R.B.P. studied is described below. As the researcher could not follow both the resident and backpacking groups simultaneously, two 24 hours visitations were made to the backpackers over their ten day trip. The remainder of the descriptions were obtained from logs kept by one leader and two participants.

July 5 (Day 1)
5:00 pm - arrive on bus
6:30 - dinner
8:15 - introductions of staff and participants; W.R.B.P. program history; goals and objectives

(Day 2)
7:45 am - breakfast
8:30 - pretest administration of questionnaires for the research at hand
9:15 - orientation walk with all Audubon staff and participants
12:15 pm - lunch
2:00 - personal gear preparation and checking
3:30 - discussion of research orientations; daily routine and low impact camping procedures to be followed (See Appendix G for record of this session).
4:30 - break
6:30 - dinner
7:00 - evening off to make final preparations for trip tomorrow
(Day 3)

7:45 am - breakfast

9:30 - on the trail to Whiskey Mountain Trail

12:00 noon - lunch; lecture on butterfly collection techniques

1:00 pm - on the trail again

3:00 - set camp at Whiskey Springs

- surveyed the day's collection - 2 caterpillars, about 50 butterflies, censused bird species (15-20) and collected flowering plants (1/2 press)
- camp set-up involved setting up tents, a cook tarp, latrine trench, soaking dehydrated supper, setting a bear rope and collecting water
- lecture on Herbarium techniques - other staff collected butterflies, beetles and grasshoppers

6:00 - supper - no fire used

7:00 - watched bighorn sheep on Whiskey Mountain

(Day 4)

7:00 am - breakfast

8:45 - hike to summit - bighorn sheep study; pollination study; planting in alpine tundra; butterfly identification and processing of specimens caught the previous day

12:00 noon - lunch - horses packed food in; sorted and distributed food

- one staff person accompanied one ill participant down to the ranch; remainder hiked to next camp (the sick individual did not return but joined residential program)

2:00 - Ross Bog hike

- pollination studies

- discussion on pros and cons of fires
5:30  - supper - no fire
10:00  - night mothimg after dark; staff processed collected moths

(Day 5)

7:00 am  - researcher arrived before breakfast
9:00  - day hiked down to Ross Lake
        - chatted with a Forest Service Ranger cleaning abused campsites
        - assistant leader caught and cleaned a fish
        - hiked on to Hidden Lake
12:30  - lunch
        - collected specimens - aquatics (larvae and adult forms, plankton tow taken), bog plants, bird census
        - two participants caught 4 fish using butterfly nets; ass't leader caught 4 with rod
5:30  - arrived back at camp, everyone pretty tired
        - dinner - built a sod fire to cook fish and biscuits
7:30  - snake lecture - showed and discussed a garter snake collected the day before

(Day 6)

7:00 am  - researcher departed before breakfast
        - Hiked over Whisky on to Wasson Creek and set camp
3:30 pm  - birding
5:00  - dinner
        - staff processed collections from previous day while participants rested

(Day 7)

8:00 am  - up to sleet then snow; breakfast
10:00  - conifer identification and keying lecture and walk
- plankton tow in creek

12:30 pm  - lunch
- lecture on general research techniques and methods; leaders checking credit campers' notebooks

1:30
- hike to Red Wing Lake to collect aquatics and dragonflies
- nest observation and documentation

5:30
- dinner and birthday party for one participant

7:00
- aquatics and plant collecting
- plant processing

(Day 8)

7:30 am  - breakfast

9:00
- long backpack to Simpson Lake; collected butterflies, censused birds, observed nests

12:15 pm  - lunch at Soapstone; an hour spent collecting: adult aquatics (sweeping); larval insects; plankton tow, algae; plant processing and identification and bird censusing

2:00
- hiked to upper Soapstone meadow - butterflying and planting - Grey Jay search
- Simpson - short hike to Dead Horse and long two hours collecting aquatics, plankton, algae, butterflies, plants and censusing birds

6:00
- supper - cooked fish and cornbread on fire at an established firering

(Day 9)

7:30 am  - breakfast

8:00
- pollination studies and plankton tows; planting

9:30
- hiked to Bighorn Sheep Nursery and Divide
- collected butterflies on the divide and did planting on Bighorn Sheep Nursery
- several sightings of bighorns

5:00 pm  - supper - fire for fish and popcorn

6:30  - collected adult aquatics and larvae at Simpson
- processed and identified plant collections and pinned pollination study specimens;
processed aquatics

(Day 10)

8:00 am  - breakfast - dismantled established fire ring

9:30  - hiked to Dead Horse and Long Lakes for aquatics
- pollination studies at Simpson
- bird nest surveys, bird censusing and meadow plant gathering

1:00 pm  - hiked to north end of Simpson for major stream crossing; demonstrated and
practised crossing technique; lunched and dried feet

3:00  - hiked to Moon Lake
- bird censusing, aquatic sampling and plankton tow at Moon Inlet
- set camp behind Moon
- went for short hike and discovered other campers; returned and moved camp further
away to avoid contact; researcher arrived

4:30  - planting, birding, butterflying; others bathed and napped

7:00  - cooked fish supper in small sod fire pit
- processed aquatics and plants

10:00  - night mothing
- skit preparations

(Day 11)

6:30 am  - everyone up early to pack
- breakfast and clean-up; fire pit dismantled

8:30  - hike to meadow; xerces count; butterflying all day; plant pressing and pollination studies
        - group photos

11:00  - hike to Jakey's Fork Trail meadow for lunch
        - cross-country hike through old timber cut and out warm springs drive
        - increased pace on road down to the pick-up point

2:30  - picked up by camp support staff at designated road access; return to Trail Lake Ranch camp dropping researcher at her vehicle en route
        - showers and laundry

6:30  - dinner

8:00  - clean up group equipment

(Day 12)

8:15 a.m.  - in lab sorting, classifying and labelling collections made.
        - staff and group very satisfied with final results

2:00 pm  - trip, program and staff evaluation

8:15  - posttest administration of questionnaires for the research at hand
        - Graduation night - songs, skits, certificates handed out

July 17 (Day 13)

- short closure walk with all Audubon staff and campers
- breakfast
- bus left with participants at 8:00 am.

In tagging along with this group for a few days, the following "Day in the Life" event record was logged by the researcher to illustrate more thoroughly, the experience of this group.
July 9 (Day 5)

Weather: rained overnight, but cleared as the morning progressed and was mostly sunny in the afternoon; temperature warm (about 75 degrees Fahrenheit) at midday.

5:15 am: packed an overnight pack and jogged up to the backpackers about 6 miles up Whiskey Mountain and down the Ross Lake Trail.
- found the group just rising for breakfast; chatted with everyone and found out what they'd been doing to this point in their trip.
- took pictures in and around camp as everyone packed up for a daytrip to Ross and Hidden Lakes.
- noted that camp established at old horsecamp site; tents set on hard ground, not vegetation; latrine shallow but on high ground; camp really clean (no litter around).

9:30 am: walked down to Ross Lake; lots of garbage around; only one instructor (no participants) was seen picking any up (and then only two pieces).
- chatted with a Forest Service Ranger who spends his time travelling in Shoshone National Forest looking for people (e.g., outfitters) who trash sites. He mentioned the problem of outfitters bringing in hay to feed their horses and unwittingly introducing new weed species into the Wilderness Area.
- the assistant instructor caught a fish (15" rainbow trout); watched him clean it in the lake and dispose of the viscera under a rock about 40' from the water's edge.

11:00 am: walked to Hidden Lake (a two hour boulder walk).
- informally talked about conifer identification, lemon lichen, willow and kinnikinic; looked for pikas in boulders, unsuccessfully.
- route choice down to the lake was quite limited and leaders did a good job of picking a durable route (walking on rock versus soft vegetation).
- leaders lead and swept and left no opportunity for participants to make significant route choices for themselves

12:30 pm - Warren caught another fish (a cutthroat trout) at Hidden Lake as we lunched on salami, cheese, crackers and chocolate bars

1:00 - group split into pairs and spent an hour doing research (censusing birds, collecting samples of sedges, butterflies, flies, aquatic insects and algae). Warren explained that the group was collecting everything they could find as this was the first time Audubon had studied at this lake. They'd been to Ross Lake four times before.

- while the leaders were preoccupied with their collecting, two of the male participants started catching fish with their butterfly nets in a couple of small tributaries. Only one had a fishing license and neither had a license to catch with a net. They caught four cutthroat between them. Warren caught four more with his rod.

2:30 - the fish were all cleaned and the viscera tossed in the bush

- felt grungy and the two women participants and I (The Audubon "All Women's Swim Team") went for a quick dip around the corner of the lake

- we all headed back to camp

- stopped briefly at an old campsite and Kerry (one of the leaders) pointed out the unnecessary scars left by ignorant campers trenching around their tent. There were also a number of cans and an old grill left in the oversized rock ringed fire circle. These we picked up and took with us.

- a few people were moving really slow on the return four mile walk up to camp

- Warren disappeared ahead and Kerry and Marianne (the leaders) asked me to lead the group in while they went ahead to find him and start dinner. I figured there must be some sort of conflict present that I wasn't fully aware of, but as we were within a mile
of camp and on a well setpath, I agreed to help out so the leaders could go ahead and work things out before the group arrived.

5:30
- arrived back tired and thirsty; everyone had run out of treated water
- the girls began cooking dinner, but it was another two hours before we got any water to drink

6:30
- dinner was cooked in a number of phases. Soup was cooked on the two M.S.R. stoves while fish and biscuits were cooked on a sod fire built by Warren and one of the campers. They used rocks to support the old grill Marianne had picked up at the campsite we'd cleaned up earlier. Water was finally boiled for drinks.

7:30
- Kerry showed us a garter snake she had caught last evening and discussed his markings, temperament and senses. While she was holding him out and describing him, he vomited two tiny baby birds he'd eaten the day before. Incredible!
- Warren showed me a spot nearby where a house sized boulder had broken free (frost action probably) and careened down the slope for 100 yards, knocking out a couple of substantial trees (two foot diameter) and rocks en route.
- dishes were washed by two campers in cold water about 50 yards from the tents. The water was dumped there. I helped rinse dishes in hot water on the fire, watching the campers splash their waste water around in the bush instead of around the firesite. Fortunately, the cooksite was at least 30 yards from the nearest tentsite.
- the food hanging tree was about 25 yards from the nearest tent. A pulley system was used to raise the stuff sacks containing all foodstuffs (including gorp, but excluding cookgear and cosmetics).

9:00
- Kerry lent me her sleeping pad and ski jacket and the group research tent and vapor barrier and I crashed. Everyone else was on their way to bed too.
C. Colorado Outward Bound School (C.O.B.S.)

Interestingly, just like the Audubon program studied, the Marble Canyon centered Colorado Outward Bound School was celebrating its quarter century anniversary. The Marble Canyon school has the distinction of being the first Outward Bound School in North America. Today, Outward Bound is recognized as the most widely known exponent of adventure based education in the world. In fact, by 1976, over 300 other institutions, “ranging from correctional agencies to private schools, were adapting Outward Bound into their on-going, on-site, indigenously staffed programs” (Walsh and Gollins, 1976, p. 1). The researcher suspects the number is significantly higher today.

Outward Bound has become most famous, not for its program content, but for its process. That process is best illustrated by the model developed by Walsh and Gollins (1976). In this model, the learner is placed in a unique physical environment (wilderness) and a unique social situation (small patrol). The individual is given a characteristic series of problem-solving tasks, each of which results in some dissonance (uncertainty). Upon successfully solving each task, the learner achieves mastery and subsequently reorganizes meaning.

This model is operationalized through a relatively standard set of activities at Colorado Outward Bound School programs. These include: a backpacking expedition, rock climbing andrapelling, a peak climb, a solo and a mountain marathon.

The Elk Range, the center of the Colorado Rockies and home of the Marble Canyon school, provides an excellent area for this varied program. The range contains six 14,000’ plus peaks and in the very center of this impressive range lies the Maroon-Bells-Snowmass Wilderness area. This wilderness area has 130 miles of marked trails and the largest number of 14,000’ peaks of any comparable area in Colorado (Campbell, n.d.).

The Marble Canyon Outward Bound base camp (9,000’) is built on a lateral moraine. The Marble ghost town is recognized as holding the largest bed of the world’s finest grade marble,
known as Yule Marble. Except for the prohibitive cost of quarrying these deposits, Marble would be a well populated boom town (Campbell, op cit.).

The 33 people attending the C.O.B.S. program at Marble Canyon during the study period came from all over the U. S. and from a wide variety of walks of life. Unlike the Audubon program which had a relatively high proportion of school teachers (about 25%), the Outward Bound program drew participants from a range of professional, business and technical careers. No single job appeared highly represented over the population. Within the patrol that the researcher travelled with, participants included a social worker, a lawyer, an office supply businessman, a computer software salesperson, a special education graduate student and a medical student.

The seven leadership staff had a range of qualifications and related experiences. The school looked for staff with technical expertise, a number of class 4 and class 5 ascents, advanced first aid, and experience teaching and working with special populations. However, the director, Rob, commented that he'd been having a hard time securing qualified staff. While certainly competent, Sam, the leader of the patrol travelled with, had come in through executive programs he'd helped lead and admitted he didn't even know the prerequisites identified on the staff application form.

In living and travelling with one patrol over the ten day course, the researcher's logbook yielded the event summary provided below. No attempt was made to review in detail, the experience of other patrols. The researcher did ascertain that all contained the same basic components identified earlier (i.e., backpack, peak climb, solo, etc.).

Friday, July 24 (Day 1)

12:30 pm  - bus arrived with all participants

  - all participants ran a mile to the truck and gear

  - the director, Rob, welcomed the group and introduced the history/philosophy of Outward Bound

  - pretest administration of questionnaires for the study at hand
- patrols separated and took different routes on two mile hike up to the school

2:00
- lunch; introduced the person we'd walked with to this point
- constructed swarms and crossed a Burma Bridge attached to overhead belay
- arrived at base camp and checked out personal and group gear
- selected our group food for our expedition from overloaded bins

8:00
- made dinner and set beds in wall tents behind base camp
- discussed our personal and group goals and itinerary
- daily closing - each day, one participant (leader for the day) carried a quote book supplied by the leader, Sam and the group journal. One of the leader for the day's tasks was to write a summary of the day's events and combine this with a few selected quotes from the quote book. At the end of the camp, one participant took this journal home and xeroxed and mailed copies to all group members.

(Day 2)
6:00 am
- up and cleaning up the mess left by skunks who marauded the food tent
- breakfast - 2 person cook groups alternating daily

9:30
- on the Lost Creek Trail
- did some tree and flower identification en route; Sam apparently didn't know the difference between the conifers (pine, spruce and fir)

12:30 pm
- lunch on the trail; packs really heavy (too much food)

5:00
- Sam set camp; at a site signed for no camping to allow site regeneration
- put up tarps for shelter; cook site 10' away; cooking on stoves; no bear rope

7:45
- group sensitivity session

9:45
- brief ecology and hygiene session; really late and people really tired

10:15
- closure

(Day 3)
6:30 am
- up and on our way by 9:00
- brief discussion about wilderness designation limitations while en route

12:00
- a quick dip and lunch at Geneva Lake
- on the trail; one member having lots of trouble with ascending with pack

4:00 pm
- hit by hail storm; set camp at Rasputin Lake and made dinner

7:45
- first aid session; participants each trying to teach various components

9:45
- closure

(Day 4)

6:00 am
- up for an early start; Rob arrived

8:00
- belay and climbing school at nearby climbing rocks; heavy emphasis on safety

12:15 pm
- lunch on the rocks; Rob pelting rocks at troublesome marmots and chipmunks to keep them away from our food bags
- climbed and rappelled on into late afternoon

6:00
- ran for camp to avoid an incoming storm; dinner (best pizza I ever made)

8:00
- session with Rob on roots of our wilderness consciousness and deep ecology (See Appendix H for record of this session)

10:30
- closure

(Day 5)

7:00 am
- up, breaky and hoist the packs for the hike over Trail Rider Pass

12:45 pm
- lunch at Snowmass Lake

4:00
- pitched a hasty tarp shelter to avoid incoming rain storm
- ended up staying where we were and setting camp; not very aesthetic camping in avalanche debris area through

5:30
- dinner and free evening discussing important things like, "the dumbest thing I ever did was..."

8:00
- closure
(Day 6)

4:15 am - up for our summit bid on Snowmass (14,000')

10:00 - snowschool - ice axe arrests, glissading

11:00 - on the summit - Yeah! - group pics; hugs all around

1:30 pm - lunch on the rocks en route down

3:00 - pass another patrol heading to a camp partway up the mountain as we descend

4:30 - participants bathed in and along lake; fairly steep slope was inconvenient to climb so
most just rinsed off soap and shampoo with potfuls on shore a few feet from the
water's edge

- Sam went fishing in the lake (without a license)

7:30 - naptime and a fashionably late dinner

8:00 - closure - the day's leader Pete read a poem he'd written asking forgiveness for
trampling all the flowers which fell under our boots today (see Appendix I for this
poem and other selected thoughts and quotes written in the group journal).

(Day 7)

6:30 am - up and on our way back over Trail Rider Pass; a few grumpy folks today (post peak
depression)

12:15 pm - arrived back at the food cache we'd left stuffed in the krumholz at our Day 3 and 4
campsite

- lunched as we repacked the food

- on our way again; multiple trailing to avoid muddy sections of trail (Sam did not
correct this)

5:00 - set group camp at old horsecamp and cooked dinner

- discussed personal goals for solo

- debriefed and dealt with a power issue and conflict with one member
9:30 - set up solo sites up and downstream near Fravert Basin; tucked in just before a big storm hit

(Day 8)

- on solo till evening; read C.O.B.S. Backcountry Handbook for Mountain, River and Desert Areas (See Appendix J for copy of mountain relevant information included).

6:00 pm - got together for dinner cooked by Sam; used huge existing firering; no discussion about use of fires for cooking or warmth or about extinguishing them after use

7:00 - shared our solo experiences; closure; socializing and singing - “Kum ba ya” and “Amazing Grace” while holding hands and standing around a candle in a pot

(Day 9)

- up as individuals wanted to; camp had been attacked by a porcupine during the night, chewing up foodstuffs and containers left lying around. Our camps are always clean when we leave, but they become very messy while we’re using them.

10:30 am - strolled up to Fravert Falls with daypacks while Sam went fishing

12:30 pm - back for lunch; cleaned up

- Sam talked about Greenpeace and the myth of the Rainbow Warrior (when man destroyed the earth and the animals, the Rainbow Warrior would rise up and save them). He described our group as Rainbow Warriors capable of making a difference in the world.

1:45 - backpacking on the trail out

4:30 - arrived at Crystal C.O.B.S. meeting site as other patrols drifted in

- cleaned up in creek

6:30 - great quiche dinner in the pouring rain

8:00 - farewell speech from Rob; a number of participants from all patrols stepping into circle to thank their leaders and each other
(Day 10)

5:00 am
- roused group
- loaded gear into a small terribly overloaded truck

6:00
- mountain marathon (5 miles) back to C.O.B.S. basecamp at Marble

8:00
- real showers and breakfast while sitting at tables and chairs
- posttest administration of questionnaires for the research at hand
- course/instructor evaluations completed
- cleaned up and returned Outward Bound gear

11:30
- group photos and closure
- Sam gave out graduation certificates and pins

12:00 noon
- group hiked down to waiting bus

In addition, the following "Day in the Life" chronology will help illustrate the process experienced.

July 26 (Day 3)

Weather
- a bit of rain overnight, but the day dawned clear and warm; temperature about 78 degrees Fahrenheit by midday; brief hailstorm in late afternoon

6:30 am
- up for a great pancake breakfast cooked by Jan
- cleaned up site really well

9:00
- on the trail; uphill grunt but beautiful view; packs distractingly heavy
- stopped briefly when we heard coyotes/sheep/cows/dirt bikes (we couldn't agree)
- rested while we listened; Sam talked about Wilderness designations in Colorado. He noted that hunting, grazing and mineral rights remain, because these rights were given prior to the Wilderness designation. Water rights are also problematic (e.g., Aurora case at Supreme Court). Permission to tunnel under a Wilderness Area to drain water is the issue in that case. The water in Colorado goes all the way to L.A. on a first-come first-served basis. Water rights are transferrable and the person selling
them doesn't even have to sell to someone on the same drainage (e.g., east-west drainage).

12:00 - lunch at Geneva Lake after a quick skinny dip (everyone but Pete); Sam quite concerned about our safety in diving in, but the water was really clear and at least four feet deep off the rocks from which we shallow dove.

- headed up the trail feeling refreshed
- Sam warned us to bunch up at the corners on switchbacks or he'd make everyone wear helmets (method of avoiding dropping rocks on each other).
- Sam pointed out that there is stability in diversity of species and discussed the problems of monocultures in agriculture, noting how rare they were in nature.

4:00 pm - arrived at the top of the plateau we were to camp on just as a hailstorm hit; dove under our tarps for protection and sat it out on packs

- made camp at Rasputin Lake as soon as the storm abated
- enjoyed some time to rest as we waited for spaghetti dinner; got cleaned up a bit

7:45 - session on A.B.C.'s of first aid, impalements and bleeding. Sam's leadership style here was delegation and it was clearly inappropriate. It was almost funny watching people who have never had any first aid training being forced to teach something as complex as C.P.R.. I felt really uncomfortable watching and not teaching and fortunately Marty, our med student, moved in and taught it.

9:45 - a personal relationships oriented closure

It is hoped that this chapter has been of interest to the reader attempting to understand the content and process of any or all of the programs studied and to make comparisons to outdoor education programs of personal interest. In addition, when reviewed in combination with the statistical and qualitative results identified in the following chapter, this descriptive data will be useful in understanding the findings noted.
IV. References


CHAPTER V

DATA ANALYSIS AND RESULTS

In this chapter, the researcher presents the quantitative and qualitative results of the study. The tremendous amount of data collected necessitated a conscious effort to limit and organize the data and results presented. In an effort to present the quantitative data succinctly, each aspect of the analysis begins with a reiteration of the relevant research and null hypotheses. A .05 alpha level of significance is used throughout.

The researcher begins with a descriptive presentation of the sociodemographic and personal experience data, including chi-square statistical comparisons of the four groups studied: 1) Audubon Residential Camp, 2) Audubon Wilderness Research Backpack Program, 3) Outward Bound General (individuals not in the patrol travelled with) and 4) Outward Bound Patrol (individuals in the patrol travelled with).

Initial group status in regards to basic ecological knowledge, knowledge of minimal impact backcountry technology and attitude toward wilderness issues is presented using chi-square analyses to determine if statistically significant differences between the groups exist. Where such differences are found, they are briefly explained in terms of the specific groups differing and other factors immediately relevant.

In the next section, the researcher identifies changes in knowledge and attitude over the three test administrations: pretest, posttest and six month delayed posttest. Statistically
significant changes within and between groups are illuminated using Analysis of Covariance statistical procedures.

Next, an analysis of the relationship between stated intentions (post and delayed post) and follow-through self-reported behavior is presented. First, all of the data is summarized into frequency data. Then, posttest intentions are correlated with delayed posttest involvement as well as with the intentions stated for the six month period following the delayed posttest. Significant differences between groups and those emerging over the three test administrations are presented.

Finally, Lisrel path analysis is applied to the posttest data in an effort to test the model of reasoned wilderness behavior proposed by the researcher.

Qualitatively, tables of observed program processes, content and field behavior are presented and relevant interview data is also summarized and presented in tables and text. These data summaries will be useful in the Chapter VI discussion of group responses and quantitative/qualitative changes over time in basic ecological and minimal impact knowledge, attitudinal, intentional and behavioral results.

**QUANTITATIVE DATA ANALYSIS AND RESULTS**

**PRETEST DATA: SUMMARY AND ANALYSIS**

**A. PREDISPOSING FACTORS**

The a priori hypotheses of interest here states that:

H1: The populations will be very similar demographically and in terms of past outdoor recreation and wilderness experience. The Audubon group will have more past environmental related experience.

The statistical null hypothesis states:

H0: There will be no difference between the groups with regard to sociodemographics and past experience in outdoor recreation, wilderness and/or environmental activities.
I. Sociodemographic Description and Comparison

Due to the fact that three of the four groups were self-selected, the four groups were analyzed individually. However, as the Outward Bound Patrol group was not self-selected, some effort was made to visually assess the data and statistical results and to consider the larger Audubon and Outward Bound populations as wholes in explaining similarities and/or differences noted. Correlation coefficients for significant relationships will be presented.

For all tables, the groups will be represented by the following abbreviations or letter codes:

<table>
<thead>
<tr>
<th>Group</th>
<th>Abbrev.</th>
<th>Letter Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audubon Residential</td>
<td>AR</td>
<td>A</td>
</tr>
<tr>
<td>Audubon Wilderness Research</td>
<td>AWRB</td>
<td>B</td>
</tr>
<tr>
<td>Backpack</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outward Bound General</td>
<td>OBG</td>
<td>C</td>
</tr>
<tr>
<td>Outward Bound Patrol</td>
<td>OBP</td>
<td>D</td>
</tr>
</tbody>
</table>

a) Gender of Participants

Table 2. The gender of participants by group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>------</td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>41.7</td>
<td>5</td>
<td>55.6</td>
<td>12</td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>58.3</td>
<td>4</td>
<td>44.4</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 0.6953  DF = 3  Prob. = 0.8743

None of the groups are significantly different with respect to gender. The AR program tended to attract more females than males, but all other groups were very evenly divided.
b) Age of Participants

Table 3. The age of participants by group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th>%</th>
<th>B N</th>
<th>%</th>
<th>C N</th>
<th>%</th>
<th>D N</th>
<th>%</th>
<th>Total N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>3</td>
<td>6.3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3.9</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>21-30</td>
<td>4</td>
<td>8.3</td>
<td>3</td>
<td>33.3</td>
<td>13</td>
<td>50</td>
<td>2</td>
<td>33.3</td>
<td>22</td>
<td>24.7</td>
</tr>
<tr>
<td>31-40</td>
<td>13</td>
<td>27.1</td>
<td>2</td>
<td>22.2</td>
<td>10</td>
<td>38.5</td>
<td>3</td>
<td>50</td>
<td>28</td>
<td>31.5</td>
</tr>
<tr>
<td>41-50</td>
<td>18</td>
<td>37.5</td>
<td>2</td>
<td>22.2</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
<td>23</td>
<td>25.8</td>
</tr>
<tr>
<td>&gt;50</td>
<td>10</td>
<td>20.8</td>
<td>2</td>
<td>22.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>13.5</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 27.8384 DF = 12 Prob. = 0.0058*

There is a significant moderate (Davis, 1971) association between age and group (Pearson's R = -0.406). The Audubon groups were, in actuality, about 10 years older (mean age 44) than the Outward Bound groups (mean age 34). The Audubon residential group had a fairly strong representation from the 50+ category (10=21%) while neither of the Outward Bound groups had any members this old and in fact, had only 3 members (9.4%) in the 41-50 category.
c) Marital Status of Participants

Table 4. The marital status of participants by group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Never Married</td>
<td>12</td>
<td>25</td>
<td>4</td>
<td>44.4</td>
<td>12</td>
<td>46.2</td>
<td>4</td>
</tr>
<tr>
<td>Married</td>
<td>25</td>
<td>52.1</td>
<td>2</td>
<td>22.2</td>
<td>8</td>
<td>30.8</td>
<td>1</td>
</tr>
<tr>
<td>Separated</td>
<td>3</td>
<td>6.3</td>
<td>1</td>
<td>11.1</td>
<td>2</td>
<td>7.7</td>
<td>0</td>
</tr>
<tr>
<td>Divorced</td>
<td>7</td>
<td>14.6</td>
<td>2</td>
<td>22.2</td>
<td>4</td>
<td>15.4</td>
<td>1</td>
</tr>
<tr>
<td>Widowed</td>
<td>1</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
</tr>
</tbody>
</table>

Chi-square = 9.7476  DF = 12  Prob. = 0.6381

There was no significant association between group and marital status. However, half of all Outward Bound participants had never been married compared to only a quarter of all Audubon participants. Conversely, about a half of all Audubon participants were married compared to only a quarter of all Outward Bound participants.
d) The Presence of Dependent Children at Home.

Table 5. The presence of dependent children at home for participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th>A %</th>
<th>B N</th>
<th>B %</th>
<th>C N</th>
<th>C %</th>
<th>D N</th>
<th>D %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>22</td>
<td>45.8</td>
<td>2</td>
<td>22.2</td>
<td>8</td>
<td>30.8</td>
<td>0</td>
<td>0</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td>54.2</td>
<td>7</td>
<td>77.8</td>
<td>18</td>
<td>69</td>
<td>6</td>
<td>100</td>
<td>57</td>
<td>64</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 6.4432  DF = 3  Prob. = 0.0919

There is no significant association between program group and the presence of dependent children at home. In every case, more group members did not have dependent families at home compared to those that did. Considering the differences in age and marital status noted helps to explain the trends and differences found in the data. In the Audubon groups, it is likely that many of the participants had grown families, while in the Outward Bound groups, the larger proportion of younger and never-married participants suggests less likelihood of these people having started their families.
e) Racial Heritage of Participants

Table 6. The racial heritage of participants by group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N %</th>
<th>B N %</th>
<th>C N %</th>
<th>D N %</th>
<th>Total N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>1 2.1</td>
<td>0 0</td>
<td>0 0</td>
<td>0 0</td>
<td>1 1.1</td>
</tr>
<tr>
<td>Asian/Pac.</td>
<td>0 0</td>
<td>0 0</td>
<td>2 7.7</td>
<td>0 0</td>
<td>2 2.2</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0 0</td>
<td>0 0</td>
<td>1 3.9</td>
<td>0 0</td>
<td>1 1.1</td>
</tr>
<tr>
<td>White</td>
<td>47 97.9</td>
<td>9 100</td>
<td>23 88.5</td>
<td>6 100</td>
<td>85 95.5</td>
</tr>
<tr>
<td>Total</td>
<td>48 100</td>
<td>9 100</td>
<td>26 100</td>
<td>6 100</td>
<td>100</td>
</tr>
</tbody>
</table>

There was no significant relationship between racial heritage and group participation.

Almost all participants in all groups were of white, non-Hispanic heritage.
f) Present Place of Residence

Table 7. The present place of residence of participants by group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>Total</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td></td>
<td></td>
<td>B</td>
<td></td>
<td>C</td>
<td></td>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N %</td>
<td></td>
<td></td>
<td>N %</td>
<td></td>
<td>N %</td>
<td></td>
<td>N %</td>
<td></td>
<td>N %</td>
<td></td>
</tr>
<tr>
<td>Metro-Urb.</td>
<td>10</td>
<td>20.8</td>
<td></td>
<td>1</td>
<td>11.1</td>
<td>11</td>
<td>42.3</td>
<td>5</td>
<td>83.3</td>
<td>27</td>
<td>30.3</td>
</tr>
<tr>
<td>Metro-Sub.</td>
<td>25</td>
<td>52.1</td>
<td></td>
<td>1</td>
<td>11.1</td>
<td>7</td>
<td>26.9</td>
<td>1</td>
<td>16.7</td>
<td>34</td>
<td>38.2</td>
</tr>
<tr>
<td>Small Town</td>
<td>8</td>
<td>16.7</td>
<td></td>
<td>2</td>
<td>22.2</td>
<td>3</td>
<td>11.5</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>14.6</td>
</tr>
<tr>
<td>Rur. Non-F.</td>
<td>2</td>
<td>4.2</td>
<td></td>
<td>2</td>
<td>22.2</td>
<td>3</td>
<td>11.5</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>7.9</td>
</tr>
<tr>
<td>Farm</td>
<td>2</td>
<td>4.2</td>
<td></td>
<td>1</td>
<td>11.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2.1</td>
<td></td>
<td>2</td>
<td>22.2</td>
<td>2</td>
<td>7.7</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>100</td>
<td></td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 29.4940  DF = 15  Prob. = 0.0139*

There was a significant moderate relationship (Cramer's V = .33) between present place of residence and group. Most significantly, while almost half of the Audubon participants live in metro-suburban centers, only a quarter of all Outward Bound participants reside in such areas. Conversely, while half of all Outward Bound participants live in metro-urban areas, less than one fifth of all Audubon campers come from such locations.
g) Place of Residence Through Childhood/Adolescence

Table 8. The place of residence through childhood/adolescence of participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>Metro-Urb.</td>
<td>14</td>
<td>29.2</td>
<td>1</td>
<td>11.1</td>
<td>7</td>
</tr>
<tr>
<td>Metro-Sub.</td>
<td>15</td>
<td>31.3</td>
<td>1</td>
<td>11.1</td>
<td>7</td>
</tr>
<tr>
<td>Small Town</td>
<td>11</td>
<td>22.9</td>
<td>3</td>
<td>33.3</td>
<td>8</td>
</tr>
<tr>
<td>Rur. Non-F.</td>
<td>4</td>
<td>8.3</td>
<td>2</td>
<td>22.2</td>
<td>2</td>
</tr>
<tr>
<td>Farm</td>
<td>4</td>
<td>8.3</td>
<td>2</td>
<td>22.2</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 11.8391   DF = 15   Prob. = 0.6912

There is no significant relationship between the place of residence while growing up and group. There appears to be a very even split between groups in association with the places identified. Most were raised in metropolitan-urban, metropolitan-suburban or small town locations. Less than 10% of participants in any group were from rural non-farm or farm homes.
h) Highest Level of Education Completed

Table 9. The highest level of education completed by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A N %</td>
<td>B N %</td>
<td>C N %</td>
<td>D N %</td>
<td>Total N %</td>
</tr>
<tr>
<td>High School</td>
<td>5 10.4</td>
<td>1 11.1</td>
<td>2 7.7</td>
<td>0 0</td>
<td>8 9</td>
</tr>
<tr>
<td>Bachelor's</td>
<td>15 31.3</td>
<td>4 44.4</td>
<td>11 42.3</td>
<td>4 66.7</td>
<td>34 38.2</td>
</tr>
<tr>
<td>Master's</td>
<td>24 50</td>
<td>4 44.4</td>
<td>9 34.6</td>
<td>1 16.7</td>
<td>38 42.7</td>
</tr>
<tr>
<td>Doctorate</td>
<td>4 8.3</td>
<td>0 0</td>
<td>4 15.4</td>
<td>1 16.7</td>
<td>9 10.1</td>
</tr>
<tr>
<td>Total</td>
<td>48 100</td>
<td>9 100</td>
<td>26 100</td>
<td>6 100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 6.8141

DF = 9

Prob. = 0.6565

There is no significant relationship between groups and education attained.
i) Diplomas/Degrees Obtained

Table 10. The diplomas/degrees obtained by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th></th>
<th>B N</th>
<th></th>
<th>C N</th>
<th></th>
<th>D N</th>
<th></th>
<th>Total  N</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>4</td>
<td>8.3</td>
<td>1</td>
<td>11.1</td>
<td>3</td>
<td>11.5</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Education</td>
<td>18</td>
<td>37.5</td>
<td>2</td>
<td>22.2</td>
<td>3</td>
<td>11.5</td>
<td>1</td>
<td>16.7</td>
<td>24</td>
</tr>
<tr>
<td>Science</td>
<td>14</td>
<td>29.2</td>
<td>5</td>
<td>55.6</td>
<td>3</td>
<td>11.5</td>
<td>2</td>
<td>33.3</td>
<td>24</td>
</tr>
<tr>
<td>Arts</td>
<td>10</td>
<td>20.8</td>
<td>1</td>
<td>11.1</td>
<td>14</td>
<td>53.9</td>
<td>3</td>
<td>50</td>
<td>28</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>4.2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7.7</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>25</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 19.6859  DF = 12  Prob. = 0.0733

There is no significant association between diploma/degree obtained and group. The differences in the data trends are explained by the fact that over a third of the Audubon Residential group was trained in an education related field. Over half of the Audubon Wilderness Backpacking group had specialized in a science related discipline. Conversely, the Outward Bound groups were better represented with people trained in the arts, with about half of each subgroup receiving a diploma or degree in this area.
j) Personal Income

Table 11. The personal income brackets of participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>&lt;$10,000</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>10-19,999</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>20-29,999</td>
<td>9</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>30-39,999</td>
<td>9</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>40-49,999</td>
<td>10</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>50-59,999</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>&gt;$60,000</td>
<td>11</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>9</td>
<td>26</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 30.0915  DF = 21  Prob. = 0.0902

There is no significant difference between groups with respect to personal income. The average income for all groups considered together is in the $30 - 40,000 bracket, with only the AWRB group averaging well below this level.
### k) Occupation

Table 12. The occupational areas of participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1 2.1</td>
<td>0 0</td>
<td>0 0</td>
<td>0 0</td>
<td>1 1.1</td>
</tr>
<tr>
<td>Education</td>
<td>21 43.8</td>
<td>4 44.5</td>
<td>4 15.4</td>
<td>0 0</td>
<td>29 33</td>
</tr>
<tr>
<td>Professions</td>
<td>11 22.9</td>
<td>0 0</td>
<td>6 23.1</td>
<td>2 33.3</td>
<td>19 21.6</td>
</tr>
<tr>
<td>Technical</td>
<td>2 4.2</td>
<td>2 22.2</td>
<td>4 15.4</td>
<td>1 16.7</td>
<td>9 10.2</td>
</tr>
<tr>
<td>Business</td>
<td>1 2.1</td>
<td>0 0</td>
<td>8 30.8</td>
<td>2 33.3</td>
<td>11 12.5</td>
</tr>
<tr>
<td>Blue Collar</td>
<td>0 0</td>
<td>0 0</td>
<td>1 3.9</td>
<td>0 0</td>
<td>1 1.1</td>
</tr>
<tr>
<td>Student</td>
<td>5 10.4</td>
<td>2 22.2</td>
<td>0 0</td>
<td>1 16.7</td>
<td>8 9.1</td>
</tr>
<tr>
<td>Retired</td>
<td>6 12.5</td>
<td>1 11.1</td>
<td>0 0</td>
<td>0 0</td>
<td>7 8</td>
</tr>
<tr>
<td>Other</td>
<td>1 2.1</td>
<td>0 0</td>
<td>2 7.7</td>
<td>0 0</td>
<td>3 3.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>48 100</td>
<td>9 100</td>
<td>25 100</td>
<td>6 100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 41.6111  
DF = 24  
Prob. = 0.0143*

There was a significant moderate association (Cramer's V = .40) between group and occupation. This relationship is explained by the high proportion (almost half) of Audubon participants involved in education related careers. The Outward Bound participants more strongly represent business (31% of all OB participants) and the professions (25% of all OB participants).
In sum, the four groups are significantly different with respect to their age, place of residence and occupation. All of the associations identified are low to moderate. The participants do not differ significantly with respect to gender, marital status, race, presence of dependent children in the home, place of residence while growing up, level of education completed, degrees/diplomas obtained or personal income.

It should be noted that in all three of the significant relationships identified, the large number of cells (20-36) combined with the small n's of at least two of the study groups (Audubon Wilderness Research Backpack and Outward Bound Patrol) may lead to apparent significant relationships where none exists in reality.

II Past Experience

Chi-square analysis was performed on the four groups to determine whether any group(s) were more strongly represented by members with outdoor education/recreation and/or environmental education activity experiences to date.

1. Participation in informal camping as a child/adolescent.

   a) Engagement in family camping (auto) as a child/adolescent.

Table 13. Engagement in family camping (auto) as a child/adolescent by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>29</td>
<td>60.4</td>
<td>5</td>
<td>55.6</td>
<td>16</td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>39.6</td>
<td>4</td>
<td>44.4</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 1.7679  DF = 3  Prob. = 0.6220
There is no significant association between group and participation in family camping (auto) as a child or adolescent. In all except the Outward Bound Patrol group, fewer participants remember engaging in this type of activity than do.

b) Engagement in family camping (primitive) as a child/adolescent.

Table 14. Engagement in family camping (primitive) as a child/adolescent by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th>A %</th>
<th>B N</th>
<th>B %</th>
<th>C N</th>
<th>C %</th>
<th>D N</th>
<th>D %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>35</td>
<td>72.9</td>
<td>9</td>
<td>100</td>
<td>20</td>
<td>41.7</td>
<td>4</td>
<td>66.7</td>
<td>68</td>
<td>76.4</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>27.1</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>66.7</td>
<td>2</td>
<td>33.3</td>
<td>21</td>
<td>23.6</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 3.4228  DF = 3  Prob. = 0.3309

There is no significant relationship between group and primitive family camping involvement as a child/adolescent. In all cases, more participants did not engage in this activity than did.
c) Engagement in wilderness travel as a child/adolescent.

Table 15. Engagement in wilderness travel as a child/adolescent by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th>A</th>
<th>N</th>
<th>%</th>
<th>B</th>
<th>N</th>
<th>%</th>
<th>C</th>
<th>N</th>
<th>%</th>
<th>D</th>
<th>N</th>
<th>%</th>
<th>Total</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
<td>38</td>
<td>79.2</td>
<td>8</td>
<td>88.9</td>
<td>20</td>
<td>41.7</td>
<td>5</td>
<td>83.3</td>
<td>71</td>
<td>79.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>10</td>
<td>20.8</td>
<td>1</td>
<td>11.1</td>
<td>6</td>
<td>12.5</td>
<td>1</td>
<td>16.7</td>
<td>18</td>
<td>20.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 0.65250  DF = 3  Prob. = 0.8843

There is no significant difference between groups with respect to participation in wilderness travel as a child/adolescent. More than three-quarters of all participants had not engaged in this activity as a youth.

2. Participation in Organized Outdoor Education/Recreation Programs

a) Scouts/Guides

Table 16. Involvement in Scouts/Guides during youth by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th>A</th>
<th>N</th>
<th>%</th>
<th>B</th>
<th>N</th>
<th>%</th>
<th>C</th>
<th>N</th>
<th>%</th>
<th>D</th>
<th>N</th>
<th>%</th>
<th>Total</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
<td>25</td>
<td>52.1</td>
<td>4</td>
<td>8.3</td>
<td>13</td>
<td>50</td>
<td>2</td>
<td>33.3</td>
<td>44</td>
<td>49.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>23</td>
<td>47.9</td>
<td>5</td>
<td>55.6</td>
<td>13</td>
<td>50</td>
<td>4</td>
<td>66.7</td>
<td>45</td>
<td>50.6</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total</td>
<td></td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 0.85  DF = 3  Prob. = 0.8375
There was no relationship between groups regarding participation in scouts/guides during youth. Just over half of all participants had engaged in programs sponsored by these agencies.

b) Boys and Girls Clubs

Table 17. Involvement in Boys and Girls Clubs during youth by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>47 97.9</td>
<td>9 100</td>
<td>24 92.3</td>
<td>6 100</td>
<td>86 96.6</td>
</tr>
<tr>
<td>Yes</td>
<td>1 2.1</td>
<td>0 0</td>
<td>2 7.7</td>
<td>0 0</td>
<td>3 3.4</td>
</tr>
<tr>
<td>Total</td>
<td>48 100</td>
<td>9 100</td>
<td>26 100</td>
<td>6 100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 2.2583  DF = 3  Prob. = 0.5206

There is no relationship between groups in relation to participation in Boys and Girls Clubs programs. Only three participants were involved in these programs at all.
c) Involvement in YM-YWCA programs during youth.

Table 18. Involvement in YM-YWCA programs during youth of participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>Total</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>A</td>
<td>45</td>
<td>93.8</td>
<td>8</td>
<td>88.9</td>
<td>22</td>
<td>84.6</td>
<td>6</td>
<td>100</td>
<td>81</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>3</td>
<td>6.25</td>
<td>1</td>
<td>11.1</td>
<td>4</td>
<td>15.4</td>
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<td>0</td>
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<td>9</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
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<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 2.3824  DF = 3  Prob. = 0.4969

There is no relationship between group and involvement in YM-YWCA programs during youth. Less than 10% of all participants had been involved in programs sponsored by these agencies.

d) Involvement in 4-H programs during youth.

Table 19. Involvement in 4-H programs during youth of participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>Total</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>A</td>
<td>47</td>
<td>97.9</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>88</td>
<td>98.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>1</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 0.8639  DF = 3  Prob. = 0.8341
There is no relationship between group and participation in 4-H programs. Only one participant had been active in 4-H.

e) Involvement in Youth Conservation Corps programs during youth

Table 20. Involvement in Y.C.C. programs during youth of participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>No</td>
<td>47</td>
<td>97.9</td>
<td>9</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>2.1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 0.6533   DF = 3   Prob. = 0.8841

There is no relationship between groups and participation in Y.C.C. sponsored programs.

Only two participants had been involved in Y.C.C. program activities during their youth.
f) Involvement in Municipal Camp programs during youth

Table 21. Involvement in Municipal Camp programs during youth by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>46</td>
<td>95.8</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>4.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 0.6346  DF = 3  Prob. = 0.8885

There is no relationship between group and participation in municipal camp programs.

Only three participants had been involved in such programs.


g) Involvement in Church Camp programs during youth.

Table 22. Involvement in Church Camp programs during youth by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>41</td>
<td>85.4</td>
<td>9</td>
<td>100</td>
<td>22</td>
</tr>
<tr>
<td>Yes</td>
<td>7</td>
<td>14.6</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 7.0457  DF = 3  Prob. = 0.0705
There is no relationship between groups and participation in Church Camp programs.

About a fifth of all participants had attended a church camp during their youth.

h) Involvement in School Camp programs during youth.

Table 23. Involvement in School Camp programs during youth by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N%</th>
<th>B N%</th>
<th>C N%</th>
<th>D N%</th>
<th>Total N%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>46 95.8</td>
<td>8 88.9</td>
<td>26 100</td>
<td>6 100</td>
<td>86 96.6</td>
</tr>
<tr>
<td>Yes</td>
<td>2 4.2</td>
<td>1 11.1</td>
<td>0 0</td>
<td>0 0</td>
<td>3 3.4</td>
</tr>
<tr>
<td>Total</td>
<td>48 100</td>
<td>9 100</td>
<td>26 100</td>
<td>6 100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 2.8651 DF = 3 Prob. = 0.4129

There is no relationship between groups and participation in School Camp programs.

Only three participants had been involved in School sponsored camps.
i) Involvement in other formal camp programs during youth.

Table 24. Involvement in other formal camp programs during youth by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
<th>N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>45 93.4</td>
<td>8 88.9</td>
<td>21 80.8</td>
<td>5 83.3</td>
<td>79 88.8</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 6.3</td>
<td>1 11.1</td>
<td>5 19.2</td>
<td>1 16.7</td>
<td>10 11.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>48 100</td>
<td>9 100</td>
<td>26 100</td>
<td>6 100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 3.0403  DF = 3  Prob. = 0.3855

There is no relationship between groups and participation in other sponsored camp programs.

In sum, there is no significant relationship between formal or informal outdoor education/recreation program experience and group. Other than Scouts/Guides, relatively few participants overall engaged in any of the types of programs identified or in any other formal or informal outdoor education/recreation experiences while growing up.
3. High School, College or University Coursework in Environmental and/or Outdoor Education Related Areas

a) Biology

Table 25. Involvement in biology programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>1</td>
<td>9</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>11.1</td>
<td>34.6</td>
<td>33.3</td>
<td>20.2</td>
</tr>
<tr>
<td>Yes</td>
<td>42</td>
<td>8</td>
<td>17</td>
<td>4</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>87.5</td>
<td>88.9</td>
<td>65.4</td>
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<td>79.8</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>9</td>
<td>26</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 17.4642  DF = 3  Prob. = 0.1016

There is no relationship between groups and biology training. About 80% of all participants had taken some biology course(s).

b) Botany

Table 26. Involvement in botany programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>29</td>
<td>2</td>
<td>24</td>
<td>5</td>
<td>60</td>
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<tr>
<td></td>
<td>60.4</td>
<td>22.2</td>
<td>92.3</td>
<td>83.3</td>
<td>67.4</td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>39.6</td>
<td>77.8</td>
<td>7.7</td>
<td>16.7</td>
<td>32.6</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>9</td>
<td>26</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 17.4642  DF = 3  Prob. = 0.0006  *
There is a significant moderate association (Cramer's V=.44) between group and botany coursework done. The difference is explained by the high proportion of Audubon participants (especially Wilderness Research Backpack) who reported having taken some botany versus Outward Bound participants who took botany in less than 10% of cases.

c) Zoology

Table 27. Involvement in zoology programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>4</td>
<td>24</td>
<td>5</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>58.3</td>
<td>44.4</td>
<td>92.3</td>
<td>83.3</td>
<td>68.5</td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>41.7</td>
<td>55.6</td>
<td>7.7</td>
<td>16.7</td>
<td>31.5</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>9</td>
<td>26</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 12.1627  DF = 3  Prob. = 0.0068*

There is a significant moderate association (Cramer's V=.37) between group and zoology coursework done. Again, while almost half of all Audubon participants had taken some zoology course(s), less than 10% of Outward Bound participants reported such education.
d) Geography

Table 28. Involvement in geography programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N %</th>
<th>B N %</th>
<th>C N %</th>
<th>D N %</th>
<th>Total N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>28</td>
<td>58.3</td>
<td>6</td>
<td>66.7</td>
<td>15 57.7</td>
</tr>
<tr>
<td>Yes</td>
<td>20</td>
<td>41.7</td>
<td>3</td>
<td>33.3</td>
<td>11 42.3</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26 100</td>
</tr>
</tbody>
</table>

Chi-square = 4.2291 DF = 3 Prob. = 0.2378

There is no significant relationship between participation in geography course(s) and group. While none of the small Outward Bound Patrol group had taken any geography, members in all other groups were reasonably evenly divided between having taken or not taken geography.

e) Geology

Table 29. Involvement in geology programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N %</th>
<th>B N %</th>
<th>C N %</th>
<th>D N %</th>
<th>Total N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>31</td>
<td>64.6</td>
<td>2</td>
<td>22.2</td>
<td>19 73.1</td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>35.4</td>
<td>7</td>
<td>77.8</td>
<td>7 26.9</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26 100</td>
</tr>
</tbody>
</table>

Chi-square = 8.7328 DF = 3 Prob. = 0.0331*
There is a significant moderate association between geology education and group (Cramer's $V = .31$). The difference is accounted for by the fact that while over 40% of all Audubon participants had some formal geology training, only a quarter of all Outward Bound participants had any such training.

f) Ecology

Table 30. Involvement in ecology programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>No</td>
<td>32</td>
<td>66.7</td>
<td>4</td>
<td>44.4</td>
<td>23</td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>33.3</td>
<td>5</td>
<td>55.6</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 7.9282   DF = 3   Prob. = 0.0475*

There is a significant low to moderate association between ecology education and group (Cramer's $V = .30$). The difference is accounted for by the higher proportion of Audubon participants (37%) who had some formal ecology training versus Outward Bound participants (only 12.5%) who had taken any such formal training.
g) Anthropology

Table 31. Involvement in anthropology programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th>B N</th>
<th>C N</th>
<th>D N</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
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<td>6</td>
<td>20</td>
<td>4</td>
<td>65</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>9</td>
<td>26</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 0.5088  DF = 3  Prob. = 0.917

There is no significant relationship between group and anthropology coursework. Two-thirds to three-quarters of participants in each group had no formal anthropology training.

h) History

Table 32. Involvement in history programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th>B N</th>
<th>C N</th>
<th>D N</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
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<td>7</td>
<td>4</td>
<td>6</td>
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<tr>
<td>Yes</td>
<td>41</td>
<td>5</td>
<td>20</td>
<td>4</td>
<td>70</td>
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<tr>
<td>Total</td>
<td>48</td>
<td>9</td>
<td>26</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 4.7271  DF = 3  Prob. = 0.1929
There is no significant relationship between history coursework and group. The majority of participants in each group had taken some history.

i) Environmental Education/Interpretation

Table 33. Involvement in environmental education/interpretation programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>Total</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>A</td>
<td>40</td>
<td>83.3</td>
<td>6</td>
<td>66.7</td>
<td>23</td>
<td>88.5</td>
<td>5</td>
<td>83.3</td>
<td>74</td>
<td>83.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>8</td>
<td>16.7</td>
<td>3</td>
<td>33.3</td>
<td>3</td>
<td>11.5</td>
<td>1</td>
<td>16.7</td>
<td>15</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>C</td>
<td>9</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>1</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>1</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 2.26972  DF = 3  Prob. = 0.5183

There is no significant relationship between environmental education/interpretation coursework and group. The majority of participants in each group had not received any such training.
j) Wilderness Management

Table 34. Involvement in wilderness management programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>45</td>
<td>93.8</td>
<td>9</td>
<td>100</td>
<td>83</td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>6.3</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 2.0544  DF = 3  Prob. = 0.5612

There is no significant relationship between wilderness management coursework and group. The majority of participants in each group had not taken any such training.

k) Outdoor Pursuits (activities)

Table 35. Involvement in outdoor pursuits programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>89.6</td>
<td>6</td>
<td>66.7</td>
<td>76</td>
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<tr>
<td>Yes</td>
<td>5</td>
<td>10.4</td>
<td>3</td>
<td>33.3</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 3.2390  DF = 3  Prob. = 0.3562
There is no significant relationship between outdoor pursuits coursework and group. The majority of participants in each group did not report having taken any formal course(s) in this area.

I) Outdoor Education/Recreation Leadership

Table 36. Involvement in outdoor education/recreation leadership programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N %</th>
<th>B N %</th>
<th>C N %</th>
<th>D N %</th>
<th>Total N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>43 89.6</td>
<td>7 77.8</td>
<td>24 92.3</td>
<td>6 100</td>
<td>80 89.9</td>
</tr>
<tr>
<td>Yes</td>
<td>5 10.4</td>
<td>2 22.2</td>
<td>2 7.7</td>
<td>0 0</td>
<td>9 10.1</td>
</tr>
<tr>
<td>Total</td>
<td>48 100</td>
<td>9 100</td>
<td>26 100</td>
<td>6 100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 2.2994  DF = 3  Prob. = 0.5126

There is no significant relationship between outdoor education/recreation leadership coursework and group. The majority of participants in each group did not report having taken any formal course(s) in this area.
m) Other natural science or outdoor leadership courses

Table 37. Involvement in other natural science or outdoor leadership programs by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th>N %</th>
<th>B N</th>
<th>N %</th>
<th>C N</th>
<th>N %</th>
<th>D N</th>
<th>N %</th>
<th>Total N</th>
<th>N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>45</td>
<td>93.8</td>
<td>8</td>
<td>88.9</td>
<td>24</td>
<td>92.3</td>
<td>6</td>
<td>100</td>
<td>83</td>
<td>93.3</td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>6.3</td>
<td>1</td>
<td>11.1</td>
<td>2</td>
<td>7.7</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>6.7</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 0.7629  DF = 3  Prob. = 0.8583

There is no significant relationship between other natural science or outdoor leadership coursework and group. The majority of participants in each group did not report having taken any formal course(s) in this area.

In sum, the groups are not significantly different with respect to their childhood/adolescent outdoor experiences and or formal outdoor education/recreation participation in organized programs. The groups did differ with respect to educational training in botany, zoology, geology and ecology. In all cases, the Audubon populations had more training in these areas than the Outward Bound groups. None of the populations studied differed significantly with respect to their self-reported training in biology, geography, anthropology, history, environmental education/interpretation, wilderness management, outdoor pursuits, outdoor education/recreation leadership or other natural science or outdoor leadership coursework.
4. Subscriptions to Outdoor Education/Recreation Journals and Magazines Over the Past Two Years.

Table 38. Subscriptions to outdoor education/recreation journals and magazines by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
<td>N %</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
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<td>19</td>
<td>2</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>22.2</td>
<td>73.1</td>
<td>33.3</td>
<td>39.3</td>
</tr>
<tr>
<td>Yes</td>
<td>36</td>
<td>7</td>
<td>7</td>
<td>4</td>
<td>54</td>
</tr>
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<td></td>
<td>75</td>
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<tr>
<td>Total</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Chi-square = 17.735  DF = 3  Prob. = 0.0005*

There is a significant moderate relationship between group and outdoor education/recreation subscriptions held (Cramer's V = .45). The Audubon Residential, Audubon Wilderness Research Backpacking and Outward Bound Patrol groups were all at least twice as likely to hold such subscriptions as not while the Outward Bound General group showed a reverse relationship in this respect.

By far, the most oft-cited outdoor education/recreation magazines or journals specified by both Audubon groups was *Sierra*. This was also the most often mentioned publication in this category mentioned by Outward Bound General participants. Other magazines noted by members in one or more groups included: *Backpacker, Outdoors, Outside, Outdoor Life, Fly Fisherman* and a variety of hiking club newsletters.
5. Subscriptions to Environmental Journals or Magazines Over the Past Two Years.

Table 39. Subscriptions to environmental journals or magazines over the past two years by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A N</th>
<th>A %</th>
<th>B N</th>
<th>B %</th>
<th>C N</th>
<th>C %</th>
<th>D N</th>
<th>D %</th>
<th>Total N</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>22</td>
<td>45.8</td>
<td>3</td>
<td>33.3</td>
<td>21</td>
<td>80.8</td>
<td>4</td>
<td>66.7</td>
<td>50</td>
<td>56.2</td>
</tr>
<tr>
<td>Yes</td>
<td>26</td>
<td>54.2</td>
<td>6</td>
<td>66.7</td>
<td>5</td>
<td>19.2</td>
<td>2</td>
<td>33.3</td>
<td>39</td>
<td>43.8</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square = 10.6493  DF = 3  Prob. = 0.0138*

There is a significant moderate association between group and environmental subscriptions (Cramer's V=.35). This difference is explained by the fact that over half of the Audubon groups' participants hold such subscriptions while less than 22% of the Outward Bound participants subscribed to such publications.

44% of the Audubon Residential group subscribe to Audubon, National Geographic, Natural History and Nature Conservancy are also very popular with this group. Audubon and Nature Conservancy are commonly subscribed to by members of the Wilderness Backpacking Program. Outward Bound members did not cite the same publication more than once in all cases, suggesting there are no trends in their subscription tendencies in this area.
6. Membership in Outdoor Activity Clubs or Organizations

Table 40. Membership in outdoor activity clubs or organizations by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>43.8</td>
<td>2</td>
<td>22.2</td>
<td>19</td>
<td>73.1</td>
<td>2</td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
<td>56.3</td>
<td>7</td>
<td>77.8</td>
<td>7</td>
<td>26.9</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
<td>100</td>
<td>6</td>
</tr>
</tbody>
</table>

Chi-square = 9.7229  DF = 3  Prob. = 0.0211*

There is a significant moderate relationship between group and outdoor organization membership (Cramer's V=.33). While 60% of all Audubon participants belonged to such formal groups, only about a third of all Outward Bound participants held such memberships.

Where an organization was specified, Audubon Residential members tended to belong to the Sierra Club, as did the Outward Bound General group. Neither the Wilderness Backpacking Program participants nor the Outward Bound Patrol showed any repeated citations in this area.
7. Membership in Environmental Groups or Organizations

Table 41. Membership in environmental groups or organizations by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Groups</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>23</td>
<td>47.9</td>
<td>3</td>
<td>33.3</td>
<td>24</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>25</td>
<td>52.1</td>
<td>6</td>
<td>66.7</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 18.4368  DF = 3  Prob. = 0.0004 *

There is a significant moderate relationship between group and environmental organization membership (Cramer's V = .46). Again, the difference is represented by the much higher rate of belonging of Audubon participants (54%) versus Outward Bound participants (9%).

Again, most Audubon members who belonged to an environmental organization were involved with Audubon and to a lesser extent, the Nature Conservancy. Wilderness Research Backpackers also identified themselves as Audubon members. With only three Outward Bound members showing any environmental affiliations, this has obviously not been a priority for these people.
8. Involvement in Environmental Issues Over the Past Two Years

Table 42. Involvement in environmental issues by participants in each group.

<table>
<thead>
<tr>
<th>Categories</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>No</td>
<td>33</td>
<td>68.8</td>
<td>7</td>
<td>77.8</td>
<td>24</td>
</tr>
<tr>
<td>Yes</td>
<td>15</td>
<td>31.3</td>
<td>2</td>
<td>33.3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi-square = 7.3231  DF = 3  Prob. = 0.0623

There is no significant relationship between group and past environmental issue activism. There does appear to be a trend in the frequency data though, with about a third of each Audubon group having been involved and less than 8% of either Outward Bound group having had similar engagement.

In sum, there were significant differences found between the groups with respect to subscriptions to outdoor education/recreation and environmental journals and magazines as well as with involvement in outdoor activity and environmental groups or organizations. In all cases, Audubon groups were more likely to participate in these activities than the Outward Bound groups studied. Interestingly, there were no significant differences with respect to involvement in environmental issues over the two year period preceding the study pretest.
B. BASIC ECOLOGICAL KNOWLEDGE

In reviewing the statistical item analysis run on all ten multiple choice basic ecological knowledge items, no significant differences emerged in the per item response patterns between groups. Condescriptive analysis of the performances of the four groups in this instrument in the pretest yielded the following summary:

Table 43. Condescriptive summary of basic ecological knowledge scores of participants in each group.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>48</td>
<td>.544</td>
<td>.177</td>
<td>.20</td>
<td>.90</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>.711</td>
<td>.203</td>
<td>.30</td>
<td>.90</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>.496</td>
<td>.197</td>
<td>.20</td>
<td>1.00</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>.583</td>
<td>.286</td>
<td>.20</td>
<td>.90</td>
</tr>
</tbody>
</table>

Where: means, minimum and maximum group scores out of 10 are represented out of 1.00 (e.g., a mean of .544 is equal to a mean of 5.44 out of 10 and a minimum score of .2 suggests one or more group members only scored 2 out of 10 on the instrument.

In running an ANOVA analysis on the four groups studied, the only significant observed difference in means occurred between the Audubon Wilderness Research Backpacking and Outward Bound General groups (Observed Difference (OD) = .21). It should be noted that the Required Difference (RD) was only .21, suggesting that the difference noted is the barest minimum to warrant mentioning.
C. MINIMAL IMPACT KNOWLEDGE

In reviewing the statistical analysis on the ten item multiple choice minimal impact knowledge instrument, only one item emerged as initially different in terms of groups' responses. This item stated:

2. When camping in unrestricted areas in the backcountry,

   a) select a site close to a water source and trail to reduce impact on fragile vegetation
   b) trench around your tent to prevent water seepage under your tent, filling in trenches prior to departure
   c) pitch your tent in meadows as opposed to sandy or forested soils
   d) try not to spend more than a few days in any one site

Alternative d) was the correct response to the item. While the Audubon Wilderness Backpacking group was unanimously correct in responding to the item, only 31 percent of the Outward Bound General and 17 percent of the Outward Bound Patrol groups were able to answer correctly, each of these groups demonstrating a preference for alternative a).

Condescriptive analysis of the performance of the four groups in this ten item instrument in the pretest yielded the following summary:

Table 44. Condescriptive summary of minimal impact knowledge scores of participants in each group.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>48</td>
<td>.561</td>
<td>.146</td>
<td>.20</td>
<td>.90</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>.678</td>
<td>.109</td>
<td>.50</td>
<td>.80</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>.469</td>
<td>.152</td>
<td>.10</td>
<td>.70</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>.450</td>
<td>.187</td>
<td>.20</td>
<td>.70</td>
</tr>
</tbody>
</table>
ANOVA analysis revealed two significant differences in group means. The Audubon Wilderness Research Backpacking group performed significantly better than the Outward Bound General (Observed Difference = .23) and Outward Bound Patrol (Observed Difference = .21) groups. The required differences were .22 and .16 respectively, suggesting that the first difference is quite a weak one while the second is somewhat more marked.

D. WILDERNESS ISSUE ATTITUDES

The ten item, five point Likert scale pretest attitudes instrument was also subjected to a response pattern analysis. Chi-square analysis indicated that only two items drew significantly different responses from the different groups. The first of these items was:

1. All forest fires should be actively and immediately suppressed

While 56 percent of Audubon Wilderness Research Backpacking and 52 percent of Audubon Residential participants agreed with this statement (suggesting relative anthropocentricity with respect to fire management), Outward Bound General and Outward Bound Patrol participants were torn between strongly disagreeing and agreeing with the statement (35 percent respectively). A Kendall’s Tau C of -.34 suggests that a moderate association exists between these groups and their response preferences.

The second item which tended to draw different responses between groups was:

10. Only those areas which, following resource inventories (e.g., oil and gas, timber, mining), show limited commercial potential, should be allowed to be designated and maintained as wilderness.

The chi-square analysis demonstrated a significant difference in response preferences. While all groups tended to strongly disagree or at least disagree with the statement (i.e., suggesting an ecocentric attitude with respect to wilderness designation and maintenance), the Audubon groups were stronger in their conviction against the statement than either Outward Bound group. 81 percent of Audubon participants responded Strongly Disagree or Disagree,
while only 71 percent of Outward Bound participants felt this way. 27 percent of Outward Bound participants agreed or strongly agreed with the statement compared to only 5 percent of Audubon participants.

Condescriptive group analysis for the attitudinal pretest data revealed the following summary:

Table 45. Condescriptive summary of wilderness issue attitudes of participants in each group.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>48</td>
<td>4.03</td>
<td>.445</td>
<td>3.0</td>
<td>5.0</td>
</tr>
<tr>
<td>B</td>
<td>9</td>
<td>4.38</td>
<td>.396</td>
<td>3.8</td>
<td>4.8</td>
</tr>
<tr>
<td>C</td>
<td>26</td>
<td>3.54</td>
<td>.477</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>3.58</td>
<td>.279</td>
<td>3.2</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Overall, a chi-square analysis showed a significant low association (Kendall's Tau C = -.11) between group and wilderness issue attitude. The ANOVA analysis of the means suggested significant differences between the Audubon Residential and Outward Bound General groups, between the Audubon Wilderness Research Backpacking and Outward Bound General groups and between the Audubon Wilderness Research Backpacking and Outward Bound Patrol groups. A table of the observed and required differences follows:
Table 46. Table of observed and required differences between groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Observed Difference</th>
<th>Required Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/C</td>
<td>.5</td>
<td>.31</td>
</tr>
<tr>
<td>B/C</td>
<td>.84</td>
<td>.49</td>
</tr>
<tr>
<td>B/D</td>
<td>.79</td>
<td>.66</td>
</tr>
</tbody>
</table>

Where:
A = Audubon Residential  
B = Audubon Wilderness Research Backpacking  
C = Outward Bound General  
D = Outward Bound Patrol

Therefore, the strongest difference found here is between the Audubon Wilderness Research Backpacking and Outward Bound General groups and secondly, between the Audubon Wilderness Research Backpacking and Outward Bound Patrol groups. These initial differences in knowledge and attitude will be considered in the repeated measures analysis conducted for the three administrations of the three relevant instruments.

REPEATED MEASURES: ANALYSIS AND RESULTS

Given the non-equivalent control group design used in this study and the existence of some identified pretest differences between the four groups studied, analysis of covariance procedures were suggested. All of the basic ecological knowledge, minimal impact knowledge, attitude, intentions and behavior data (pre, post and delayed posttest) was subjected to UANOVA analysis. UANOVA is a multivariate analysis of covariance program developed at the University of Alberta. It is very efficient and recommended for complex ANCOVA problems, including those with cells of equal or unequal size. One of UANOVA's greatest advantages over GLM, MANOVA and other SPSSX Analysis of Variance programs lies in its ability to break down complex interactions involving groups of unequal size (Milliken, et al., 1984).
For each instrument, a priori research and statistical null hypotheses are presented, followed by a summary of means (knowledge, attitude) or frequency (intentions, behavior) data. This is followed by an ANCOVA analysis of results within and between groups. Significant changes within each group are identified over the test administrations. The two primary groups (Audubon and Outward Bound) as well as the four subgroups (Audubon Residential, Audubon Wilderness Research Backpacking, Outward Bound General and Outward Bound Patrol) are compared through UANOVA Analysis of Covariance.

Results of the two knowledge and one attitude instruments are summarized, analyzed and graphed over the three administrations. The posttest intention and delayed posttest behavior and intention data are treated collectively, again through UANOVA's Analysis of Covariance procedures. Similarities and significant differences between groups and changes over test administrations are tabled, and specific intentions and behaviors specified in the questionnaires are presented for illustrative purposes.

A. Basic Ecological Knowledge

The a priori research hypothesis states:

\[ H_1: \text{The Audubon groups will improve more than the Outward Bound groups in ecological conceptual and factual knowledge.} \]

The null hypothesis states:

\[ H_0: \text{There will be no significant differences in the basic ecological knowledge gains made by the Audubon versus Outward Bound groups.} \]
a) Two Group

Table 47. Basic Ecological Knowledge means for Audubon and Outward Bound groups based on scores from all three test administrations (means out of 1.00).

<table>
<thead>
<tr>
<th>Test Time</th>
<th>Audubon</th>
<th>Outward Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>.570</td>
<td>.512</td>
</tr>
<tr>
<td>Posttest</td>
<td>.632</td>
<td>.476</td>
</tr>
<tr>
<td>Delayed Posttest</td>
<td>.599</td>
<td>.483</td>
</tr>
<tr>
<td>Total</td>
<td>.603</td>
<td>.490</td>
</tr>
</tbody>
</table>

Table 48. F-table for basic ecological knowledge tests for Audubon and Outward Bound groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.64</td>
<td>.64</td>
<td>10.19</td>
<td>.002*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>2</td>
<td>5.47</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>.03</td>
<td>.01</td>
<td>1.21</td>
<td>.301</td>
</tr>
<tr>
<td>Time X Group</td>
<td>6</td>
<td>.10</td>
<td>.05</td>
<td>3.67</td>
<td>.028*</td>
</tr>
<tr>
<td>Time X Cases (Group)</td>
<td>146</td>
<td>5.47</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>5.57</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The graph of time X group means shows significant disordinal interaction between the Audubon and Outward Bound groups over the three test administrations. There is significant interaction in the post basic knowledge means (Observed Difference (OD) = .16; Required Difference (RD) = .13) with Audubon groups showing improvement over their pretest scores and Outward Bound groups showing declined performance. This difference remains slight, but significant at the delayed posttest administration (OD = .15; RD = .14).

Therefore, the null hypothesis is rejected at the .05 level of alpha and the alternative research hypothesis is accepted; the Audubon group did significantly outperform the Outward Bound groups in the basic ecological knowledge testing.
b) Four Group

Table 49. Means for AR, AWRB, OBG and OBP groups based on scores from all three test administrations of the basic ecological knowledge instrument.

<table>
<thead>
<tr>
<th>Test Time</th>
<th>AR</th>
<th>AWRB</th>
<th>OBG</th>
<th>OBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>.54</td>
<td>.71</td>
<td>.50</td>
<td>.58</td>
</tr>
<tr>
<td>Posttest</td>
<td>.61</td>
<td>.74</td>
<td>.46</td>
<td>.56</td>
</tr>
<tr>
<td>Delayed Posttest</td>
<td>.60</td>
<td>.60</td>
<td>.49</td>
<td>.45</td>
</tr>
<tr>
<td>Total</td>
<td>.58</td>
<td>.68</td>
<td>.48</td>
<td>.53</td>
</tr>
</tbody>
</table>

Table 50. F-table for basic ecological knowledge tests for all four groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>0.93</td>
<td>0.91</td>
<td>5.15</td>
<td>0.0025*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>85</td>
<td>5.1</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>.03</td>
<td>.02</td>
<td>1.22</td>
<td>0.2985</td>
</tr>
<tr>
<td>Time X Group</td>
<td>6</td>
<td>.24</td>
<td>.04</td>
<td>3.11</td>
<td>0.0069*</td>
</tr>
<tr>
<td>Time X Cases(Group)</td>
<td>146</td>
<td>1.85</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>2.09</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 6. Line graph of basic ecological test means for AR, AWRB, OBG and OBP groups.

Again, there is a significant disordinal interaction between test time and group. The groups which interact are Audubon Residential (AR) and Audubon Wilderness Research Backpack (AWRB), AR and Outward Bound General (OBG), and OBG and Outward Bound Patrol (OBP). The relationship between observed and required differences was as follows:
The two Audubon groups tended to improve between pre and posttesting. However, while the AR group retained the ecological knowledge gained, the AWRB group dropped off quite severely by the delayed posttest, indicating either a lot of lucky guessing on the posttest or quite poor retention over the six months following the program.

The OBG group showed a general decline in performance between pre and posttesting, with some improvement at the delayed posttest, starting out slightly above the AR group, but ending up lower than any other group by delayed posttesting. The OBP group showed a general decline in ecological knowledge by the posttest and, according to the delayed posttest means, the lowest retention mean of any group.

According to the ANCOVA analysis, there are significant differences between the AWRB and OBG group means throughout, with the AWRB’s performing significantly better on all three test administrations. Inspite of the decline in the AWRB mean between post and delayed posttesting, the two Audubon groups remained well above the OB groups at the delayed posttest.

Therefore, the null hypothesis can be rejected with respect to the AR and AWRB versus OBG and OBP groups between pre and posttesting. Both Audubon groups improved substantially more than the two Outward Bound groups, which both declined in ecological
knowledge between pre and posttesting. However, the AWRB group’s post program decline is disturbing, and may reflect poor effort on the delayed posttest instrument.

B. Minimal Impact Knowledge

The a priori research hypothesis states:

\( H_2: \) The Outward Bound groups will improve more than the Audubon groups in minimal impact knowledge.

The null hypothesis states:

\( H_0: \) There will be no significant differences in the minimal impact knowledge gains made by the Audubon and Outward Bound groups.

a) Two Group

Table 52. Minimal Impact Knowledge means for Audubon and Outward Bound groups based on scores from all three test administrations.

<table>
<thead>
<tr>
<th>Test Time</th>
<th>Group</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Audubon</td>
<td>Outward Bound</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>.579</td>
<td>.466</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td>.603</td>
<td>.545</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delayed Posttest</td>
<td>.616</td>
<td>.591</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.599</td>
<td>.534</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 53. F-table for minimal impact knowledge tests for Audubon and Outward Bound groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.27</td>
<td>.27</td>
<td>.683</td>
<td>.0106*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>2</td>
<td>3.46</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>.19</td>
<td>.09</td>
<td>.680</td>
<td>.0015*</td>
</tr>
<tr>
<td>Time X Group</td>
<td>6</td>
<td>.07</td>
<td>.04</td>
<td>.265</td>
<td>.0744</td>
</tr>
<tr>
<td>Time X Cases(Group)</td>
<td>146</td>
<td>3.46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>3.53</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is no significant interaction between groups and minimal impact knowledge test times. However, there are significant main effect differences in both group and test administration. The Audubon groups performed better overall than the Outward Bound groups. This difference was slight, but prevalent at the pretest (OD = .11; RD = .11) and remained significantly present throughout the posttest (OD = .14; RD = .11) and delayed posttesting (OD = .13; RD = .12). While starting out and remaining lower in mean throughout the study, the Outward Bound group showed much more improvement between test administrations, exhibiting a significant increase between the pre and delayed posttest administrations (OD = .13; RD = .11).

Therefore, the null hypothesis may be rejected. The alternative research hypothesis may be accepted; the OB groups did improve more in minimal impact knowledge between pre, post and delayed posttesting than the Audubon groups.
b) Four Group

Table 54. Means for AR, AWRB, OBG and OBP groups based on scores from all three Minimal Impact Knowledge test administrations.

<table>
<thead>
<tr>
<th>Test Time</th>
<th>AR</th>
<th>AWRB</th>
<th>OBG</th>
<th>OBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>.56</td>
<td>.68</td>
<td>.47</td>
<td>.45</td>
</tr>
<tr>
<td>Posttest</td>
<td>.58</td>
<td>.71</td>
<td>.55</td>
<td>.52</td>
</tr>
<tr>
<td>Delayed Posttest</td>
<td>.59</td>
<td>.73</td>
<td>.58</td>
<td>.63</td>
</tr>
<tr>
<td>Total</td>
<td>.58</td>
<td>.70</td>
<td>.53</td>
<td>.53</td>
</tr>
</tbody>
</table>

Table 55. F-table for minimal impact knowledge tests for all four groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>.62</td>
<td>.21</td>
<td>5.67</td>
<td>0.0014*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>85</td>
<td>3.11</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>.18</td>
<td>.09</td>
<td>6.29</td>
<td>0.0024*</td>
</tr>
<tr>
<td>Time X Group</td>
<td>6</td>
<td>.09</td>
<td>.01</td>
<td>1.09</td>
<td>0.3952</td>
</tr>
<tr>
<td>Time X Cases(Group)</td>
<td>146</td>
<td>2.0</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>2.09</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 8. Line graph of minimal impact knowledge test means for AR, AWRB, OBG and OBP groups.

According to the ANCOVA F-table for minimal impact knowledge ratios, there is no significant interaction between the groups or test administrations. However, there are significant main effect differences between groups and between test time means within groups. In all cases, the delayed posttest scores were significantly higher than the pretest scores. Both the OBG (OD = .08; RD = .07) and the OBP (OD = .07; RD = .07) increased between pre and posttesting, although only slightly. While this difference is minimal for AR and AWRB groups, the OBP group showed a tremendous increase over the three test administrations. In observing the group differences, the AWRB group performed significantly better than the OBP group, especially on the initial pretest (OD = .64; RD = .37), but also on the posttest (OD = .58; RD = .26). The AR group also outperformed the OBG group on the pretest (OD = .39; RD = .26) as well as the OBP group on this same test administration (OD = .43; RD = .26).
C. Wilderness Issue Attitude

The a priori research hypothesis states:

H₃: The Audubon groups will increase more in wilderness preservation issue attitude (ecocentric), while the Outward Bound group will become more recreational utilization oriented (anthropocentric).

The null hypothesis states:

H₀: There will be no significant differences in the wilderness issue attitudes of the Audubon versus Outward Bound groups over the test period.

In assessing the differences between the means, it should be noted that respondents replied on a five point Likert scale which was marked with point values increasing from an anthropocentric to an ecocentric perspective. While half of the issue statements were written from each perspective, all were scored so a strongly anthropocentric attitude was reflected by a 1 and a strongly ecocentric attitude by a 5. An "I don't know" response was scored as a 3 to avoid any effect one way or the other.

a) Two Group

Table 56. Wilderness Issue Attitude means for Audubon and Outward Bound groups based on scores from all three test administrations.

<table>
<thead>
<tr>
<th>Test Time</th>
<th>Audubon</th>
<th>Outward Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>4.09</td>
<td>3.54</td>
</tr>
<tr>
<td>Posttest</td>
<td>4.16</td>
<td>3.65</td>
</tr>
<tr>
<td>Delayed Posttest</td>
<td>4.16</td>
<td>3.74</td>
</tr>
<tr>
<td>Total</td>
<td>4.14</td>
<td>3.85</td>
</tr>
</tbody>
</table>
Table 57. F-table for minimal impact knowledge tests for Audubon and Outward Bound groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>13.53</td>
<td>13.53</td>
<td>33.32</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>2</td>
<td>35.31</td>
<td>.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>.55</td>
<td>.28</td>
<td>4.0</td>
<td>.0204*</td>
</tr>
<tr>
<td>Time X Group</td>
<td>6</td>
<td>.14</td>
<td>.07</td>
<td>1.04</td>
<td>.3573</td>
</tr>
<tr>
<td>Time X Cases(Group)</td>
<td>146</td>
<td>35.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>35.44</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 9. Line graph of wilderness issue attitude means of Audubon and Outward Bound groups.

There is no interaction between groups and test time. In analyzing the group differences, the Audubon group (AR and AWRB) means were consistently above those of the Outward Bound (OBG and OBP), reflecting a more ecocentric wilderness preservation attitude by Audubon over Outward Bound groups. A table of observed and required differences follows:
Table 58. Observed and required differences of groups and test instruments.

<table>
<thead>
<tr>
<th></th>
<th>A Pre</th>
<th>A Post</th>
<th>A D. Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>OB Pre</td>
<td>.55</td>
<td>.33</td>
<td>.62</td>
</tr>
<tr>
<td>OB Post</td>
<td>.44</td>
<td>.33</td>
<td>.51</td>
</tr>
<tr>
<td>OB D. Post</td>
<td>.35</td>
<td>.34</td>
<td>.42</td>
</tr>
</tbody>
</table>

There was a significant difference between pre and delayed posttest score means (OD = .11; RD = .11) for both groups, suggesting increased ecocentric wilderness attitude development for most Audubon and Outward Bound groups.

Therefore, the null hypothesis can be rejected at the .05 level of alpha, but the a priori research hypothesis cannot be accepted either. The Audubon group demonstrated a significantly higher ecocentric wilderness attitude over all test administrations, but the Outward Bound group did not become more anthropocentric in orientation. The Audubon group did not gain substantially more in ecocentricity in relation to the gains demonstrated by the Outward Bound group; the graph illustrates an almost identical trend in the two plot lines. This suggests that both Audubon and Outward Bound programs were effective in increasing ecocentric wilderness attitude in their respective participants.
b) Four Group

Table 59. Means for AR, AWRB, OBG and OBP groups based on scores from all three wilderness issue attitude test administrations.

<table>
<thead>
<tr>
<th>Test Time</th>
<th>AR</th>
<th>AWRB</th>
<th>OBG</th>
<th>OBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>4.03</td>
<td>4.38</td>
<td>3.54</td>
<td>3.58</td>
</tr>
<tr>
<td>Posttest</td>
<td>4.13</td>
<td>4.30</td>
<td>3.61</td>
<td>3.82</td>
</tr>
<tr>
<td>Delayed Posttest</td>
<td>4.12</td>
<td>4.33</td>
<td>3.70</td>
<td>3.93</td>
</tr>
<tr>
<td>Total</td>
<td>4.09</td>
<td>4.34</td>
<td>3.62</td>
<td>3.78</td>
</tr>
</tbody>
</table>

Table 60. F-table for wilderness issue attitude tests for all four groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>15.08</td>
<td>5.03</td>
<td>12.62</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>85</td>
<td>33.85</td>
<td>.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>2</td>
<td>.53</td>
<td>.26</td>
<td>3.83</td>
<td>0.024*</td>
</tr>
<tr>
<td>Time X Group</td>
<td>6</td>
<td>.37</td>
<td>.06</td>
<td>.89</td>
<td>0.5034</td>
</tr>
<tr>
<td>Time X Cases(Group)</td>
<td>146</td>
<td>9.79</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>10.16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 10. Line graph of wilderness issue attitude means for AR, AWRB, OBG and OBP groups.

There is no interaction between the four groups and three test administrations. However, there are significant differences between the main effects of group and of test time.

In further analyzing the group comparison, the ANCOVA procedures showed significant differences between the following groups:

Table 61. Observed and required differences of attitude means between all four groups.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AR/OBG</td>
<td>.48</td>
<td>.27</td>
</tr>
<tr>
<td>AWRB/OBG</td>
<td>.73</td>
<td>.42</td>
</tr>
<tr>
<td>AWRB/OBP</td>
<td>.58</td>
<td>.58</td>
</tr>
</tbody>
</table>
The AWRB/OBP difference is very minimal in significance and the AWRB/OBG group difference is not really much more significant. The AWRB group still holds somewhat more ecocentric wilderness issue attitude levels than either Outward Bound group.

In analyzing the means within groups, no significant changes in wilderness attitude were found across the three test administrations for the AR and AWRB groups. These groups began with and and maintained agreement with an ecocentric approach to wilderness management (means between 4.03 and 4.38).

The OBG group underwent a significant change in wilderness attitude over the three test times, reflecting an increase in ecocentric perspective between the pretest and delayed posttest (\(OD = .17; \ RD = .14\)). A change in group means from 3.54 to 3.70 suggests some growing agreement with an ecocentric approach.

The OBP group demonstrated significant posttest and delayed posttest increases in ecocentric attitude toward wilderness issues. The posttest observed difference was .24 (\(RD = .13\)) and the delayed posttest observed difference was .34 (\(RD = .14\)). This small group showed the most marked change in wilderness attitude of any of the four groups tested.

D. INTENTIONS AND BEHAVIOR

In this section, the researcher presents the data and analyses of the posttest stated intentions, the delayed posttest self-reported behavior and the delayed posttest stated intentions instruments. These instruments are identical in item ordering and wording, other than timeframe references. The posttest intentions instrument asked participants what they planned to do for the six months following the program. The delayed posttest behavior instrument asked respondents what they had actually done over the six month period following the program and the delayed posttest intentions instrument asked participants what they planned to do for the period
from six months to one year following the program they had engaged in during the summer of 1987. As the items are directly relatable, it will be most efficient and effective to present the frequency data for each item (post intentions, delayed post behavior and delayed post intentions inclusive). Where relevant, following the tabling of this frequency data for the four groups for a given item, specific information about the relevant responses received is presented in text or table form. The next tables included are the two group and four group ANOVA F-tables. The UANOVA procedure described earlier was used to generate these tables. Significant differences identified are discussed briefly in terms of the observed and required differences noted between the groups and/or test administrations.

The a priori stated hypotheses relevant to the two intention instrument administrations were that:

\[ H_4: \] The Outward Bound groups will exhibit more intentions related to the pursuit of wilderness recreation following their program.

\[ H_5: \] The Audubon group will demonstrate a higher number of intentions related to general environmental involvement (i.e., activism).

The statistical null hypotheses relevant to the two intention instrument administrations are that:

\[ H_{01}: \] There will be no difference between the number of intentions related to the pursuit of wilderness recreation following participation in an Outward Bound or an Audubon program.

\[ H_{02}: \] There will be no difference between the number of intentions related to environmental involvement by Audubon or Outward Bound groups.

The a priori research hypotheses relevant to the behavior instrument were as follows:

\[ H_3: \] The Outward Bound groups will exhibit more behavior related to the pursuit of wilderness recreation following their program.

\[ H_4: \] The Audubon group will demonstrate more general environmental involvement (i.e., activism).
The statistical null hypotheses relevant to the delayed posttest behavior instrument administration are that:

- $H_{03}$: There will be no difference between the amount of behavior related to the pursuit of wilderness recreation following participation in an Outward Bound or an Audubon program.
- $H_{04}$: There will be no difference between the amount of behavior related to environmental involvement by Audubon or Outward Bound groups.

1. Intentions and behavior related to post-program travel into wilderness.

Table 62. Frequency data of post-program wilderness travel intentions and behavior.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>%</th>
<th>B</th>
<th>%</th>
<th>C</th>
<th>%</th>
<th>D</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>No</td>
<td>29</td>
<td>63.0</td>
<td>3</td>
<td>33.3</td>
<td>13</td>
<td>50.0</td>
<td>3</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>16</td>
<td>34.8</td>
<td>6</td>
<td>66.7</td>
<td>11</td>
<td>42.3</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1</td>
<td>2.2</td>
<td>0</td>
<td>100</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>19</td>
<td>41.3</td>
<td>1</td>
<td>11.1</td>
<td>8</td>
<td>30.8</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>16</td>
<td>34.8</td>
<td>7</td>
<td>77.8</td>
<td>11</td>
<td>42.3</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>1</td>
<td>11.1</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>16</td>
<td>34.8</td>
<td>1</td>
<td>11.1</td>
<td>6</td>
<td>23.1</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>19</td>
<td>41.3</td>
<td>6</td>
<td>66.7</td>
<td>13</td>
<td>50.0</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>2</td>
<td>22.2</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>
### Table 63. F-table of Audubon and Outward Bound groups intentions and involvement in post-program wilderness travel.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.24</td>
<td>.24</td>
<td>.71</td>
<td>.4011</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>28.28</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>1.86</td>
<td>.93</td>
<td>5.01</td>
<td>.0081*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.12</td>
<td>.06</td>
<td>123</td>
<td>.7231</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>123</td>
<td>22.83</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>22.95</td>
<td>.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The significant difference over the three test administrations is explained by a significant difference between intentions formed at posttest time and new intentions formed at the delayed posttest (OD = .22; RD = .18). The Audubon groups tended to form fewer intentions to travel into wilderness in the six months following the delayed posttest as compared to the number they formed right after the program. Conversely, the Outward Bound groups tended to form more intentions at the delayed posttest time than immediately following their program experience. This may suggest a period of reflection coupled with action and may be related to efficacy.
b) Four Group

Table 64. F-table of AR, AWRB, OBG and OBP group intentions and involvement in post-program wilderness travel.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>2.67</td>
<td>.89</td>
<td>2.86</td>
<td>.0417*</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>83</td>
<td>25.84</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>1.85</td>
<td>.93</td>
<td>4.90</td>
<td>.0090*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.50</td>
<td>.08</td>
<td>.44</td>
<td>.8506</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>119</td>
<td>22.47</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>22.97</td>
<td>.27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

While the F-table shows a significant group difference, in analyzing the multiple comparisons run to specify the statistical differences noted, none of the programs demonstrated statistically significant differences. The closest is the difference between the AR and AWRB groups (OD = 1.11, RD = .93). In looking at the trends over the three instruments, it appears that there is a significant difference between the intentions formed at posttest time and those new ones stated for the six month period following the delayed posttest.
2. The number of post-program wilderness travel related activities of interest to groups.

Table 65. Number of post-program wilderness travel related activities of interest to groups.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>%</th>
<th>B</th>
<th>%</th>
<th>C</th>
<th>%</th>
<th>D</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>0</td>
<td>29</td>
<td>63</td>
<td>3</td>
<td>33.3</td>
<td>13</td>
<td>50.0</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>7</td>
<td>15.2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>13.0</td>
<td>1</td>
<td>11.1</td>
<td>5</td>
<td>19.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3</td>
<td>6.5</td>
<td>5</td>
<td>55.6</td>
<td>5</td>
<td>19.2</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>2.2</td>
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Table 66. Summary of specific activities intended and pursued in wilderness post-program.

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<th>AR</th>
<th>AWRB</th>
<th>Group</th>
<th>OBG</th>
<th>OBP</th>
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</tr>
<tr>
<td>- hike (6)</td>
<td>- backpack (5)</td>
<td>- camp (9)</td>
<td>- camp (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- camp (6)</td>
<td>- nature study (4)</td>
<td>- hike (5)</td>
<td>- hike</td>
<td></td>
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</tr>
<tr>
<td>- backpack (4)</td>
<td>- hike (3)</td>
<td>- backpack (3)</td>
<td>- x-c ski</td>
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<td></td>
</tr>
<tr>
<td>- fish (2)</td>
<td>- camp (3)</td>
<td>- ski tour (2)</td>
<td>- rock climb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- photography (2)</td>
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<tr>
<td>- hike (11)</td>
<td>- backpack (2)</td>
<td>- camp (8)</td>
<td>- camp (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- camp (5)</td>
<td>- nature study (3)</td>
<td>- hike (5)</td>
<td>- backpack</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- backpack (3)</td>
<td>- hike (3)</td>
<td>- backpack (3)</td>
<td>- x-c ski</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- fish (2)</td>
<td>- camp (3)</td>
<td>- rock climb (2)</td>
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<tr>
<td>- photography (3)</td>
<td>- fish</td>
<td>- fish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- canoe (2)</td>
<td></td>
<td>- hunt</td>
<td></td>
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<td><strong>D.P. Intentions</strong></td>
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</tr>
<tr>
<td>- hike (10)</td>
<td>- backpack (4)</td>
<td>- camp (8)</td>
<td>- camp (3)</td>
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<tr>
<td>- watersports (6)</td>
<td>- canoe (2)</td>
<td>- hike (3)</td>
<td>- hike (2)</td>
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<td>- backpack (3)</td>
<td>- hike (3)</td>
<td>- backpack (3)</td>
<td>- x-c ski (2)</td>
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<tr>
<td>- fish</td>
<td>- camp (2)</td>
<td>- rock climb (2)</td>
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<tr>
<td>- photog. (5)</td>
<td>- photography (2)</td>
<td></td>
<td>- x-c ski (3)</td>
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</tr>
</tbody>
</table>

a) Two Group

Table 67. F-table of the number of wilderness travel related activities of interest to Audubon and Outward Bound groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
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<td>1.26</td>
<td>.56</td>
<td>.4583</td>
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<td></td>
<td></td>
</tr>
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<td><strong>Instrument</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inst. X Group</td>
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<td>8.11</td>
<td>4.05</td>
<td>3.61</td>
<td>.0301*</td>
</tr>
<tr>
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<td>.41</td>
<td>.20</td>
<td>.18</td>
<td>.8342</td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
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<td>1.12</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>138.71</td>
<td>1.32</td>
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</table>
The difference noted in time is reflected by a significant difference between the number of activities Audubon and Outward Bound groups planned to engage in immediately following their programs and the number they stated they planned to pursue six months later, at the point of delayed posttesting (OD = .47; RD = .44). This difference is difficult to explain, as a perusal of the actual lists of activities specified by respondents (see Table 5.6.4 above) does not seem to illustrate substantially more intentions at post versus delayed post administrations. While intent to engage in some activities went up, others declined, resulting in an absence of an apparent pattern.

a) Four Group

Table 68. F-table of the number of activities of interest to AR, AWRB, OSG and OBP groups in post-program wilderness travel.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
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<th>MS</th>
<th>F</th>
<th>Prob.</th>
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<td>.0071*</td>
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<td>Instrument</td>
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<td>8.11</td>
<td>4.05</td>
<td>3.53</td>
<td>.0324*</td>
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<td>1.89</td>
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<td>136.7</td>
<td>1.15</td>
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<tr>
<td>Total</td>
<td>125</td>
<td>138.59</td>
<td>1.47</td>
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</table>

The F-table suggests significant differences both between groups and over time. The group comparison showed significant differences between AR and AWRB (OD = 1.11; RD = .93). The frequency data suggest that the AWRB group forms more intentions to pursue wilderness travel opportunities than does the AR group. The most significant difference over instruments occurred with the OPB group which formed twice as many intentions at delayed posttesting than they had formed or carried out on either of the two previous test administration periods.
3. Intentions and involvement in post-program auto (high access) camping.

Table 69. Frequency data of post-program auto camping intentions and behavior.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>F</th>
<th>%</th>
<th>B</th>
<th>F</th>
<th>%</th>
<th>C</th>
<th>F</th>
<th>%</th>
<th>D</th>
<th>F</th>
<th>%</th>
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<td>7.7</td>
<td>1</td>
<td>16.7</td>
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<tr>
<td>D.P. Behavior</td>
<td>No</td>
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<td>8</td>
<td>88.9</td>
<td>16</td>
<td>61.5</td>
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<td>11.1</td>
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<tr>
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<td>22.2</td>
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</tbody>
</table>

a) Two Group

Table 70. F-table of Audubon and Outward Bound group intentions and involvement in post-program auto camping.

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<td>.14</td>
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</tr>
</tbody>
</table>

There are no significant relationships between group and/or time with regard to planning and/or being involved in auto camping following the Audubon or Outward Bound program.
a) Four Group

Table 71. F-table of intentions and/or involvement in auto camping by AR, AWRB, OGB and OBP groups in post-program wilderness travel.

<table>
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</tr>
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</table>

There is no significant relationship between group and/or instrument and intentions and/or involvement in post-program auto camping.

4. Intentions and involvement in survival (low technology) camping following programs.

Table 72. Frequency data of post-program survival camping intentions and behavior.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>%</th>
<th>B</th>
<th>%</th>
<th>C</th>
<th>%</th>
<th>D</th>
<th>%</th>
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<td>F</td>
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<td>F</td>
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<td>F</td>
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<td>33.3</td>
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<td>7</td>
<td>77.8</td>
<td>19</td>
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<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>
a) Two Group

Table 73. F-table of Audubon and Outward Bound group intentions and involvement in post-program survival camping.

<table>
<thead>
<tr>
<th>Source</th>
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<th>Prob.</th>
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<td>.008</td>
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<td>1.41</td>
<td>.2470</td>
</tr>
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<td>Inst. X Cases (Gr)</td>
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</tr>
<tr>
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<td>125</td>
<td>1.28</td>
<td>.001</td>
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</tr>
</tbody>
</table>

There is no significant relationship between groups and/or time and intentions and/or involvement in survival camping after the programs.

b) Four Group

Table 74. F-table of intentions and/or involvement in survival camping for AR, AWRB, OBG and OBP in post-program travel.

<table>
<thead>
<tr>
<th>Source</th>
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<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Cases (Group)</td>
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<td>.66</td>
<td>.008</td>
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</tr>
<tr>
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<td>2</td>
<td>.3</td>
<td>.01</td>
<td>1.37</td>
<td>.2577</td>
</tr>
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<td>6</td>
<td>.01</td>
<td>.002</td>
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<td></td>
</tr>
<tr>
<td>Inst. X Cases (Gr.)</td>
<td>119</td>
<td>1.27</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>1.28</td>
<td>.0012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is no significant relationship between groups and/or time and intentions and/or involvement in survival camping after the program.

5. Intentions and involvement in post-program minimal impact (high technology) camping.

Table 75. Frequency data of post-program minimal impact camping intentions and behavior.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>%</th>
<th>B</th>
<th>%</th>
<th>C</th>
<th>%</th>
<th>D</th>
<th>%</th>
</tr>
</thead>
<tbody>
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<td>Post Intentions</td>
<td>No</td>
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<td>78.3</td>
<td>5</td>
<td>55.6</td>
<td>19</td>
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<td>4</td>
<td>44.4</td>
<td>5</td>
<td>19.2</td>
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<td>16.7</td>
</tr>
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<td>Missing</td>
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<td>2.2</td>
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<td>0</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>31</td>
<td>67.4</td>
<td>4</td>
<td>44.4</td>
<td>16</td>
<td>61.5</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>4</td>
<td>8.7</td>
<td>4</td>
<td>44.4</td>
<td>3</td>
<td>11.5</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
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<td>23.9</td>
<td>1</td>
<td>11.1</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
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<td>65.2</td>
<td>3</td>
<td>33.3</td>
<td>12</td>
<td>46.2</td>
<td>3</td>
<td>50</td>
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<tr>
<td></td>
<td>Yes</td>
<td>5</td>
<td>10.9</td>
<td>4</td>
<td>44.4</td>
<td>7</td>
<td>26.9</td>
<td>1</td>
<td>16.7</td>
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<td>2</td>
<td>22.2</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

a) Two Group

Table 76. F-table of Audubon and Outward Bound group intentions and involvement in post-program minimal impact camping.

<table>
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<tr>
<th>Source</th>
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<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
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<td>.07</td>
<td>.07</td>
<td>.29</td>
<td>.5891</td>
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<td>Cases (Groups)</td>
<td>85</td>
<td>19.81</td>
<td>.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
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<td>.14</td>
<td>.07</td>
<td>.48</td>
<td>6225</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.23</td>
<td>.12</td>
<td>.82</td>
<td>.4430</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td></td>
<td>123</td>
<td>17.53</td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>17.76</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are no significant differences in post-program minimal impact camping by the two groups.
b) Four Group

Table 77. F-table of intentions and/or involvement in minimal impact camping for AR, AWRB, OBG and OBP groups in post-program travel.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>2.46</td>
<td>.82</td>
<td>3.86</td>
<td>.0122*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>17.79</td>
<td>.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.15</td>
<td>.08</td>
<td>.55</td>
<td>.5799</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.75</td>
<td>.12</td>
<td>.88</td>
<td>.5114</td>
</tr>
<tr>
<td>Inst. X Cases (Gr.)</td>
<td>119</td>
<td>1.27</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>1.28</td>
<td>.0012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant relationship between groups and intentions/involvement in post-program minimal impact camping. The difference occurs between the AR and AWRB programs (OD = .34; RD = .30). The backpacking group showed a significantly higher rate of forming intentions to camp using a minimal impact approach and to carry out those intentions than the residential program group.
6. Intentions and involvement in post-program combination approach camping.

Table 78: Frequency data of post-program combination camping intentions and behavior.

| Instrument        | Response | A |  F | % | B |  F | % | C |  F | % | D |  F | % |
|-------------------|----------|---|----|---|---|----|---|---|----|---|---|----|---|---|
| Post Intentions    | No       | 44| 95.7| 7 | 77.8| 21| 80.8| 4 | 66.7|
|                    | Yes      | 1 | 2.2 | 2 | 22.2| 3 | 11.5| 1 | 16.7|
|                    | Missing  | 1 | 2.2 | 0 | 0   | 2 | 7.7 | 1 | 16.7|
| D.P. Behavior      | No       | 34| 73.9| 7 | 77.8| 14| 53.8| 4 | 66.7|
|                    | Yes      | 1 | 2.2 | 1 | 11.1| 5 | 19.2| 0 | 0   |
|                    | Missing  | 11| 23.9| 1 | 11.1| 7 | 26.9| 2 | 33.3|
| D.P. Intentions    | No       | 33| 71.7| 6 | 66.7| 17| 65.4| 3 | 50  |
|                    | Yes      | 2 | 4.3 | 1 | 11.1| 2 | 7.7 | 1 | 16.7|
|                    | Missing  | 11| 23.9| 2 | 22.2| 7 | 26.9| 2 | 33.3|

a) Two Group

Table 79: F-table of Audubon and Outward Bound group intentions and involvement in post-program combination camping.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
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<td>.51</td>
<td>5.05</td>
<td>.0272*</td>
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<td>85</td>
<td>8.6</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.02</td>
<td>.009</td>
<td>.12</td>
<td>.8849</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.11</td>
<td>.05</td>
<td>.73</td>
<td>.4833</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
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<td>8.9</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>9.01</td>
<td>.12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is a slight, but significant relationship between Audubon and Outward Bound

groups with respect to intent to camp using a combined low tech/high tech approach (OD = .27;
RD = .26). The Audubon groups were a bit more likely to consider a combined approach to
camping than the Outward Bound groups.

b) Four Group

Table 80. F-table of post-program intentions and/or involvement in combination camping for AR,
AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob</th>
</tr>
</thead>
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<td>8.3</td>
<td>.10</td>
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<td></td>
</tr>
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<td>Instrument</td>
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<td>.02</td>
<td>.008</td>
<td>.11</td>
<td>.8998</td>
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<td>Inst. X Group</td>
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<td>.49</td>
<td>.08</td>
<td>1.14</td>
<td>.3427</td>
</tr>
<tr>
<td>Inst. X Cases (Gr.)</td>
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<td>8.5</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>8.99</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a slight but significant difference between the groups with respect to intent and
involvement in combination camping. The AR group is slightly more likely than the OBG group
(OD = .14; RD = .13) to pursue this form.
7. Intentions and involvement in other forms of post-program camping.

Table 81. Frequency data of post-program intentions and involvement in other forms of camping.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
<td>F %</td>
</tr>
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<td>95.7</td>
<td>9</td>
<td>100</td>
</tr>
<tr>
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<td>2.2</td>
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<td>0</td>
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<td>Missing</td>
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<td>2.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>35</td>
<td>76.7</td>
<td>8</td>
<td>88.9</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>1</td>
<td>11.1</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>35</td>
<td>76.1</td>
<td>7</td>
<td>77.8</td>
</tr>
<tr>
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<td>Yes</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>2</td>
<td>22.2</td>
</tr>
</tbody>
</table>

Table 82. F-table of Audubon and Outward Bound group intentions and involvement in post-program camping of other forms.

<table>
<thead>
<tr>
<th>Source</th>
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<th>Prob.</th>
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<td>.002</td>
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<td>.65</td>
<td>.008</td>
<td>.009</td>
<td>.6604</td>
</tr>
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<td>.004</td>
<td>.42</td>
<td>.2132</td>
</tr>
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<td>.02</td>
<td>1.56</td>
<td>.2132</td>
</tr>
<tr>
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<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>1.32</td>
<td>.03</td>
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</tr>
</tbody>
</table>

There is no significant relationship between groups and/or instruments with respect to intentions and/or engagement in other forms of camping.
b) Four Group

Table 83. F-table of post-program intentions and/or involvement in other forms of camping for AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
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<th>F</th>
<th>Prob.</th>
</tr>
</thead>
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<td>.02</td>
<td>3.11</td>
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</tr>
<tr>
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<td>.59</td>
<td>.007</td>
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<td>.004</td>
<td>.45</td>
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<td>.03</td>
<td>3.12</td>
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</tr>
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<td>.009</td>
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<td>1.31</td>
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</tr>
</tbody>
</table>

There is significant interaction with regards to this item. However, the frequency data suggests such limited intent and/or engagement (it is only mentioned four times across all four groups and three instrument administrations) that it is not worth pursuing further here.

8. Intentions and involvement in joining outdoor activity clubs or organizations.

Table 84. Frequency data of post-program intentions and involvement in joining outdoor activity clubs or organizations.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>%</th>
<th>B</th>
<th>%</th>
<th>C</th>
<th>%</th>
<th>D</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>No</td>
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<td>63</td>
<td>6</td>
<td>66.7</td>
<td>12</td>
<td>46.2</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>16</td>
<td>34.8</td>
<td>3</td>
<td>33.3</td>
<td>12</td>
<td>46.2</td>
<td>2</td>
<td>33.3</td>
</tr>
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<td>Missing</td>
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<td>2.2</td>
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<td>0</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
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<td>60.9</td>
<td>7</td>
<td>77.8</td>
<td>16</td>
<td>61.5</td>
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<td></td>
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<td>15.2</td>
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<td>11.1</td>
<td>3</td>
<td>11.5</td>
<td>2</td>
<td>33.3</td>
</tr>
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<td>Missing</td>
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<td>11.1</td>
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<td>26.9</td>
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<td>33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
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<td>77.8</td>
<td>17</td>
<td>65.4</td>
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<td>2</td>
<td>22.2</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>
The most commonly specified outdoor activity club or organization noted by members of all groups was the Sierra Club.

a) Two Group

Table 85. F-table of Audubon and Outward Bound group intentions and involvement in joining outdoor activity clubs and organizations.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.2</td>
<td>.2</td>
<td>.86</td>
<td>.3577</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>19.94</td>
<td>.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>3.92</td>
<td>1.96</td>
<td>16.44</td>
<td>&lt;.001*</td>
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<tr>
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<td>.14</td>
<td>.07</td>
<td>.57</td>
<td>.5683</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
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<td>14.66</td>
<td>.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
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<td>14.8</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant relationship between instruments with respect to intentions and/or engagement in joining outdoor activity clubs or organizations following the programs. Actual self-reported outdoor activity club or organization joining behavior is significantly different from the intentions to engage in this activity following the programs taken (OD = .20; RD = .14). There is also a significant difference between the frequency of intentions in this area formed immediately after the programs as opposed to those noted for the period following the delayed posttest (OD = .32; RD = .14). In all cases, more intentions to join outdoor activity groups were made for the six month period following the program than for the succeeding six month period.
b) Four Group

Table 86. F-table of intentions and/or involvement in joining outdoor activity clubs and organizations for AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>.28</td>
<td>.09</td>
<td>.39</td>
<td>.7575</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>19.85</td>
<td>.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>3.91</td>
<td>1.96</td>
<td>16.4</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.6</td>
<td>.1</td>
<td>.84</td>
<td>.5380</td>
</tr>
<tr>
<td>Inst. X Cases (Gr.)</td>
<td>119</td>
<td>14.2</td>
<td>.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>14.8</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant relationship between instrument administration and intentions/involvement to join outdoor activity clubs or organizations following program participation. There are significant differences between posttest intentions and delayed posttest self-reported behavior (OD = .20; RD = .14) and between posttest intentions and delayed posttest intentions (OD = .32; RD = .14). In general, more intentions were formed at the end of the programs than were carried out by participants in all groups. Also, more post program behavior was reported at delayed posttesting than intentions formed for the subsequent six month period. This suggested either a fulfilment of this objective by those who initially formed the intention or conversely, a decline in interest in joining outdoor activity groups.
9. Intentions and involvement in joining environmental groups or organizations.

Table 87. Frequency data of post-program intentions and involvement in joining environmental groups or organizations.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A F</th>
<th>A %</th>
<th>B F</th>
<th>B %</th>
<th>C F</th>
<th>C %</th>
<th>D F</th>
<th>D %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>No</td>
<td>26</td>
<td>56.5</td>
<td>6</td>
<td>66.7</td>
<td>17</td>
<td>65.4</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>19</td>
<td>41.3</td>
<td>3</td>
<td>33.3</td>
<td>7</td>
<td>26.9</td>
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<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
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<td>7.7</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>22</td>
<td>47.8</td>
<td>4</td>
<td>44.4</td>
<td>15</td>
<td>57.7</td>
<td>3</td>
<td>50</td>
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<tr>
<td></td>
<td>Yes</td>
<td>13</td>
<td>28.3</td>
<td>4</td>
<td>44.4</td>
<td>4</td>
<td>15.4</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>1</td>
<td>11.1</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>31</td>
<td>67.4</td>
<td>7</td>
<td>77.8</td>
<td>17</td>
<td>65.4</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>4</td>
<td>8.7</td>
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<td>0</td>
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<td>7.7</td>
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<td>23.9</td>
<td>2</td>
<td>22.2</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

The most commonly specified environmental group or organization noted by members of Audubon groups was The National Audubon Society. Other organizations mentioned by Audubon participants included Sierra, the Nature Conservancy, World Wildlife Fund, National Association for Environmental Education and a variety of other local groups and networks. While few participants from other groups responded positively to this item, those who did were primarily interested in the Sierra Club, the Wilderness Society and the Nature Conservancy.
a) Two Group

Table 88. F-table of Audubon and Outward Bound group intentions and involvement in joining environmental groups and organizations.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.45</td>
<td>.45</td>
<td>2.39</td>
<td>.1260</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>15.99</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>3.19</td>
<td>1.59</td>
<td>8.57</td>
<td>.0003*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.21</td>
<td>.11</td>
<td>.58</td>
<td>.5628</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>123</td>
<td>22.89</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>23.0</td>
<td>.30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference between stated posttest intentions and delayed posttest intentions with respect to joining environmental groups or organizations (OD = .28; RD = .18).

More intentions were made for the six month period immediately following the program than for the second six month period. The self-reported environmental joining behavior following the programs was also significantly more than the intentions stated for the six month period following delayed posttesting (OD = .24; RD = .19). There were very few intentions stated in this respect on the delayed posttest instrument, suggesting either that participants have met most of their objectives in this regard or that a decline in this joining behavior occurs over time.
b) Four Group

Table 89. F-table of intentions and/or involvement in joining environmental groups and organizations for AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>.46</td>
<td>.15</td>
<td>.8</td>
<td>.4983</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>16.05</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>3.19</td>
<td>1.6</td>
<td>8.44</td>
<td>.0004*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.53</td>
<td>.09</td>
<td>.47</td>
<td>.8301</td>
</tr>
<tr>
<td>Inst. X Cases (Gr.)</td>
<td>119</td>
<td>22.5</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>125</td>
<td>23.08</td>
<td>.28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant relationship between intentions stated at the posttest administration and the actual self-reported environmental group joining behavior identified six months later (OD = .24; RD = .19). Groups stated more intentions than actual related behavior. There were also substantially fewer intentions stated at the delayed posttest administration than were stated at the posttest administration of this same instrument (OD = .28; RD = .18).
10. Intentions and involvement in taking outdoor pursuit or outdoor leadership courses.

Table 90. Frequency data of post-program intentions and involvement in taking outdoor pursuit or outdoor leadership courses.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>%</th>
<th>B</th>
<th>%</th>
<th>C</th>
<th>%</th>
<th>D</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>No</td>
<td>36</td>
<td>78.3</td>
<td>9</td>
<td>100</td>
<td>22</td>
<td>84.6</td>
<td>5</td>
<td>83.3</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>9</td>
<td>19.6</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1</td>
<td>2.2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>28</td>
<td>60.9</td>
<td>7</td>
<td>77.8</td>
<td>17</td>
<td>65.4</td>
<td>3</td>
<td>50</td>
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<tr>
<td></td>
<td>Yes</td>
<td>7</td>
<td>15.2</td>
<td>1</td>
<td>11.1</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
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<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>1</td>
<td>11.1</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>28</td>
<td>60.9</td>
<td>7</td>
<td>77.8</td>
<td>15</td>
<td>57.7</td>
<td>3</td>
<td>50</td>
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<tr>
<td></td>
<td>Yes</td>
<td>7</td>
<td>15.2</td>
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<td>4</td>
<td>15.4</td>
<td>1</td>
<td>16.7</td>
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<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>2</td>
<td>22.2</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

Audubon Residential members appeared to form most intentions and to engage most in formal outdoor courses. The most common types mentioned were hiking and skiing. Very few respondents from other groups responded positively to this item, suggesting little interest in furthering outdoor skill and/or leadership development through formal coursework by members of these groups.
a) Two Group

Table 91. F-table of Audubon and Outward Bound group intentions and involvement in taking outdoor pursuit or outdoor leadership courses.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.08</td>
<td>.08</td>
<td>.4</td>
<td>.5264</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>15.83</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.11</td>
<td>.05</td>
<td>.52</td>
<td>.5947</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.19</td>
<td>.09</td>
<td>.94</td>
<td>.3948</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>123</td>
<td>12.4</td>
<td>.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>12.59</td>
<td>.19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are no significant differences between groups and/or instruments with respect to the taking of outdoor pursuit or outdoor leadership courses.

b) Four Group

Table 92. F-table of intentions and/or involvement in taking outdoor pursuit or outdoor leadership courses for AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
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<td>.19</td>
<td>1.05</td>
<td>.3744</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>15.26</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.11</td>
<td>.05</td>
<td>.52</td>
<td>.5961</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.36</td>
<td>.06</td>
<td>.57</td>
<td>.7512</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>119</td>
<td>12.3</td>
<td>.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>12.66</td>
<td>.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is no significant relationship between the groups and/or instrument administrations with respect to intentions or involvement in outdoor pursuit and/or outdoor leadership courses following the posttest.

11. Intentions and involvement in taking environmental or environmental leadership courses.

Table 93. Frequency data of post-program intentions and involvement in taking environmental or environmental leadership courses.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A</th>
<th>%</th>
<th>B</th>
<th>%</th>
<th>C</th>
<th>%</th>
<th>D</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>No</td>
<td>40</td>
<td>87</td>
<td>8</td>
<td>88.9</td>
<td>24</td>
<td>92.3</td>
<td>5</td>
<td>83.3</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5</td>
<td>10.9</td>
<td>1</td>
<td>11.1</td>
<td>2</td>
<td>7.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1</td>
<td>2.2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>31</td>
<td>67.4</td>
<td>7</td>
<td>77.8</td>
<td>19</td>
<td>73.1</td>
<td>4</td>
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<td>Yes</td>
<td>4</td>
<td>8.7</td>
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<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>32</td>
<td>69.6</td>
<td>7</td>
<td>77.8</td>
<td>18</td>
<td>69.2</td>
<td>4</td>
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</tr>
<tr>
<td></td>
<td>Yes</td>
<td>3</td>
<td>6.5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>2</td>
<td>22.2</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

Audubon Residential members formed most intentions and engaged most in formal environmental courses. There were no particular courses which seemed to attract this group above others. Some of the courses mentioned were Project Wild, Project Learning Tree, Audubon, ecology, ranger leadership, Sierra, zoo, urban interface and environmental education. Very few respondents from other groups responded to this item, suggesting little interest in furthering environmental knowledge, skill and/or leadership development through formal coursework.
a) Two Group

Table 94. F-table of Audubon and Outward Bound group intentions and involvement in taking environmental or environmental leadership courses.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.37</td>
<td>.37</td>
<td>4.45</td>
<td>.0378*</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>7.1</td>
<td>.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.007</td>
<td>.003</td>
<td>.07</td>
<td>.9368</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.08</td>
<td>.04</td>
<td>.73</td>
<td>.4852</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>123</td>
<td>6.39</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>6.47</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference between groups with regard to the intention to take and/or actually enrolling in environmental and/or environmental leadership courses. The Audubon groups tended to form such intentions and pursue such interests more frequently than the Outward Bound groups (OD = .19; RD = .07).

b) Four Group

Table 95. F-table of intentions and/or involvement in taking environmental and environmental leadership courses by AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>.38</td>
<td>.13</td>
<td>1.5</td>
<td>.2198</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>7.1</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.007</td>
<td>.004</td>
<td>.07</td>
<td>.9370</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.12</td>
<td>.02</td>
<td>.36</td>
<td>.9013</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>119</td>
<td>6.38</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>6.5</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is no significant relationship between group and/or test instrument administration and the intention to take or self-reported taking of environmental and environmental leadership courses.

12. Intentions and involvement in subscribing to outdoor education/recreation magazines or journals following program participation.

Table 96. Frequency data of post-program intentions and involvement in subscribing to outdoor education/recreation magazines or journals.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Post Intentions</td>
<td>No</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
</tr>
</tbody>
</table>

The most common publications specified by AR members was Sierra (3) while AWRB participants appeared most interested in Backpacker (2). OBG members mentioned Outdoors and Outside and an OBP participant identified the Journal of Experiential Education, but none of these were noted by more than one member.
a) Two Group

Table 97. F-table of Audubon and Outward Bound group intentions and involvement in subscribing to outdoor education/recreation magazines or journals.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.07</td>
<td>.07</td>
<td>.41</td>
<td>.5236</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>14.4</td>
<td>.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>1.14</td>
<td>.57</td>
<td>7.61</td>
<td>.0008*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.31</td>
<td>.15</td>
<td>2.04</td>
<td>.1343</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>123</td>
<td>9.21</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>9.52</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference between test instrument administration periods. More intentions were formed immediately following the programs taken than are formed at the six month follow-up (OD = .13; RD = .11). Also, more self-reported subscription behavior was reported at delayed post-testing than future related intentions formed at that same point in time (OD = .18; RD = .12), suggesting either that members who formed these intentions earlier either pursued this objective actively prior to post-testing or that there was a decay in this interest over time.
There is significant disordinal interaction between group and instrument with respect to subscribing to outdoor education/recreation magazines and journals following the programs. The AR group tended to actually subscribe to more publications than they intended to immediately following their program. This group also stated few intentions to obtain additional subscriptions over the six months following delayed posttesting. The AWRB and OBP groups followed the same up and down trend over the three administrations. The OBG group, conversely, failed to achieve most of its stated intentions in this area according to delayed posttest behavior data. This group formed virtually no intentions in this regard for the period following delayed posttesting.

### Table 98. F-table of intentions and/or involvement in subscribing to outdoor education/recreation magazines or journals for AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>1.56</td>
<td>.52</td>
<td>3.39</td>
<td>.0218*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>12.7</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>1.13</td>
<td>.57</td>
<td>7.77</td>
<td>.0007*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.99</td>
<td>.17</td>
<td>2.27</td>
<td>.0413*</td>
</tr>
<tr>
<td>Inst. X Cases (Gr.)</td>
<td>119</td>
<td>8.68</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>9.67</td>
<td>.24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13. Intentions and involvement in subscribing to environmental magazines or journals following program participation.

Table 99. Frequency data of post-program intentions and involvement in subscribing to environmental magazines or journals.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A F %</th>
<th>B F %</th>
<th>C F %</th>
<th>D F %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>No</td>
<td>37 80.4</td>
<td>9 100</td>
<td>22 84.6</td>
<td>4 66.7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8 17.4</td>
<td>0 0</td>
<td>2 7.7</td>
<td>1 16.7</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1 2.2</td>
<td>0 0</td>
<td>2 7.7</td>
<td>1 16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>26 56.5</td>
<td>8 88.9</td>
<td>17 65.4</td>
<td>2 33.3</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>9 19.6</td>
<td>0 0</td>
<td>2 7.7</td>
<td>2 33.3</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11 23.9</td>
<td>1 11.1</td>
<td>7 26.9</td>
<td>2 33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>32 69.6</td>
<td>7 77.8</td>
<td>19 73.1</td>
<td>4 66.7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>3 6.5</td>
<td>0 0</td>
<td>0 0</td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11 23.9</td>
<td>2 22.2</td>
<td>7 26.9</td>
<td>2 33.3</td>
</tr>
</tbody>
</table>

The most common publication specified by AR members was Audubon. Others mentioned by this group included the Journal of Environmental Education, the World Wildlife Fund, Earthwatch and the Nature Conservancy. The AWRB group did not pursue any new environmental publications. Only one OBG and two OBP members identified any environmental magazines or journals and two of these three pursued the National Geographic magazine.
a) Two Group

Table 100. F-table of Audubon and Outward Bound group intentions and involvement in subscribing to environmental magazines or journals.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>.12</td>
<td>.12</td>
<td>.89</td>
<td>.3470</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>11.83</td>
<td>.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.75</td>
<td>.37</td>
<td>4.23</td>
<td>.0168*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.01</td>
<td>.005</td>
<td>.06</td>
<td>.9421</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>123</td>
<td>10.88</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>10.89</td>
<td>.095</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference between test instrument administration periods. More self-reported subscription behavior was reported at delayed posttesting than future related intentions formed at that same point in time (OD = .15; RD = .13), suggesting either that members who formed these intentions earlier either pursued this objective actively prior to delayed posttesting or that there was a decay in this interest over time.

b) Four Group

Table 101. F-table of intentions and/or involvement in subscribing to environmental magazines or journals for AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>1.02</td>
<td>.34</td>
<td>2.58</td>
<td>.0587</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>10.94</td>
<td>.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>.77</td>
<td>.38</td>
<td>4.36</td>
<td>.0149*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.37</td>
<td>.06</td>
<td>.71</td>
<td>.6448</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>119</td>
<td>10.49</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>10.86</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is a significant difference with regards to test instrument administered. The difference is the same as that noted above in the two group analysis above.

14. Intentions and involvement in becoming actively involved in environmental issues following program participation.

Table 102. Frequency data of post-program intentions and involvement in environmental issues.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Response</th>
<th>A F</th>
<th>%</th>
<th>B F</th>
<th>%</th>
<th>C F</th>
<th>%</th>
<th>D F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>No</td>
<td>14</td>
<td>30.4</td>
<td>6</td>
<td>66.7</td>
<td>16</td>
<td>61.5</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>31</td>
<td>67.4</td>
<td>3</td>
<td>33.3</td>
<td>8</td>
<td>30.8</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>1</td>
<td>2.2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>7.7</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>No</td>
<td>22</td>
<td>47.8</td>
<td>5</td>
<td>55.6</td>
<td>18</td>
<td>69.2</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>13</td>
<td>28.3</td>
<td>3</td>
<td>33.3</td>
<td>1</td>
<td>3.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>1</td>
<td>11.1</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>No</td>
<td>19</td>
<td>41.3</td>
<td>4</td>
<td>44.4</td>
<td>17</td>
<td>65.4</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>16</td>
<td>34.8</td>
<td>3</td>
<td>33.3</td>
<td>2</td>
<td>7.7</td>
<td>2</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Missing</td>
<td>11</td>
<td>23.9</td>
<td>2</td>
<td>22.2</td>
<td>7</td>
<td>26.9</td>
<td>2</td>
<td>33.3</td>
</tr>
</tbody>
</table>

As the range and frequencies of intentions and behavior in this area were quite extensive, the specific issues pursued are tabled below:
Table 103. Specific environmental intentions and behaviors identified by members of each group.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>AR</th>
<th>AWRB</th>
<th>OBG</th>
<th>OBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Intentions</td>
<td>acid rain (16)</td>
<td>wilderness pres.</td>
<td>water (2)</td>
<td>wilderness (3)</td>
</tr>
<tr>
<td></td>
<td>wilderness (6)</td>
<td>habitat protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>wildlife (4)</td>
<td>wildlife</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>water (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>other (8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.P. Behavior</td>
<td>wilderness (3)</td>
<td>wildlife</td>
<td>water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>water (3)</td>
<td>air</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>wildlife (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>acid rain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.P. Intentions</td>
<td>wilderness (6)</td>
<td>habitat</td>
<td>public lands</td>
<td>wilderness</td>
</tr>
<tr>
<td></td>
<td>water (3)</td>
<td>endangered species</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>wildlife (2)</td>
<td>wetlands</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>acid rain</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a) Two Group

Table 104. F-table of Audubon and Outward Bound group intentions and involvement in environmental issues.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>1</td>
<td>3.9</td>
<td>3.9</td>
<td>11.76</td>
<td>.0010*</td>
</tr>
<tr>
<td>Cases (Groups)</td>
<td>85</td>
<td>28.21</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>3.15</td>
<td>1.58</td>
<td>12.17</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>2</td>
<td>.05</td>
<td>.03</td>
<td>.2</td>
<td>.8195</td>
</tr>
<tr>
<td>Inst. X Cases (Gr)</td>
<td>123</td>
<td>15.92</td>
<td>.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>15.97</td>
<td>.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There is a significant difference between groups and between test instrument administration periods with respect to intentions and involvement in environmental issues. The Audubon groups formed significantly more environmental activist intentions and engaged in more related behavior than their Outward Bound counterparts (OD = .34; RD = .26). There is also a significant difference between post intentions and self-reported behavior (OD = .28; RD = .15) and between post intentions and delayed post intentions (OD = .19; RD = .15). In sum, more intentions to become environmentally involved are formed immediately following the programs taken than are actually acted on prior to delayed posttesting, and fewer intentions to become environmentally involved are formed at delayed posttesting than at the earlier questioning.

b) Four Group

Table 105. F-table of intentions and/or involvement in environmental issues for AR, AWRB, OBG and OBP groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>3</td>
<td>4.79</td>
<td>1.6</td>
<td>4.82</td>
<td>.0038*</td>
</tr>
<tr>
<td>Cases (Group)</td>
<td>83</td>
<td>27.49</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td>2</td>
<td>3.12</td>
<td>1.56</td>
<td>12.48</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>Inst. X Group</td>
<td>6</td>
<td>.96</td>
<td>.16</td>
<td>1.29</td>
<td>.2686</td>
</tr>
<tr>
<td>Inst. X Cases (Gr.)</td>
<td>119</td>
<td>14.87</td>
<td>.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>15.83</td>
<td>.28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There is a significant difference between group and frequency of intentions, behavior, and further intentions stated. The AR group is significantly more involved in planning and carrying out environmental activist intentions than the OBG group (OD = .34; RD = .26). Again, more initial
intentions are formed than are carried out by all groups (OD = .28; RD = .14) and more intentions are stated immediately following the programs taken than six months later (OD = .19; RD = .15).

In sum, the two group (Audubon versus Outward Bound) analysis yielded very few significant differences between groups (only two), while the four group (Audubon Residential, Audubon Wilderness Research Backpacking, Outward Bound General, Outward Bound Patrol) analysis found groups significantly different on at least half of the 14 intention and behavior items. Group comparisons were inconsistent with the research hypotheses, even where sample size and low item response numbers were considered. Audubon groups did get more involved in environmental groups, courses, publications and issue activism, demonstrating a greater likelihood to become involved in activities for the wilderness environment. These relationships allow rejection of the null hypothesis stating that the groups will not differ in intentions and/or behavior related to environmental activities. Here, the alternative research hypothesis which states that Audubon groups will become more involved in environmental related activities than Outward Bound groups may be accepted.

However, Outward Bound groups did not, as expected, demonstrate a higher propensity compared to Audubon groups to become involved in outdoor education/recreation travel, activities, groups or publications; i.e., activities in wilderness. While the null hypothesis in this regard states that there will not be any significant difference between the groups compared may be statistically rejected, all differences noted suggested greater post-program involvement in outdoor education/recreation by the Audubon groups than by the Outward Bound groups. The original hypothesis in this regard was somewhat confounded by the emergence of the Audubon Wilderness Research Backpacking program which tended to draw people with environmental interests into a higher adventure setting than the Audubon Residential program.
The two group analysis identified at least half of the instrument related (three administrations) frequency data significantly different and the four group analysis was consistent with significant differences on six of the 14 items. In general, participants tended to form more intentions directly following their program experience than they reported following through on six months later and they subsequently formed substantially fewer related intentions for the next six month period.

MODEL VERIFICATION: PATH ANALYSIS

A model of reasoned wilderness behavior was proposed by the researcher in chapter II. This model suggested that predisposing factors such as sociodemographics and past experience lead to the development of a belief (knowledge) base about various aspects of wilderness. These personal description factors and knowledge about wilderness (i.e., basic ecological knowledge and minimal impact knowledge) combine in each individual to result in a general attitude in favor of or against the attitude object, wilderness. It was proposed that this general attitude leads to the formation of specific intentions in and/or for wilderness and that the formation of such intentions will lead to actual involvement in and/or for wilderness.

This proposed model was tested by applying the data to a Lisrel path analysis procedure. The procedure was repeated twice to determine if it was valid prior to as well as following treatment. The following data was used in each of these analyses:

1) Personal description factors (age, occupation), pretest basic ecological knowledge, pretest minimal impact knowledge, pretest wilderness issue attitude, intentions in (intention to travel into wilderness) and for (intention to become involved in environmental issues), and delayed posttest behavior reflecting follow-through on those same intentions.

2) Personal description factors (age, occupation), posttest basic ecological knowledge, posttest minimal impact knowledge, posttest wilderness issue attitude, intentions in (intention to
travel into wilderness) and for (intention to become involved in environmental issues), and
delayed posttest behavior reflecting follow-through on those same intentions. In order to attempt
to simplify the potential pathways, only two personal description factors were considered, age and
occupation. Age and occupation were selected as exogenous variables representing the
endogenous variable "predisposing factors". Audubon and Outward Bound groups were found
to differ significantly on these variables and each variable helped account for other observed
differences in life stage and past experience. Age, it was noted, likely accounted for marital status,
presence of dependent children at home and place of residence. Occupation was selected
because it tended to account for other differences observed such as previous science
coursework taken and type of diploma/degree held.

The two intention/behavior correlates (travel into wilderness and participation in
environmental issues) were also specified in part because the two groups differed on these two
parameters. These two particular elements were also considered because they respectively
represent intentions and involvement in and for wilderness.

The model was tested using error terms consistent with the instrument reliability values
observed in the pilot test data. These error terms are as follows:

- age = .05
- occupation = .05
- basic ecological knowledge = .40
- minimal impact knowledge = .30
- wilderness issue attitude = .20
- intention to travel into wilderness = .30
- intention to become involved in environmental issues = .30
- travel into wilderness = .20
- involvement in environmental issues = .20
Assessment of the above model involves an analysis of the significance of the beta and gamma weights involved between the factors identified. Beta weights are regression coefficients among the endogenous variables (those coming out of the model). Gamma weights are regression coefficients between exogenous variables (those coming into the model from outside which affect it) and the endogenous ones specified. Following are the beta and gamma weights for the relationships between the components of the above model:

**Beta weights:**

- basic ecological knowledge - wilderness issue attitude = 0.221
- minimal impact knowledge - wilderness issue attitude = 0.171
- wilderness issue attitude - intention to travel into wilderness = -0.740
wilderness issue attitude - intention to become involved in environmental issues = .355
intention to travel into wilderness - involvement in wilderness travel = .508
intention to become involved in wilderness issues - involvement in environmental issues = 1.185

Gamma weights:
age - basic ecological knowledge = -.010
age - minimal impact knowledge = -.079
age - wilderness issue attitude = .303
occupation - basic ecological knowledge = .255
occupation - minimal impact knowledge = -.005
occupation - wilderness issue attitude = -.035
Chi-square = 3.47 DF = 2 Prob. = 0.176

The insignificant Chi-square finding suggests that the model is plausible.

According to the model, the endogenous factor “predisposing factors” as represented by age and occupation, affects both the participant’s knowledge about wilderness (basic ecological knowledge and minimal impact knowledge) and their attitudes toward its preservation/use. The Gamma weights derived suggest the relationship is strongest between predisposing factors and knowledge of basic ecological knowledge (age = -.01 and occupation = .255) and minimal impact knowledge (age = -.079 and occupation = -.005) and somewhat weaker in the direct link to attitude (age = .303 and occupation = -.305). The relationship between basic ecological knowledge/minimal impact knowledge and attitude, as evident by the Beta weights of .221 and .171 respectively are also quite strong. These relationships suggest that it may be more effective to develop a desired attitude through cognitive channels (i.e., teaching facts and concepts about the natural world and how to live and travel in it with the environment in mind). The more one knows about a given attitude object, in this case wilderness, the stronger one is likely to feel about it. Wilderness issue attitude was also found to be related, although somewhat weakly, to the
formation of specific intentions to go into wilderness (Be = -.740) and to become involved in environmental issues (Be = .355).

The actual connection between intentions related to activity in and for wilderness and self-reported involvement in those activities appears to be the weakest link in the model (Be = .508 and 1.185 respectively). This fact is not really surprising as this relationship is the furthest removed from the program. There are always a myriad of reasons why people cannot or do not fulfill their best intentions.

Due to reliance on the delayed posttest for wilderness behavior data, only 62 cases of 89 total participants could be used in the path analysis. This rather small n combined with the relatively large number of parameters included in the model, results in only two degrees of freedom. The reader is cautioned to keep this qualification in mind when reading and interpreting the results of these analyses.
QUALITATIVE DATA RESULTS AND ANALYSIS

In this section, the researcher presents observations and interview data collected. This data is summarized and presented under three headings as follows:

A. Basic Ecological Information Taught and Observed in the Field: Information about Wilderness

B. Minimal Impact Techniques Taught and Observed in the Field: Actions in Wilderness

C. Wilderness Environmental Attitude Development: Actions for Wilderness

D. Interview Data: Instruction, Program and Environment Related Expectations and Evaluations

A. Basic Ecological Information Taught and Observed in the Field

The researcher did not observe, nor did she see any documented evidence of content/process related to basic ecological facts or concepts delivered over the Audubon Wilderness Research Backpacking program or the Outward Bound General group. Both the Audubon Residential and Outward Bound Patrol groups received some instruction in this area. While it would be extremely time-consuming and cumbersome to provide the reader with all of the ecological information disseminated over the Audubon Residential program, following is a brief presentation of the content delivered relevant to the ten item multiple choice basic ecological instrument used. Each item covered is accompanied by the date(s) and resource instructor's initials. The few items covered by the Outward Bound instructor will also be presented.
Table 106. Basic ecological information taught and observed over AR and OBP programs.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Audubon Residential</th>
<th>Outward Bound Patrol</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Food Web</td>
<td>J.6 - K. In botany session.</td>
<td></td>
</tr>
<tr>
<td>b) Food Chain</td>
<td>J.6 - H. On orientation walk.</td>
<td></td>
</tr>
<tr>
<td>c) Plants Take Nutrients From Soil</td>
<td>J.6 - K. In botany session.</td>
<td></td>
</tr>
<tr>
<td>f) Succession</td>
<td></td>
<td>J.25 - S. On walk up to basecamp; taught incorrectly that pine replaces aspen; called a fir a pine.</td>
</tr>
<tr>
<td>g) Endangered Species</td>
<td>J.12 - H. In endangered species session.</td>
<td>J.13 - In display in lounge</td>
</tr>
<tr>
<td>h) Changes With Elevation</td>
<td>Visible from camp.</td>
<td>Visible as hiked.</td>
</tr>
</tbody>
</table>

Below is a table of the number of items on the 10 item basic ecological knowledge instrument used and the group means on the pre, post and delayed posttest administrations.

Table 107. Basic ecological knowledge test related teaching items covered in AR and OBP programs.

<table>
<thead>
<tr>
<th>Group</th>
<th># of items addressed</th>
<th>Pretest</th>
<th>Means Posttest</th>
<th>D.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>6</td>
<td>.54</td>
<td>.61</td>
<td>.60</td>
</tr>
<tr>
<td>OBP</td>
<td>2</td>
<td>.58</td>
<td>.56</td>
<td>.45</td>
</tr>
</tbody>
</table>
As can be seen from the table above, the Audubon Residential program gave somewhat more attention to the content covered by the ecological knowledge instrument used. It, of course, included much more than could be tested with such a short instrument. The instructor of the Outward Bound Patrol travelled with attempted to do some of this type of teaching, but appeared quite untrained and unskilled as an ecology educator and as often as not, taught the material incorrectly.

B. Minimal Impact Techniques Taught and Observed In the Field

Here, the researcher has endeavored to present specific comments made by instructors and actual behaviors of instructors and participants during each of the three programs actually observed: AR, AWRB and OBP. As noted earlier, it was not possible for the researcher to travel with more than one OB patrol over the ten day period of data collection. The fact that the program patrol observed may or may not be wholly representative of the other groups in terms of wilderness travel technology must be recognized as a limitation of the study. However, according to the school director, all instructors were held accountable for teaching minimal impact backcountry travel techniques in accordance with the Colorado Outward Bound School's Backcountry Handbook for the Mountain, River and Desert Areas (see appendix 10 for relevant content). The researcher reviewed this manual in preparing the appendix and found it to contain virtually all the information necessary for environmentally conscious travel.

Following is a comparative summary of the instruction and behavior observed in the three programs observed in detail. The content has been divided into a number of sections, including: wilderness travel, campsite selection, solid waste disposal, liquid waste disposal, human sanitation, fires, wildlife, artifacts and water. In addition, each entry will be prefaced with the date (e.g., J.7 means July 7th) and the initial(s) of the leader or participant making the comment or being observed.
Table 108. Program instruction/process incidents related to minimal impact technology.

<table>
<thead>
<tr>
<th>A) Wilderness Travel (route selection, contouring, selection of hard surface in alpine, spreading out in alpine, avoiding multiple trailing)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Audubon Residential</strong></td>
</tr>
<tr>
<td>J.7 - T. - while on geology walk, asked group to spread out while walking in meadows.</td>
</tr>
<tr>
<td>J.9 - met ranger looking for campsite abuse; noted that outfitters bring in exotic weeds in hay for horses.</td>
</tr>
<tr>
<td>J.15 - good route selection, group automatically slogging through mud (except where deep puddles) and spreading out in alpine meadows.</td>
</tr>
</tbody>
</table>

B) Campsite Selection (away from trails and water sources, use of existing sites, avoidance of overuse of previously unused site, minimal vegetation under tents, no trenching)

<table>
<thead>
<tr>
<th>Audubon Residential</th>
<th>Wilderness Research Backpacking</th>
<th>Outward Bound Patrol</th>
</tr>
</thead>
<tbody>
<tr>
<td>J.6 - K. in min. imp. session, told group to camp at least 50' from trails and 100' from lake and out of view, not to put tents on fragile vegetation, to avoid foliage and windfall areas, not to trench around tents, not to move logs &amp; rocks &amp; to keep cook area away from tents.</td>
<td>J.25 - S. selected a campsite which was closed by the N.F.S. to allow restoration (either did not see or ignored sign, but did not move group when it was pointed out to him).</td>
<td></td>
</tr>
</tbody>
</table>
J.9 - group camped at old horsecamp; tents on hard soil, not vegetation, set tents 30 yards from cooksite and used gas cookstoves.

J.9 - K. pointed out an abused site with tent trench scars still evident; brought out old grill left at site.

J.28 - S. mentioned that he had mixed feelings about site restoration v. leaving trashed sites as is so others will use them and not make new ones.

J.28 - set camp in avalanche debris about 20 yards from Snowmass Lake.

C) Solid Waste Disposal (no littering, picking up and packing out, dealing with fish viscera)

Audubon Residential Wilderness Research Backpacking Outward Bound Patrol

J.6 - K. in min. imp. session; told group to leave as little trace as possible & to take everything out. M. told group to take out own & others' trash. She said anything burned must be fully burned (i.e., not plastics, foil, tampons, etc.). Fish guts are not to be thrown in the lake, but spread out in the woods for small animals. In bear areas, walk downtrail & scatter up off trail in woods.

J.9 - clean site, no litter around. Ross Lake was quite littered, but only 1 leader was seen picking any up (no campers).

J.9 - leader caught fish, cleaned it along the lake and placed the viscera under a rock 40' away.

J.9 - leader and campers caught 8 fish at Hidden Lake, tossing all viscera in bush <10' from trail.

J.15 - ziplock baggies full of unburnable garbage were shared around for hike out.

D) Liquid Waste Disposal (pour around fire or use sump hole, wash dishes away from watersource)

Audubon Residential Wilderness Research Backpacking Outward Bound Patrol

J.6 - K. told group to use biodegradable soap, not to use it directly in water source, but at least 100' away. She told J.24 - S. told group to pour dishwater in a sumphole dug for this purpose. This was
them to fill a pot with a cup & to walk away from the stream, to use hands, sand, scrubby, etc. Dishes are to be washed in this way, sterilized with hot water & allowed to dry or towel dried to avoid giardia.

J.9 - dishes were washed in cold water 50 yards from tents. The water was dumped here (no sump hole). The campers did not use an existing fire to dump wash or rinse water; rinse water was splashed around in bush.

done consistently over trip. S. said it was o.k. to spit toothpaste on ground.

E) Human Sanitation (washing self and clothes away from water source, use of biodegradable soap, use of latrines v. catholes, use and disposal of toilet paper).

Audubon Residential Wilderness Research Backpacking Outward Bound Patrol

J.6 - K. told group they didn't need soap to wash clothes, but just to rinse them & to hang them out of sight of the trail. She told them they don't need soap for washing themselves & not to bathe in the water source directly. She told the group to build & use latrines at all campsites, the depth of each being determined by soil depth. If little or no soil, rely on sunlight for decomposition. Don't use toilet paper, but use leaves (green gentian) taken to the latrine. She told the group to use water from their water bottle to wash hands afterwards.

J.25 - S. was the only one to bring toilet paper. It was only used rarely; the whole group used leaves, sticks, stones & snow as available.

J.25 - S. asked group not to wash in the stream, but away from it. He also told them to dig catholes with an entrenching tool brought for this purpose, & to select sites at least 30 yards from water, washing hands after.

J.29 - bathed with the women in the lake. Inspite of S.'s directions to wash away from the water, all washed right along the edge (the bank was steep & rocky & they were barefoot).

A.1 - the whole group washed up in & along stream (no effort to wash away).
F) **Fires** (use of existing sites, wood selection, structuring, extinguishing, disposal, site reclamation)

<table>
<thead>
<tr>
<th>Audubon Residential</th>
<th>Wilderness Research Backpacking</th>
<th>Outward Bound Patrol</th>
</tr>
</thead>
<tbody>
<tr>
<td>J.5 - during orientation walk, J.B. noted that people cut snags down for firewood, resulting in snag depreciation.</td>
<td>J.6 - K. told group to build fires 100' from water source. M. told group to use existing sites &amp; to dismantle them after. Fires were to be burned to ash &amp; coals scattered in woods. Camp stoves were to be used for the most part, but sod fires were to be built for cooking fish. Sod was to be replaced afterwards.</td>
<td>J.31 - S. built a fire in an existing fire circle. He never discussed fire building, lighting, extinguishing or site reclamation. When we left, the fire was out &amp; S. had pulled out the cans &amp; foil left there by earlier users. We packed them out with our garbage.</td>
</tr>
<tr>
<td>J.9 - group built a fire to cook fish &amp; biscuits; the sod fire was well built. The grill was placed on rocks.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

G) **Water** (treatment for drinking)

<table>
<thead>
<tr>
<th>Audubon Residential</th>
<th>Wilderness Research Backpacking</th>
<th>Outward Bound Patrol</th>
</tr>
</thead>
<tbody>
<tr>
<td>J.6 - K. talked to group about boiling water at low elevations and using iodine at higher ones to save fuel &amp; because it works better.</td>
<td>J.9 - everyone in the group ran out of treated water in mid-afternoon (hot, dry hike back to camp). It was 2 hours after getting back to camp before people had boiled water to drink.</td>
<td>J.25 - all group members were given an iodine bottle &amp; water bottle &amp; told to treat their drinking water. This was done over the trip.</td>
</tr>
</tbody>
</table>

H) **Wildlife** (respect, avoidance, food storage, fishing)

<table>
<thead>
<tr>
<th>Audubon Residential</th>
<th>Wilderness Research Backpacking</th>
<th>Outward Bound Patrol</th>
</tr>
</thead>
<tbody>
<tr>
<td>J.12 - a camper pulled an immature cowbird from the river, brought it back to his cabin &amp; built a nest for it. He released it the next morning, apparently alright.</td>
<td>J.6 - K. warned group not to disturb animals by getting too close.</td>
<td>J.24 - S. said our biggest wildlife concern would be skunks (rabies worry). That same night, our food tent was raided by skunks.</td>
</tr>
<tr>
<td>J.14 - horseback riding with P.; stuck to roads &amp; trails.</td>
<td>J.9 - at Hidden Lake, 2 campers caught 4 trout using their butterfly nets; only 1 had a license &amp; none were licensed to fish using nets.</td>
<td>J.27 2 marmots &amp; a few chipmunks were sneaking around our lunch food. The camp director threw rocks at them &amp; yelled to scare</td>
</tr>
<tr>
<td>J.9 - W. caught 4 more fish using rod &amp; reel. All fish caught were cleaned, cooked &amp; eaten that night.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
J.9 - K. showed group a garter snake she'd been carrying around for a day. He vomited 2 baby birds as she held & talked about him.

J.9 - the group hung all foodstuffs using a rope & pulley system to get them up high. The hanging tree was about 20 yards from the nearest tent.

J.28 - stuck our food cache bags in the krumholz to keep them from animals.

J.28 - S. went fishing in Snowmass Lake, without a license. He didn't catch anything.

J.31 - a porcupine visited our messy camp and chewed the cap off our plastic soya sauce bottle. The bottle had been left lying on the ground. The group leaves its sites very clean, but they are almost always very messy while we are there. No efforts were made to hang food bags at night.

A.1 - S. went fishing again, but didn't catch anything.

I) Artifacts (not picking flowers or collecting rocks or other artifacts)

Audubon Residential Wilderness Research Backpacking Outward Bound Patrol

J.5 - P. noted importance of leaving bones, plants, rocks, etc. in place. "Mice use bones for calcium & everything has its place. We've had 25 years of Audubon camps in the Torrey Valley, and the valley is still relatively pristine."

J.14 - the members of this group collected a wide variety of plant, insect, & aquatic specimens. None were kept for personal collections; all were categorized & kept by Audubon as far as is known.

J.6 - A. on orientation walk, said she didn't mind people collecting things as long as it was for a reason, for example, education. Personal collections are not a valid reason.

J.12 - B. told group who were collecting butterflies and moths & placing them in sample jars, that they off. He scored a direct hit on one very surprised marmot.
the insects could survive in the
sealed jars for at least a day.

J.16 - over the camp, many rock,
bone, plant & other objects were
picked up and studied, but no one
was seen keeping anything. Most
items were returned at or near the
site at which they were found.

In sum, while the Audubon Residential program appears to address few activities for care
in the wilderness environment, both the Audubon Wilderness Backpacking and Outward Bound
Patrol groups were exposed to a substantial quantity of such teaching. The table below identifies
the number of items on the ten item multiple choice minimal impact instrument covered by the
instruction and process seen in each of the three programs. Each is accompanied by the same
groups minimal impact knowledge means from all three test administrations.

Table 109. Minimal impact knowledge test related teaching items covered in AR, AWRB and OBP
programs.

<table>
<thead>
<tr>
<th>Group</th>
<th># of items addressed</th>
<th>Pretest</th>
<th>Means</th>
<th>Posttest</th>
<th>D.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AR</td>
<td>1</td>
<td>.56</td>
<td>.58</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td>AWRB</td>
<td>8</td>
<td>.68</td>
<td>.71</td>
<td>.73</td>
<td></td>
</tr>
<tr>
<td>OBP</td>
<td>3</td>
<td>.45</td>
<td>.52</td>
<td>.63</td>
<td></td>
</tr>
</tbody>
</table>
The Audubon Residential group received by far the least training in minimal impact techniques. The Audubon Wilderness Research Backpack program group received the most of this type of training and was extremely sensitive to applying the techniques taught throughout the program. However, two aspects were taught different from the current technological thinking; dealing with fish viscera and disposal of wastewater from washing dishes.

The Outward Bound Patrol group did quite well, given their relative absence of instruction in minimal impact technology. As described in the incident table above, this group was not taught much of the test item content at all and the instructor in fact, appeared to set a poor example on numerous occasions (e.g., hiking single file across meadows, multiple trailing, not using latrines, keeping messy campsites, fishing without a licence, etc.).

C. Wilderness Attitude Development Observed In the Field

In this section, the researcher synthesized the program content and processes observed and experienced which related to long term participant involvement in wilderness preservation or conservation. Because of a total absence of time spent with Outward Bound groups other than the patrol travelled with, no efforts were made to describe the relevant content experienced by these 27 participants. In addition, a review of the researcher's log, instructors' log and participants' notes and journals taken over the Audubon Wilderness Research Backpacking program showed little, if any relevant content, and so is also not be addressed in this section.

In this section, a table of relevant program content/process is presented. The table is divided into a number of sections, including: wildlife habitat, endangered species, resource development, wilderness designation, and general philosophical content. This data summarization is followed by a table illustrating the relationship to pre, post and delayed post wilderness issue attitude means. Similarities and differences between the two groups are briefly described.
Table 110. Instructional content/processes relevant to long term wilderness conservation.

A) Wildlife Habitat

Audubon Residential

J.6 - J.B. on orientation walk; noted that roads result in habitat manipulation. Research shows interstates form complete barrier to populations resulting in potential extinction. Smaller roads weren't as significant. Road mortality isn't significant; reflectors reduce elk mortality.

J.6 - H. Fitzpatrick Wilderness area has cultured meadows in valley for sheep mgmt.

J.12 - M. Audubon has been involved in promoting an Artic National Wildlife Refuge in Alaska

J.14 - J.K. Showed group an osprey nest on Trail Lake which Audubon staff helped build the platform for. 3 eggs hatched during the camp.

Outward Bound Patrol

B) Endangered Species

Audubon Residential

J.12 - B. During Butterflies & Moths session. Noted that "rare and endangered species can be used to stop various resource dev't projects & suggested we have to work with them to find ways to do things soundly.

J.12 - H. Discussion on Endangered Species. Where should $ be spent? Is extinction natural? What species should be saved & which not? Which extinction(s) could destroy the earth? What about habitat destruction?

J.12 - M. - Evening session. Audubon involved inTellico dam fight over the snail darter.

Outward Bound

J.13. - P. - Evening session. If grizzly and wolf pop's o.k., rest of wildlife will be fine. Need to understand relevant legislation. All want grizzly, but "NIMBY". Low reproductive rate, therefore hard to reintroduce. Only 2 vital pop's in U.S. Wolf has rapid repro. rate. But both
consciously eradicated (bounties, cyanide, traps). Read Craig's *Track of the Grizzly.*

C) Public Lands

**Audubon Residential**


**Outward Bound**

J.29 - S. ski concessions on public land and rel'p between concessionnaire and land manager (e.g., can ski up and down hill, but can't use lifts).

D) Resource Development Impacts

**Audubon Residential**


J.13 - P. - Evening session on grizzlies, wolves & Yellowstone. Leopold's game mgt. phil. reversed. Yellowstone gets 2 mil. visitors/yr. Read Chase's *Playing God With Yellowstone.* Y's resources result in pressure for big game hunting, geothermal efforts outside park and timber cuts to boundary (resulting in edge effects & road threats to wildlife).

J.6 - H. Wilderness is managed in U.S.; must consider economics, people & culture and science.

**Outward Bound**

J.26 S. Wilderness designa'n; hunting, grazing & mining remain b/c allowed prior to designa'n. Water rights (e.g., Aurora at Supreme Court); can tunnel under wilderness to drain water. Water in Co. goes to L.A. on a first-come, first-served basis. Rights are transferable; don't even have to sell to someone on the same drainage.

E) Philosophy and Activism

**Audubon Residential**

J.12 - H. - Endangered Species session. Earth First sabotage gives environmentalists a bad name, but makes headlines. Some are optimistic old political guard being replaced

**Outward Bound**

J.25 - S. Said metaphor of wilderness is throughout the bible. Jesus, Moses & John the Baptist each went into the w. for 40 days.
with more ecologically conscious blood. Spaceship Earth 60's concept now replaced with earth as a living organism concept.

J.12 - M. Evening session. Audubon is heavily involved in educational programming.

J.12 - M. Evening session. Tellico dam fight (snail darter, flooding of Cherokee lands, loss of agricultural land) could have been won if had had our more recent organiza'n and network'g.

J.13 - P. - Evening session on grizzlies, wolves & Yellowstone. Cumulative effects on Yellowstone need to know real limits, politically and legally. Do some letterwriting!

J.16 - J.K. and T. On rim walk. Be yourself; respect the earth, but don't get too philos'. Think of frackles (patterns in disorder); what orders our patterns? Best way you can dev. an indiv's reverence for the land is to take them into the natural environment and give them a memorable experience - will last a lifetime. Did an exercise with selected concepts & webbing, making shapes to reflect each key word named. Tension/release a constant. Are moving from cause/effect to focus/content paradigm (e.g., eastern phil.). I Ching auraclie. Leopold, "the price we pay of seeing the world of nature is that we see the scars". Can see the land thru the eyes of scientists, taoists, confucians, indians, etc. Anthropocentric v. ecocentric approach. Need to balance time preserving wilderness with that spent enjoying it.

J.25 - S. Asked group if w. experiences are transferrable. Answers: Yes, increase self-confidence, provide grounding. We are coming into a new ecological era; a new feminine based wave; Shamanism; a more balanced energy.

J.27 R. Roots of our wilderness consciousness (see appendix 8). Really don't have w. at all b/c resource development allowed; a rip-off, a real tragedy. We won't have the w. our forefathers had & have our political system & corporate interests to thank. Prospect for change is nil & growing worse. Allowing ever more resource dev't. Idea of N. Parks is one of U.S.'s greatest contributions to the world. In England, they would never tear down Buckingham Palace b/c there was a shortage of bricks. But, Gates of Arctic oil will provide 1 year's worth of oil to U.S. and American people think, "I'll never go there so why preserve it." No other people would destroy the spirit of their culture, which in America comes from our w. legacy. Read Sand County Almanac and Wilderness and the American Mind.

J.27 - S. Your life can't be much unless it's lived in balance. Amer. life is so out of balance, it's a tragedy. We impact on world consumerism, e.g., Banana Republics; chopping down rainforests to make beefburgers. We are smug know-it-alls; the idiot chick - what the fuck do we care what's going on in Brazil. We can only change ourselves; our body inside our skin & our exobody, e.g., the trees. We must learn to care. We cast our money votes as consumers. Reagan v. Mondale = Pepsi v. Coke; Big Deal. 'm not down on the market economy but people can make a difference. Companies are very sensitive to their public image, e.g., Nestle's boycott was successful. Starting to learn about your food is really important b/c your food is your link to the land. We use far too many insensitive ways of production.

J.27 - One camper mentioned that she had joined the Sierra Club and only received info, about negatives and destruction of our country, so dropped out. R. replied that Sierra was a bunch of yuppies anyway. I don't belong to any organizations; I can do more within my life and my family. I don't want anyone making my decisions for me. I do a lot of public service talks, etc. Sending $ is like feeding the poor box; you feel guilty so you pay. Every individual can make a contribution by thinking of ecology of products
A quick look at the above table suggests that the Audubon Residential program addressed a wider variety of wilderness issues. The Outward Bound Patrol, however, was exposed to a number of very impactful commentaries on the scarcity and value of wilderness and the need for personal lifestyle changes to help preserve what little remains. The table below illustrates the number of items from the ten item Likert scale instrument addressed by each of these two programs and the group means from the pre, post and delayed post administrations of this instrument.

Table 111. Wilderness issue attitude items addressed in the Audubon Residential and Outward Bound programs.

<table>
<thead>
<tr>
<th>Group</th>
<th># of Issue Items x/10</th>
<th>Pre</th>
<th>Post</th>
<th>D.P.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audubon Residential</td>
<td>6</td>
<td>4.03</td>
<td>4.13</td>
<td>4.12</td>
</tr>
<tr>
<td>Outward Bound Patrol</td>
<td>2</td>
<td>3.58</td>
<td>3.82</td>
<td>3.93</td>
</tr>
</tbody>
</table>
This table is consistent with the content/process table above (Table 110.). The Audubon group received more attention to a wider variety of wilderness-related issues and also demonstrated a much larger gain in wilderness-related ecocentricity over the Outward Bound group.

D. INTERVIEW DATA: Instruction, Program and Environment Related Expectations and Evaluations

As noted earlier, formal interviews were conducted with four participants from the Audubon Residential and the Outward Bound Patrol studied. An initial interview was conducted at the beginning of the program to identify participant expectations of the program, instruction and environment. Post-program interviews were also performed, for the purpose of collecting some evaluative comments as well as allowing participants to identify personal changes they expected for themselves as a result of the program. Following is a summary of the study relevant responses made by these participants in each of the two interviews. In the interest of brevity, some of the comments have been edited. The full interview transcripts are included in appendix K.

The participants interviewed were purposely selected according to outdoor recreation and environmental experience, gender and age. These participants were:

Audubon Residential:

Donald (D.) - high outdoor/high environment, male, over 35
Linda (L.) - low outdoor/low environment, female, under 35
Chery (C.) - high outdoor/low environment, female, over 35
Rick (R.) - low outdoor/high environment, male, under 35
Outward Bound Patrol:

<table>
<thead>
<tr>
<th>Name</th>
<th>Environment/Experience</th>
<th>Age/Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karen (K.)</td>
<td>high outdoor/low environment, female, under 35</td>
<td></td>
</tr>
<tr>
<td>Gerry (G.)</td>
<td>low outdoor/low environment, male, over 35</td>
<td></td>
</tr>
<tr>
<td>Jane (J.)</td>
<td>high outdoor/low environment, female, over 35</td>
<td></td>
</tr>
<tr>
<td>Mitch (M.)</td>
<td>low outdoor/high environment, male, under 35</td>
<td></td>
</tr>
</tbody>
</table>

Table 112. Wilderness-related responses of interviewed participants on initial and follow-up interviews.

**A) Instructor Role**

**Audubon Residential**

- D. - Spreading enthusiasm for the natural world & awareness of it. Transfer of knowledge & asking questions, provoking thought & trying to show us that man has a role as an active participant in the biosphere.
- L. - To share their knowledge & appreciation.
- C. - Contagious enthusiasm; imparting info.
- R. - They are like different paths and as you go down the trail of knowledge, their function is to bring out the awareness. They are the transition between a person with intellect and mind and nature; they facilitate.

**Outward Bound Patrol**

- G. - Primarily as a teacher.
- J. - I would like to see the instructor educate, laying things out so we understand them & then letting us execute them.

**B) Environment Role**

**Audubon Residential**

- D. - I see this valley as one of the last pristine areas left; roughly pristine area. It's good to be able to study nature or wilderness closer to what it has been like after millions of years of evolution.
- L. - I see it as a pretty typical environment. The same things could be done in any environment.

**Outward Bound Patrol**

- K. - It's a reflector. The air & the smells & the things you can see there are as important to me as the physical.
- G. - It's a teacher also; teaching us how to live in this environment and how to appreciate it.
C. - It's the specific environment we're studying; we can apply things we learn here to other environments.

- R. - This could be any habitat; these naturalists would pull out all the elements of the ecosystem. Although a site may not be so profound as this; this is a beautiful site b/c of the animals & the drainage & the geology & all of the biotic & abiotic factors. This area is significant to influence people, to motivate people. But, an Audubon camp could be in a city park, the same concepts and philosophies could be taught there.

J. - It's the setting; the vehicle through which we will express our teamwork. I expect it to be beautiful. I expect it to be dangerous. I expect it to be awesome. I expect it to be quiet. I expect it to be grounding; calming.

M. - It represents a certain grounding for me. It puts me back in touch with a side of myself that I think has a bigger perspective on life & on the world. It's something that is very hard to come by in the day to day rat race urban setting, especially while in pursuit of a professional career.

C) Expectations of Environmental Quality

Audubon Residential

- D. - My definition of quality would be "untouched" & there's obviously lots of signs of man around here. My preference would be for absolutely pristine wilderness.

- L. - I'd like some variety.

- C. - Much closer to a pristine environment; low so there wouldn't be as much human impact as back home. I'd love to see a pristine wilderness, but I'm not particularly against human impacts as long as they are well controlled. Well marked trail systems are o.k.

- R. - Things in a natural state; with little human impact.

Outward Bound Patrol

- K. - I expect about a 7-8/10.

- G. - I expect a 10 compared to what I'm used to in Indiana.

- J. - I want a 10; I wouldn't be here if I wasn't looking forward to the pristine environment, to the cleanliness.

- M. - I expect an 8 1/2 to 9 out of 10. I think we're going into an area that's about as pristine as you can get with a couple of days of amateur hiking with heavy packs.

D) Knowledge Increase Expectations

Audubon Residential

- D. - The interrelationships of the animals, with emphasis on the evolutionary aspects.

- R. - Geology; what created the mountains.

Outward Bound Patrol

- K. - I don't expect to learn a lot about the vegetation & wildlife & rocks & stuff. I'd like to learn about the connections. I like things explained in very simplistic non-technical terms. I'd like to learn about how the geography formed, but not the scientific names. I'm more interested in how these things grow together, like why we have this certain plant in this area.
- G. - Basically how to survive. Environmentally, I would like to gain some general knowledge about things that occur at different heights, ecosystems & things like that.

- J. - I like to learn everything. I want to know how the mountains got there. I'd like to know about the flowers & the birds & the animals. Most interesting to me is the techniques for survival. What kinds of things you can eat. What kinds of places make good campsites.

- M. - Top of the list for me would be outdoor skills so I can go and experience the outdoors myself with good common sense and good ecological conservation practices. And secondly, more of the things along the line of understanding the environment; some of the basics like understanding the trees & understanding ecosystems. I'm interested in the ecology because I'd like to have a much better appreciation for it.

E) Expectations for Personal Change Following Program

Audubon Residential

- D. - Teaching; I'll continue to look for things; energy flows, distribution of biomass, etc. and I'm sure I'll be more attuned to birds. I probably won't become more environmentally active; it's almost a religion now.

- R. - The 2 most important things in conservation are actively writing letters and being knowledgeable and aware of conservation.

Outward Bound Patrol

A) Instructor Role (expectations met, role definition)

Audubon Residential

- D. - Made us aware of relationships of organisms; of plants & animals. They communicated specific knowledge. They kept up the enthusiasm.

- L. - Fantastic; great enthusiasm.

Outward Bound Patrol

- K. - His numerous talks on world affairs have given me a lot of things to think about, career-wise & in terms of lifestyle options. He was a provoker; provoking feelings.

- J. - He was a teacher, guide & counsellor.
- C. - They provided motivation and enthusiasm & shared a lot of information.

- R. - Excellent job. Role was to convey the knowledge & to mediate it & the environment to the campers.

- M. - He was a guide as much as an instructor.

B) Environment Role (perceived quality, appropriateness)

**Audubon Residential**

- D. - 6-7/10. In Torrey Valley, there was a fair amount of impact with roads & trails going in to the end of the valley, rocks were picked over & sulphur dioxide & nitrous oxides were coming in from out of town. Out of this area (e.g., Union Pass) there were cowpies everywhere which attracted flies & clearcutting was affecting the lake. The enviro. couldn't have been more approp. b/c the vegetation isn't so dense as to be overwhelming.

- L. - 7/10. It wasn't pristine wilderness, but it was still far from urban.

- C. - Torrey Valley was a 6/10 & as we went further from the Valley, it was getting much closer to wilderness. We were right next to a wilderness area (7-8/10). It was a perfect environment; there were so many habitats.

- R. - 7-8/10 on the whole & maybe a 10 in some of the backcountry areas; the Valley would be less b/c it was used. This environment had so much to offer; the diversity of plant communities, the geological history, the botanical community, the zoological diversity. Being at this elevation & being able to go up the mountain or down the road gave you a great variety of habitats.

**Outward Bound Patrol**

- K. - 8/10. It was appropriate. A couple of the camps weren't really good. We were a little sloppy in the group campsites we were in.

- G. - 10/10. Definitely appropriate.

- J. - 8/10. I'm suprised the wilderness has as much people activity. This detracted from my experience.

- M. - 8/10.

C) Adequacy of Knowledge Gained

**Audubon Residential**

- D. - About perfect; could have had more rigor in natural coursework & maybe more handouts.

**Outward Bound Patrol**

- K. - I learned as much as I expected although I sometimes missed hearing things or wasn't listening, which was disappointing.
- L. - There was plenty of info. about the area & life around here. I would have liked more history.

- C. - I'm seeing this place in a completely different way from when I first arrived, which is wonderful. I remember one of the instructors saying the first night, "You'll realize you're learning when you start feeling at home here". It really happened. I'm recognizing what I'm seeing, I'm noticing what's growing where & why. It's a great feeling.

- R. - Instructors were very thorough on the whole; botany, astronomy & human ecology were a bit weak.

- G. - I think we learned about as much as we could. On a longer course, say 23 days, you learn more about nature; about plants & flowers & that sort of thing.

- M. - I learned about as much as I expected to. In conversations between Sam & Rob a lot of topics were covered that I wasn't expecting & that I enjoyed learning about. Even if I would have written up an expected agenda of the ecological topics that I thought might be covered, it would have just been speculation. I learned a lot.

D) Most Useful Learnings (knowledge, attitudes & behavior changes expected following the program)

Audubon Residential

- L. - An appreciation of the interaction of everything will go with me wherever I go for the rest of my life. Your reality changes when you have more of an education.

- C. - Most useful in terms of recreation; I'll be able to enjoy the outdoors more b/c I'll be more observant.

- R. - All the different concepts related to bird-watching (song, identification, behavior, fitness, the riparian study), aquatic insects, pollination, butterflies & moths and geology. Everytime I took notes, I thought about ideas for how to apply them to school. Environmentally, as an interpreter & a naturalist leading public walks, I gained a lot from the instructor's methods.

Outward Bound Patrol

- K. - The whole connectedness idea & the concepts of ecology; just looking at things in a new way & learning about different environmental efforts in terms of organizations; the things people do. Especially what Rob was about wilderness history helps me put a perspective on how I might involve myself; that I don't need to go join Sierra Club to do it, but that there are a lot of other options to become more involved. I think that I will; it's been on my agenda & it's interesting that this came along to give me the options. I think I'll get actively involved in some issues now.

- G. - Gaining a greater appreciation of how all the different ecosystems work together & we have to keep everything in equilibrium. If we destroy one part, then everything gets out of balance. I have a greater appreciation for nature & for God's world.
- M. - My appreciation & understanding of the importance of mountain wilderness is much more heartfelt than it was before. I'd like to be more involved in environmental issues. I haven't been very involved in them in the past & I'd like to change that. I want to keep an open mind about diversifying my career to including some aspect of environmental medicine. And I think that I'll put a much higher priority getting out in the wilderness & enjoying it for fun.

In reviewing the above table, a number of commonalities as well as differences emerge in the expectations and evaluations presented by the interview respondents. A summary look at these may be beneficial. The researcher recognizes the limited number of programs and individuals interviewed is a potential source of concern for some readers. However, much of the data collected and summarized here was also cross-referenced with objectives stated in group meetings on day one of each program, with ongoing member checks, and with course and instructor evaluation forms completed by all participants at the end of each program. There were no glaring inconsistencies between these sources.

While both Audubon Residential (AR) and Outward Bound Patrol (OBP) interview participants felt their leaders should teach them something, the AR people felt the instructors should also work to motivate and enthuse them about the subject matter. All felt satisfied at program's end that their leaders had fulfilled their roles. None of the OBP members identified sharing enthusiasm as an essential function of their leader, but they did recognize that their leader must not only teach in a formal way, but be prepared to sit back more and act as a facilitator to the group's own dynamics. In the post-interview, a number noted his assumed roles as a guide and counsellor and one commented on his function in provoking thought and feelings related to personal lifestyle values.
In looking at the expected role of the environment, the AR group members seemed to be seeking as pristine a mountain wilderness as possible to serve as an example of this ecosystem for their study. However, half of these interviewees recognized that an Audubon camp could occur in any environment; that the same ecological concepts, program disciplines and processes would apply. The OBP participants interviewed saw the mountain wilderness more metaphorically as a “reflector”, a “teacher”, a contrasting setting and/or one which could help put them in touch with their whole selves in a “grounding” process.

Half the members interviewed from each group claimed to be seeking pristine wilderness, while the other half recognized the need for study recreation support developments (e.g., trails) would reduce the quality of the environment they were to visit. Interestingly, both groups were very close on their assessments of the environmental quality following the program. The AR interviewees rated the Torrey Valley itself at about a 7/10, with the nearby backcountry areas approaching a 9/10. The more environmentally experienced members tended to give lower assessments of existing quality than those less experienced at the start of the program. The OBP group members tended to rate the Snowmass/Maroon Bells Wilderness Area they travelled in at an 8/10, with one member believing that it was a 10/10. One member noted the surprising number of other recreational users encountered as detracting from her wilderness experience and another identified the OBP group's own poor minimal impact etiquette as detrimentally affecting the wilderness character of the environment.

A number of interviewees from both groups specified learning about ecological connections and interrelationships as an important expectation for them. The AR members also identified specific discipline content areas of personal interest. With a few minor disappointments in particular content areas, the AR members interviewed were unanimously satisfied with what they had learned. The OBP group seemed to be equally interested in learning outdoor skills and ecological facts and concepts. One member identified minimal impact backcountry conservation practices as important content which would allow him to return to wilderness following the program
with the confidence that he would not abuse the areas he travelled in. OBP members appeared satisfied with the amount of outdoor skills and environmental knowledge acquired, with a couple qualifying their responses to consider the short program time available. A number were also pleasantly surprised by the amount of unexpected serendipitous learning they experienced in the areas of the history and philosophy of wilderness conservation.

In considering how useful in the future various facts, concepts and skills learned were, members of both groups mentioned the concept of interrelationships or connections and that the programs would be useful in their future recreational endeavors outdoors. Interestingly, while AR interviewees noted specific content areas and methods, only one mentioned future environmental activist involvement (the one who was already the most involved of the eight interviewees). But, half of the OBP members interviewed (both with relatively high environmental experience pre-program) suggested that they would get involved in environmental issues as a result of their program experience.

In sum, the interview data helped illuminate the many similarities as well as some of the differences between the participants’ expectations and evaluations of their experience in the Audubon Residential and Outward Bound Patrol programs. Both these common elements and distinctions will be relevant in the discussion to follow in chapter VI.
V. References


This study was undertaken in an effort to answer the following research question: What are the similarities and differences between adventure and ecology education programming on participants' wilderness knowledge, attitude, intentions and behavior?

As identified in chapter 1, the purposes of this study were to:

1. Determine the sociodemographic and past experience similarities and differences between the outdoor adventure and field ecology programs studied.

2. Assess whether either or both of the programs studied (outdoor adventure, field ecology) produced significant gains in participants' knowledge of basic ecological concepts.

3. Determine whether either of both of the programs studied resulted in significant gains in participants knowledge of minimal impact backcountry technology and minimal impact techniques.

4. Assess whether either or both of the programs studied produced significant shifts in attitudes toward wilderness and wilderness related issues.

5. Determine whether either or both of the programs studied resulted in intentions to act in and/or for wilderness.
6. Determine which of the two programs studied was more effective in changing participants' wilderness knowledge, attitude, intentions and/or behavior, separately and collectively. Identify and discuss areas of strength and weakness in each approach in facilitating these wilderness related outcomes.

7. Identify how each program is organized and operated, and how the structure and methodologies used interact with participant's initial wilderness knowledge and attitude in effecting changes where these in fact, occur.

8. Make recommendations regarding outdoor education programming based on the results noted.

As the reader can appreciate by reading chapters IV and V, a good deal of quantitative and qualitative data was collected in an effort to answer the research question and subquestions posed. At this point, it will be useful to discuss the collective quantitative and qualitative data relevant to the overall problem statement and purposes of the study as identified above. This discussion has been organized to address each of the purposes noted above, with the exception of items 7 and 8 which will be discussed throughout.

A. Predisposing Factors

Based on a review of existing environmental education and outdoor recreation research, the researcher initially hypothesized that the Audubon and Outward Bound groups would be very similar demographically and in terms of past outdoor recreation and wilderness experience, but that the Audubon group would demonstrate more past environmental experience. The personal data and past experience data collected do, for the most part, support this hypothesis.

Sociodemographically, there were no significant differences between the two Audubon and two Outward Bound groups studied in terms of gender (all programs attracting about an equal number of males as females; marital status (while somewhat more Auduboners were married); race
(almost all participants studied were of white, non-hispanic heritage); presence of dependent children at home (while more Auduboners tended to have children); place of residence while growing up (most were raised in metro-urban, metro-suburban or small town locations); highest level of education completed (all groups could be classified as highly educated); diplomas/degrees obtained (while Audubon tended to have a high proportion with education related degrees) and personal income (most participants earned a middle income).

There were, however, low to moderate differences between the four subgroups studied in regards to: age (Audubon participants were, on average, ten years older than Outward Bound ones); present place of residence (Audubon members tended to live in metro-suburban areas while Outward Bound registrants tended to come from metro-urban locations); and occupation (Auduboners tended to be involved in teaching related professions and Outward Bound enrollees tended to work in business or professions other than teaching). The factors of age, life stage in terms of marital status, presence of dependent children at home and place of residency are all likely closely related and explained by the first variable, age. People in their 40's today are more likely (than those in their 30's) to be married, to have young families and to move to the suburbs to raise those families. These life stage differences could, according to the literature, impact most upon these individual's intentions to travel into wilderness to pursue outdoor recreation opportunities.

The other difference which emerged between the Audubon and Outward Bound groups was that the Audubon group tended to be more highly represented by people who were teachers by profession (over 40%). This statistic was supported by the results of a market survey of 156 Audubon participants performed in 1985 (Vander Zanden, 1986). For many of these people, an Audubon camp represents a professional development opportunity as well as a vacation. The initial interview data collected supported this tendency. Two of the four Audubon participants interviewed were teachers by profession and when asked what, if any relation they saw between
the Audubon camp and their job, their responses spoke clearly to the obvious applications they saw:

Donald: “I’m teaching every day and I’d like to expose them to and teach them about more of the natural world and the interconnections in it and this looked like an excellent way to do it. I reach lots of kids”

Rick: “I’m in a transition in school. I’ve revamped my curriculum and I’ve taught lots already, but I can apply all of the skills I learn to teaching”.

The people enrolling in the Outward Bound program tended to more strongly represent business (31%) and the professions (25%). Similarly to the Audubon participants, half of those interviewed saw some applications to their careers, but the applications themselves were somewhat different. Karen saw herself applying what she learned to her career as a professional social worker developing curriculums and promoting “these sorts of things as an alternative to drug use for kids”. Another saw the value in more social terms. Gerry, an office supply businessman claimed, “It will help me learn more about working with people. I mean, here we are, thrown together with strangers and we have to learn to work together”.

In terms of past experience, as hypothesized, there were no significant differences between Audubon and Outward Bound enrollees in their previous formal and/or informal outdoor education/recreation experience. Over a third of participants in Audubon and Outward Bound groups had engaged in auto camping with their families while children/adolescents and about a quarter of each group had engaged in more primitive camping with their families. Of formal outdoor education programs/camps taken, about half of all participants had belonged to Scouts/Guides at one time. All other outdoor programming agencies (i.e., Boys and Girls Clubs, YM-YWCA, 4-H, YCC, municipal camp, church camp, school camp and other formal camp experiences) were found to have attracted very few participants from either pool of people studied (Audubon and Outward Bound).
In assessing formal education differences of relevance to outdoor education/recreation and environmental education, there were no significant group differences in formal training in a number of discipline areas including: biology (inspite of a 20% difference between Audubon (higher) and Outward Bound engagement rates); geography (all groups were quite evenly divided 50/50 between takers and non-takers, except the Outward Bound Patrol who had no coursework in this area); anthropology (a quarter to a third of each group had taken some); history (over three-quarters had taken some); environmental education/interpretation (a third of the Audubon Wilderness Research Backpack group took a course or more in this area while less that a fifth of members in each remaining group had taken formal courses); wilderness management (very few took any); outdoor pursuits (less than 15% overall had taken any courses here); outdoor education/recreation leadership (only about one in ten had any formal leadership training in this area); or other natural science or outdoor leadership courses (very few participants noted involvement of this kind).

The dearth of members identifying formal environmental education/interpretation and outdoor pursuits formal training was somewhat suprising to the researcher. Given the number of school teachers involved in professional development through the Audubon program (as suggested by the number of campers involved in the program for university credit), one may have expected more than 17% to have had at least one environmental education or interpretation course.

Also, the research cited in chapter II suggests a reasonably high expectation of at least some outdoor pursuit activity training by both groups, which does not appear to be the case here. This group may be somewhat atypical in this regard or perhaps some failed to understand the term "outdoor pursuit (activities)" in the instrument. This item could perhaps have been more descriptive by listing a few examples (i.e., outdoor pursuits (e.g., backpacking, canoeing, cross-country skiing, etc.).
There were some significant differences between the groups in a number of the more specific science coursework areas. The Audubon groups had a stronger background in botany, zoology, geology and ecology. This finding was consistent with earlier findings of greater involvement in education and science for Audubon campers versus Outward Bound. One could reasonably expect them to have had more training in the sciences.

Interestingly, Audubon participants subscribed not only to more environmental magazines and journals, but also to more outdoor education/recreation periodicals. Audubon registrants also belonged to more formal environmental groups and organizations as well as more outdoor activity clubs and organizations than those enrolling in Outward Bound.

However, and despite the 25% higher participation rate of Audubon over Outward Bound groups, there was no significant difference (at the .05 level of alpha) in involvement in environmental issues over the two years preceding the programs. It should be noted that the relationship did very closely approach significance with a probability of .06. Given the stronger educational training and professional relationships demonstrated, one would have expected a significant difference between the groups on this item.

In sum, the groups were not found to differ significantly overall in terms of their past experience in and/or for wilderness. However, the Audubon groups did show significantly greater involvement in formal science coursework, higher subscription rates to related publications and involvement in recognized clubs, groups and/or organizations.

Given these findings, it is reasonable to expect that they may perform better on the basic ecological knowledge test and may consistently demonstrate a more strongly ecocentric attitude toward wilderness than the Outward Bound groups studied. An evaluation of the relevant data supports this contention.
B. Basic Ecological Knowledge

The researcher's hypothesis which suggested that the Audubon groups would improve more and perform better than the Outward Bound groups in repeated measures tests of basic ecological knowledge was supported. In fact, while the Audubon groups both demonstrated pre-to-posttest improvements, the Outward Bound groups both dropped off in performance between pre and posttesting.

The improved performance of the Audubon groups is easy to explain, given the much greater coverage of the test items observed over the programs (6/10 versus 2/10 for the Outward Bound Patrol group). The declining performance of the Outward Bound groups may be reflective of not only the general failure of these leaders to include such content, but in fact, the incorrect information occasionally passed on. For example, the Outward Bound Patrol instructor taught tree species and succession incorrectly, undoubtedly leading to some of his students getting the relevant item on the instrument wrong on the post and delayed posttests.

It is noteworthy that virtually all four of the Outward Bound participants interviewed in the initial interviews said that they wanted to learn facts and concepts about the mountain environment. Following are quotes from these individuals:

Karen: "I'd like to learn about the connections. I like things explained in very simplistic non-technical terms. I'd like to learn how the geography formed; but not the scientific names. I'm more interested in how these things grow together, like why we have this certain plant in this area".

Gerry: "Environmentally, I would like to gain some general knowledge about things that occur at different heights, ecosystems and things like that".

Jane: "I like to learn everything. I want to know how the mountains got there. I'd like to know about the flowers and the birds and the animals".
Mitch: "...more of the things along the line of understanding the environment; some of the basics like understanding the trees and understanding ecosystems. I'm interested in the ecology because I'd like to have a much better appreciation of it.

Perhaps those involved in training leaders and the leaders themselves would do well to take note and increase the quantity and quality of ecological and science training. The Colorado Outward Bound School has recognized this need and has published an Environmental Handbook for the Marble Canyon Area. However, if group performance on the cognitive test is any indication, it does not appear that the instructors are reading this handbook and delivering its content to their participants.

Interestingly, while the Audubon Residential group showed quite good retention of facts and concepts learned, both the Audubon Wilderness Research Backpacking and Outward Bound Patrol groups experienced serious decay of basic ecological learning, well below initial levels of performance. Only the Outward Bound General group showed any improvement between post and delayed posttesting. The researcher is at a loss to explain these inconsistent post-program changes. Perhaps a number of the Outward Bound General participants did some additional reading or coursework which aided them. However, given the lack of control in a multiple choice test taken at home, it is possible that some of the Outward Bound General participants sought assistance through other people or resource materials to answer the questions. All mailed delayed posttest correct/incorrect marked test must be viewed with some skepticism concerning the validity of the data collected.

C. Minimal Impact Knowledge

The researcher hypothesized that the Outward Bound groups would improve more than the Audubon groups in terms of the minimal impact knowledge. This relationship was borne out somewhat by the data. Observation of the relevant line graphs in chapter V illustrates lower pretest points, but steeper growth lines for the Outward bound groups, both when considered
together and separately. However, the Audubon groups collectively and severally performed better than the Outward Bound groups on all but one test administration (delayed posttest for the Outward Bound Patrol group).

The researcher is reluctant to blindly accept that the Outward Bound Patrol group gained so much more minimal impact knowledge post-program. It is perhaps more likely that this small unit formed a closer relationship with the researcher and that one or more of these people became more interested in the subject and sought out the correct information prior to mailing in their completed delayed posttest questionnaires.

In looking at the program/participant observation data of other groups, it is not surprising to see that the Audubon Wilderness Research Backpacking group, the group which received by far the most specific training (8/10 minimal impact test items covered) performed well above all other groups. Even the Audubon Residential program participants, who received very little specific attention to minimal impact technology during their program, outperformed the Outward Bound groups on the pre and posttests. This may be reflective of specific relevant learning which has occurred through the reading of outdoor and/or environmental magazines and journals and/or through involvement in outdoor and/or environmental clubs, groups or organizations. It may also reflect a transfer of knowledge stemming from a greater awareness, understanding and appreciation of basic ecological facts and concepts; knowledge about the natural environment.

That the Outward Bound Patrol group showed any improvement in minimal impact knowledge is somewhat surprising, considering the program/participant observation data collected. Only 3/10 techniques were covered by the leader (with those taught late at night and rather hastily in the researcher's opinion). A number of poor practices were evident in the group's camping and wilderness travel procedures (e.g., multiple trailing, backpacking single file in alpine areas, not using latrines, camping in formally closed sites, not learning how to use and rehabilitate fire sites, etc.).
Adventure programmers and those charged with outdoor education/recreation leadership development should take heed of these findings and recognize the need for specific minimal impact procedures to be taught and reinforced throughout each program. It is possible also, that the teaching of basic ecological concepts such as interrelatedness (i.e., "there is no free lunch" and "Mother Nature always bats last") have carryover value in helping students appreciate the need for ecologically conscious wilderness travel and living. Virtually all minimal impact techniques require extra time and energy above the less environmentally considerate alternatives. An overriding awareness and feeling of connectedness may prove motivational in the face of time constraints, weather limitations, personal and group energy fluctuations and other factors which impinge on performance of optimal environmental practices.

The researcher would like to continue to look at the quantitative and qualitative data related to the development of wilderness issue attitude to study this potential relationship further.

D. Wilderness Issue Attitude

The researcher hypothesized that between pre and posttestings, the Audubon groups would grow more in ecocentricity (i.e., wilderness preservation attitude) while the Outward Bound groups would demonstrate more anthropocentric attitudes (i.e., wilderness should be preserved as a venue for their outdoor recreation needs).

This proposed relationship was not completely borne out by the data. Both the Audubon and Outward Bound groups demonstrated similar gains in ecocentricity as a result of participation in their field ecology or adventure camp program. In looking at the four group comparison, the Outward Bound Patrol group made the most significant gains of all between pre and post and again between post and delayed posttest administrations of the Likert scale instrument. Inspite of the fact that the program observation record shows only 2/10 of the selected issue statements discussed in this group compared to 6/10 for the Audubon Residential group, this group still gained more. The researcher attributes these gains to the ongoing wilderness issue discussions
led by the leader and camp director and especially to the evening session on the roots of
cwilderness and philosophy of deep ecology presented to this patrol. The fact that this group
showed such impressive gains over the other Outward Bound General patrols suggests that
outdoor adventure leaders can have tremendous impact on lasting attitudes related to the
wilderness environment with relatively little cost in terms of program time. All that is required is a
personal commitment and some reading and/or other training in the history and philosophy of
wilderness and current wilderness issues of relevance to the area being travelled in. Some of the
follow-up interview quotes relating specifically to the most useful things learned and personal
changes expected as a result of the Outward Bound Patrol experience help illustrate the power of
influence and strength of convictions raised in this small group:

Karen: "The whole connectedness idea and the concepts of ecology; just
looking at things in a new way and learning about different environmental
efforts in terms of organizations; the things people do. Especially what
Rob was saying about wilderness history helps me put a perspective on
how I might involve myself; that I don't need to go join Sierra Club to do
it, but that there are a lot of other options to become more involved. I think
that I will; it's been on my agenda and it's interesting that this came along
to give me the options. I think I'll get actively involved in some issues now."

Gerry: "Gaining a greater appreciation of how all the different ecosystems
work together and we have to keep everything in equilibrium. If we destroy
one part, then everything gets out of balance. I have a greater appreciation
for nature and for God's world."

Mitch: " My appreciation and understanding of the importance of mountain
wilderness is much more heartfelt that it was before. I'd like to be more
involved in environmental issues. I haven't been very involved in them
in the past and I'd like to change that. I want to keep an open mind about
diversifying my career to including some aspect of environmental medicine.
And I think that I'll put a much higher priority getting out in the wilderness
and enjoying it for fun."

These testimonies are very encouraging and should motivate outdoor leaders to pursue
inclusion of content/processes fostering similar outcomes in their programs. However, it should
be noted that inspite of the tremendous increase in wilderness preservation attitude by the
Outward Bound groups, especially the Outward Bound Patrol group, that the Audubon groups
demonstrated consistently stronger ecocentric attitudes on all three test administrations. The
researcher attributes this to more prior experience through science coursework, environmental publications read and outdoor and environmental groups affiliations. All of these experiences have collectively added to these people's commitment to learning about and taking care of the natural environment. Their Audubon programs appeared to have little impact positively or negatively in affecting their attitudes. Given that their pretest means were above four on a five point scale, it may be argued that this group did not have very much room to increase in ecocentricity without appearing to be radical environmental extremists.

E. Intentions

The researcher hypothesized that the Outward Bound group would form more intentions to become involved in outdoor recreation (involvement in wilderness) following their program and the Audubon participants would form more intentions to become environmentally involved (involvement for wilderness).

A review of the similarities and differences in intentions formed between groups and over time may be useful in helping us appreciate the general level of expected involvement within and between groups. Over a third of participants from each group formed intentions to travel into wilderness following their program experience, with two-thirds of Audubon Wilderness Research Backpackers noting this intention. While Audubon participants tended to form more intentions to visit wilderness in the six month period following their program, the Outward Bound groups identified a higher rate of such intentions for the period following the delayed posttest. This may reflect a seasonal considerations, where many of the Outward Bound business and professional people were planning their next summer holiday.

While on such excursions, there was no significant difference in the number of outdoor activities planned between Audubon and Outward Bound participants, although the Audubon Wilderness Research Backpacking groups tended to plan more than the Audubon Residential group. The researcher is somewhat concerned that in listing commonly pursued activities, a
definitional problem arose between the terms "hiking" and "backpacking". As few if any
respondants used both terms, it is likely that people using the term "hiking" (definitionally referring
to day tripping) actually on occasion meant "backpacking" (carrying enough gear and food to stay
out overnight or over a number of nights). It is unlikely that the reverse error would arise (i.e., using
the term "backpacking" to refer to day hiking). While this definitional concern may have introduced
some error into the data, it is not of serious concern. If anything, its only effect will be an
underestimation of the number of participants hoisting full packs and heading off into the
wilderness.

There were no significant differences between Audubon and Outward Bound groups in
intentions to auto, survival, minimal impact camp or camp using other forms except combination
camping (survival/minimal impact), where Audubon participants were more likely than Outward
Bound (because Audubon Residential were more likely than Outward Bound General). The
Audubon Wilderness Research Backpacking group was more likely to use a minimal impact
camping approach than the Audubon Residential group was. This combined with the Audubon
Residential group's lower minimal impact knowledge means may suggest that the residential
campers are simply not as aware of and trained in this high-tech approach. As camping,
backpacking and hiking appear to be a popular activities for this group to pursue following their
program, ecology residential camp programmers should consider its inclusion in the curriculum.

About a third of each group identified intentions to join an outdoor activity club and/or
environmental group following their program, but very few retained this intention or formed more
similar ones for the period following delayed posttesting. This may reflect the fact that a number of
individuals followed through on their first stated intentions in this regard, and by fulfilling this
personal objective, would have no reason to state it again.

However, few participants from any groups seemed destined to take any outdoor pursuit/
outdoor leadership and/or environmental/ environmental leadership courses in the year following
their programs. A significant difference did appear between Audubon and Outward Bound
groups (due to higher Audubon Residential interest), but overall, the numbers are quite low and it is difficult to put much stock in this difference.

More Outward Bound than Audubon participants formed intentions to subscribe to outdoor education/recreation magazines following posttesting. However, very few participants from any group formed such intentions for the period following delayed posttesting.

There were very definite significant differences between groups in terms of intentions to become actively involved in environmental issues following program participation. Two-thirds of Audubon Residential members stated such intentions at posttesting time, while only about a third of each remaining group made such plans. Where intentions were formed, 50% of those identified by the Outward Bound Patrol were wilderness/wildlife specific, while 20% of those formed by Audubon Residential and Audubon Wilderness Research Backpacking members fell into those categories.

At delayed posttesting, intention rates dropped significantly, with Audubon Residential, Audubon Wilderness Research Backpacking and Outward Bound Patrol groups each represented by about a third of their members still planning environmental activism while less than 10% of the Outward Bound General groups formed any more such intentions. The Audubon Residential group still demonstrated strong interest in wilderness/wildlife issues (8 relevant intentions specified).

F. Behavior

For the most part, the self-reported behaviors identified at delayed posttesting were reasonably consistent with the intentions stated at posttesting. A few notable differences between the intention and follow-through behavior data did emerge. Significantly more Outward Bound Patrol members than Audubon Residential campers joined outdoor activity clubs, while more Audubon than Outward Bound participants actually subscribed to outdoor education/recreation magazines or journals. Self-reported involvement in environmental issues also differed
between groups. While many great intentions emerged immediately following the programs, especially for Audubon groups, the involvement rate was substantially lower, especially with Outward Bound members.

The almost total non-involvement of Outward Bound participants in environmental issues (only 1/32 identified any active participation) is a rather disappointing finding. Two of the four Outward Bound Patrol members interviewed near the end of their programs (and quoted earlier in this chapter), seemed very enthusiastic about becoming involved in one or more environmental issues. The researcher speculates that the total lack of follow-through by this group may be attributed to the leader and camp director's attitude toward formal groups and organizations (e.g., Sierra). It was all well and good to tell participants that they could each make a significant difference through personal lifestyle alterations and considered consumerism. However, few individuals have a strong enough grasp on specific environmental issues, wilderness related or otherwise, to write a letter or take other more specific actions on particular issues. By telling these individuals not to bother joining formal organizations (and thus receiving their journals, magazines or newsletters), the leaders may have left the participants feeling impotent to actually act on any particular issues.

In looking at the combined results of the post intentions, delayed post behavior and delayed post intentions analysis, the researcher noted that the Audubon groups did, as hypothesized, become more actively involved in environmental issues. These people also seemed much more likely to join formal groups and subscribe to relevant publications.

The Outward Bound groups, however, did not display a complimentary higher level of interest in becoming more involved in wilderness (i.e., by planning more and more active excursions into wilderness, by joining more outdoor activity clubs or by taking more outdoor pursuit/outdoor leadership courses). In actual fact, the only related activities in wilderness in which Outward Bound members showed a significantly higher rate of interest was in subscribing to
outdoor education/recreation magazines and journals. No significant differences emerged in the group data on the other related factors.

In part, the researcher has attributed the lack of significant effect here to the emergence of the Audubon Wilderness Research Backpacking program which tended to draw people with environmental training and interest into an adventure setting and activity. The members of this small group were very enthusiastic about pursuing activities both in (outdoor recreation) and for (environmental activities) wilderness.

What the results suggest is not that Outward Bound participants do not get involved in wilderness travel following their program, but that Audubon field ecology participants (Residential and Wilderness Research Backpack) are just as likely to visit wilderness and to engage in wilderness related activities. As noted in the discussion of minimal impact camping earlier, this post-program interest suggests some responsibility on the part of field ecology programmers to teach ecologically sound wilderness living and travel skills to their participants. This could be accomplished ideally through an overnight camping component held sometime over the camp and/or if this is not possible, through an audio visual presentation in a classroom session. The minimal impact knowledge group means suggest that this group is capable of making good educated guesses in this regard, but the lack of past experience in formal outdoor programs demonstrated on the pretest instrument suggests a lack of specific training and likely of skill in this area.

G. The Model of Reasoned Wilderness Behavior

The model of reasoned wilderness behavior proposed by the researcher in chapter I and tested using Lisrel path analysis in chapter V was supported using posttest knowledge and attitude scores. Verification of this proposed model suggests that there may be a link between the components of the model: demographics and past experience related to wilderness; basic
ecological knowledge; knowledge of minimal impact technology; attitude toward wilderness
issues; intentions in and for wilderness; and behavior in and for wilderness.

Age and occupation were selected as exogenous variables representing the
endogenous variable "predisposing factors". Audubon and Outward Bound groups were found
to differ significantly on these variables and each variable helped account for other observed data
trends in life stage and past experience. Age, it was noted, likely accounted for marital status,
presence of dependent children at home and place of residence. Occupation was selected
because it tended to account for other differences observed such as previous science
coursework taken and type of diploma/degree held (not a significant factor).

According to the model, the endogenous factor "predisposing factors" as represented by
age and occupation, affects both the participant's knowledge about wilderness (basic ecological
knowledge and minimal impact knowledge) and their attitudes toward its preservation/use. The
Gamma weights derived suggest the relationship is strongest between predisposing factors and
knowledge of basic ecological knowledge (age = -.01 and occupation = .255) and minimal impact
knowledge (age = -.079 and occupation = -.005) and somewhat weaker in the direct link to
attitude (age = .303 and occupation = -.305). The relationship between basic ecological
knowledge/minimal impact knowledge and attitude, as evident by the Beta weights of .221 and
.171 respectively are also quite strong. These relationships suggest that it may be more effective
to develop a desired attitude through cognitive channels (i.e., teaching facts and concepts about
the natural world and how to live and travel in it with the environment in mind). The more one
knows about a given attitude object, in this case wilderness, the stronger one is likely to feel about
it. Wilderness issue attitude was also found to be related, although somewhat weakly, to the
formation of specific intentions to go into wilderness (Be = -.740) and to become involved in
environmental issues (Be = .355).

The actual connection between intentions related to activity in and for wilderness and
self-reported involvement in those activities appears to be the weakest link in the model (Be =
.508 and 1.185 respectively). This fact is not really surprising as this relationship is the furthest removed from the program. There are always a myriad of reasons why people cannot or do not fulfill their best intentions.

The collection of intention data prior to the programs taken would have allowed more reflection on the impact of Audubon and Outward Bound camps in leading people into intention forming experiences. Based on the actual data collected during the post and delayed post administrations, the researcher cannot unequivocally state that the intentions formed were not held prior to the programs experienced. Unfortunately, time simply did not permit the administration of another instrument at pretest time. Such a procedure could be advocated for future similar research, perhaps this time focussing more closely on the wilderness attitude, intention and behavior relationships.

In terms of programmatic implications, the researcher believes that leaders in both programs could have had greater affect on the formation of specific intentions, and perhaps ultimately on actual follow-through behavior, by conducting a "so what now?" type of exercise. While closures in both Audubon and Outward Bound programs addressed the need for personal enjoyment of the natural environment and personal change and responsibility in the care and stewardship of that environment, an hour spent sharing specific personal goals, objectives and avenues may have left participants with something approaching an action plan for personal involvement. Perhaps outlining one future visit to a natural area and one environmental issue involvement of interest would have resulted in more significant changes. The researcher had a strong feeling, especially from the Outward Bound Patrol participants, that these people had the energy and conviction to do something positive for the environment after returning home, but that they seriously lacked direction, focus or means to achieve any measurable success. This is most unfortunate, and perhaps with minimal program time cost, the hundreds of participants
taking these programs could have a tremendous collective impact, sharing the natural environment wisely and taking appropriate steps to preserve and conserve it for future generations.
VI. References

CHAPTER VII

SUMMARY AND IMPLICATIONS

The purpose of this study was to describe and explain the similarities and differences which exist between adventure and ecology education programming with respect to participants' wilderness knowledge, attitude, intentions and behavior. To this end, an adult outdoor adventure program (Outward Bound) was compared with an adult field ecology program (Audubon).

A model of reasoned wilderness behavior was developed by the researcher based on the foundational work of Fishbein and Ajzen. This explanatory and predictive model proposes that predisposing factors such as sociodemographics and past experience in and for wilderness interact with what an individual knows about the natural environment and living and travelling in it. These factors work together and lead to the development of attitudes toward wilderness issues; from anthropocentric (wilderness should be preserved as a venue for outdoor recreation and other utilitarian purposes) to ecocentric (wilderness should be preserved for environmental conservation purposes). According to the model, wilderness issue attitude leads to the formation of intentions in and/or for wilderness. Finally, these intentions are manifest in actual specifically related behavior in wilderness (outdoor recreation) and/or for wilderness (environmental involvement).

The two programs selected were studied quantitatively with batteries of instruments administered on a pretest, posttest and six month delayed posttest schedule. In addition, qualitative data (e.g., observational, interview, etc.) was collected over the length of each program in order to provide descriptive information. The triangulation of qualitative methods and sources
was valuable in explaining, supporting and on occasion, bringing into question the results obtained quantitatively.

The study conducted provided general support for the model proposed. While there were some mixed results, the Audubon participants tended to show more outdoor and environmental tendencies than the Outward Bound participants. This was attributed in part, to the emergence of a Wilderness Research Backpacking option which tended to draw people with environmental backgrounds and objectives into a small group wilderness travel experience similar to that seen in an Outward Bound program. However, the Outward Bound patrol travelled with did experience the most significant gains in ecocentric attitudes toward wilderness, suggesting that adventure education programs can have substantial impacts on people in this regard.

Implications for Outdoor Education Programming

The findings of this study suggest that people exposed to either field ecology or adventure education programming change with respect to what they know about the natural environment and travelling in it, and how strongly they feel about its preservation. While insufficient quantitative data was collected to support the theory of growth in the formation of intentions and resulting follow-through behavior following these programs, both formal and informal interviews and member checking did suggest that these outcomes occurred to a greater or lesser extent in each program studied. In light of the quantitative and qualitative findings, the following recommendations for outdoor education program practitioners (both adventure and environmental) can be suggested:

1. Adventure education program leaders should consider including an introduction and application of basic ecological concepts and interpretation of the environment travelled. Initial interview data suggests that participants want and expect this sort of information, and follow-
through interview, observational and post and delayed posttest basic ecological test means suggest they are not receiving very much of it.

2. Both adventure and environmental educators should include attention to minimal impact outdoor living and travelling technologies and skill practice. The one program receiving this sort of training (Audubon Wilderness Research Backpacking) performed far better on the post and delayed posttest minimal impact instrument and were observed to have the least impact on the environment while they were out. As both intention and behavior data suggest that many participants from both adventure and field ecology programs become involved in wilderness excursions following their program experience (many overnighting), their leaders have a responsibility to teach them how to carry out these visitations with minimal impact on the environment. These participants may, in many cases, be viewed by their friends, families and/or students as relative experts in outdoor travel due to their participation in the formal outdoor education program taken. Given the potential breadth of their personal environmental impact and that of those they travel with, they must be taught the knowledge and skills which allow them to act as good role models.

Programs such as Outward Bound are tailor-made for the delivery and exercise of such content and processes. Leaders must be reminded of their responsibility in this regard. Residential programs such as Audubon's do not lend themselves as well to such material, but the introduction of an overnight camping experience (perhaps offered as an option for those intending to travel into wilderness following their program) would be the ideal medium for delivery of this content. Where this is not feasible, the researcher suggests that even a half hour audio-visual session explaining wilderness travel environmental do's and don'ts would be welcome by participants. At least half a dozen residential campers informally expressed interest in such an introduction to the researcher over their program. Many confessed being somewhat embarrassed that they did not know the answers to many of the questions on the minimal impact instrument.
3. Adventure educators leading programs in wilderness environments should consciously include attention to the history and philosophy of wilderness and discussions of current environmental issues relevant to that environment. The tremendous increase in ecocentric attitude seen in the Outward Bound patrol travelled with following exposure to such lectures and discussions, supports the researcher's belief that adventure leaders can have great impacts on the development of positive attitudes toward wilderness in their participants. These attitudes will be instrumental in the formation of specific intentions to act in and for wilderness, both while recreating in it and upon returning to the urban setting.

4. Both adventure and environmental instructors/leaders should consider spending some time near closure discussing future intentions participants have in and for wilderness and looking at ways and means for them to achieve their personal goals and objectives in these areas. While the Audubon participants appeared to be quite well networked, at least having Audubon as a starting point, the Outward Bound participants studied had no such resource. While at least half of the Outward Bound Patrol members studied (two in follow-up interviews and three on posttest questionnaires) claimed that they intended to become involved in environmental issues related to wilderness, none had followed through on this intention by the point of delayed posttesting. The researcher contends that this may be due to the lack of direction and contacts provided during their adventure program. They simply didn't feel knowledgeable enough to take any action immediately themselves and they had been directed not to join the existing formal outdoor and environmental groups that could provide them with the issues, facts and encouragement they needed to get started.

5. Of course, all of the above recommendations will have leadership development implications. Outdoor leaders themselves must have a basic working knowledge of ecological concepts, current minimal impact technology, wilderness related history, philosophy and environmental issues. They must not only be taught the relevant facts, concepts and skills, but they must be trained in effective and efficient processes for delivering these messages in a
manner which adds to rather than detracts from the overall program experience. In the experience
of the Outward Bound members interviewed, environmental related learning was among the most
useful longterm things absorbed over the program.

Recommendations For Future Research

Readers can see that this model testing effort required the collection of data from a variety
of instruments and methods. The strength of this study is the wholistic approach taken and the
general picture it provides of the environmental outcomes of the adult adventure and field
ecology programs studied. Few application studies involving adaptations of Fishbein and Ajzen's
theory of reasoned behavior have been so comprehensive in aspects studied and/or methods
employed. While this approach has undoubtedly been advantageous in opening this area for
research and helping identify potentially important relationships, more and more rigorous research
efforts are necessary to further support or disconfirm the theory of reasoned wilderness behavior
and the effects of adventure and environmental education programming on such outcomes.
Following are a number of future research applications which could fruitfully extend what we know
about this aspect of outdoor education and which could lead us to the development of more
environmentally powerful programs where this is one of our objectives:

1. The study undertaken here will require replication. While the model was suggested by
the data, it was done so with qualifications because of the relatively small number of individuals
and large number of parameters involved.

2. It would be valuable to conduct replication efforts with a more limited focus. By looking
at two or three relationships at a time instead of the five or more studied here, longer quantitative
instruments could be used, thereby enhancing reliability.

3. The results obtained and the model tested were found valid and plausible for outdoor
education programs of about ten to twelve days in duration. Both longer and shorter duration
programs should be studied to determine if program length is an important variable.
4. More rigorous research designs could be employed in the study of environmental outcomes of outdoor education programs. For example, participants could be randomly assigned to groups receiving high and low ecological, minimal impact and/or wilderness issue training. Quantitative and qualitative studies of the similarities and differences noted under such programmatic variations could help in more clearly illuminating what specific aspects in the program result in the biggest changes in wilderness attitude, intentions and/or behavior within participants.

5. Program curriculum development and testing needs to occur under a theory based, structured approach. The development of environmental related content and processes which fit into adventure programs and achieve desired ends (environmental knowledge, attitudes, intentions and behavior) while not detracting from other program objectives, will require a considered scientific approach.

In closing, both environmental and adventure branches of the outdoor education tree can and should strive to impact upon the environmental consciousness of program participants. While the short term objectives may differ somewhat between environmental and adventure programs, the long term interest in conservation of wilderness resources for the recreational, educational, scientific and aesthetic values they contain must be a goal shared by both. Gone are the days when we can ignore our responsibility in this light, hiding behind the false assumption that significant learning will occur if we simply "let the mountains speak for themselves". Research has shown us that such osmotic learning is not nearly as effective as attention to the inclusion of environmental content and processes in all of our outdoor education programs, and it is time we began working to develop the best strategies to achieve these learning objectives.
APPENDIX A

INSTRUMENTS
PERCEPTIONS OF WILDERNESS

OF PARTICIPANTS OF AN OUTWARD BOUND MOUNTAIN PROGRAM

The Ohio State University
Outward Bound
PART I. PERSONAL DATA

In order to allow us to compare the knowledge and attitudes of different groups of participants, we would like to learn a little about your background.

A. Personal Data

Please answer the following:
(Circle the number corresponding to your answer)

Q - 1. What is your sex?
   1 MALE
   2 FEMALE

Q - 2. What is your age?
   1 15-20 years
   2 21-30 years
   3 31-40 years
   4 41-50 years
   5 50+ years

Q - 3. What is your marital status?
   1 NEVER MARRIED
   2 MARRIED
   3 SEPARATED
   4 DIVORCED
   5 WIDOWED

Q - 4. Do you have any dependent children?
   1 YES
   2 NO

Q - 5. What is your racial heritage?
   1 BLACK, NON-HISPANIC
   2 NORTH AMERICAN INDIAN
   3 ASIAN OR PACIFIC ISLANDER
   4 HISPANIC
   5 WHITE, NON-HISPANIC

Q - 6. What is your present place of residence?
   1 METROPOLITAN AREA - URBAN
   2 METROPOLITAN AREA - SUBURBAN
   3 SMALL TOWN
   4 RURAL, NON-FARM
   5 FARM
   6 OTHER (SPECIFY) ___________________
Personal data continued.

Q - 7. What was your place of residence through most of your childhood?

1 METROPOLITAN AREA - URBAN
2 METROPOLITAN AREA - SUBURBAN
3 SMALL TOWN
4 RURAL, NON-FARM
5 FARM
6 OTHER (SPECIFY) ________________

Q - 8. What is the highest level of education you have completed?

1 HIGH SCHOOL
2 BACHELOR'S
3 MASTER'S
4 DOCTORATE

Q - 9. What college diploma(s) or university degree(s) have you obtained?
(Please Specify)

____________________________________

Q - 10. What is your personal income (gross)?

1 <$10,000
2 $10,000 - $19,999
3 $20,000 - $29,999
4 $30,000 - $39,999
5 $40,000 - $49,999
6 $50,000 - $59,999
7 >$70,000

Q - 11. What is your occupation?

____________________________________
B. Past Experience

In addition to your personal background, your past experiences may help explain your present interests and tendencies. Please circle the letters corresponding to all of those items relevant to your experience.

Example:
Did you happen to participate in any of the following activities as a child or adolescent:

- a. family camping (auto)
- b. family camping (primitive)
- c. wilderness travel

Interpretation - As a child, the respondent participated in family camping (auto and primitive), but not wilderness travel.

Q - 1. Did you happen to participate in any of the following activities as a child or adolescent:

- a. family camping (auto)
- b. family camping (primitive)
- c. wilderness travel

Q - 2. As a child or adolescent, did you happen to become involved in outdoor education/recreation programming offered through any of the following organizations:

- a. Scouts/Guides
- b. Boys and/or Girls Club
- c. Y.M.C.A. - Y.W.C.A.
- d. 4-H
- e. Youth Conservation Corps
- f. Municipal Camp
- g. Church Camp
- h. School Camp
- i. Other formal camp experience: __________________________

Q - 3. Did your high school, college or university coursework include any of the following:

- a. Biology
- b. Botany
- c. Zoology
- d. Geography
- e. Geology
- f. Ecology
- g. Anthropology
- h. History
- i. Environmental Education/Interpretation
- j. Wilderness Management
- k. Outdoor Pursuits (activities)
- m. Outdoor Education/Recreation Leadership
- n. Other natural science or outdoor leadership courses:
  (Specify) ___________________________________________
Past Experience continued.
(Please circle your No/Yes response for each question and use the space below to provide more detail as requested)

Q - 4. Over the last two years, have you or your household subscribed to any outdoor education/recreation magazines or journals? NO Yes

If yes, please list the title(s) of those you read:
________________________________________________________________________
________________________________________________________________________

Q - 5. Over the last two years, have you or your household subscribed to any environmental magazines or journals? NO YES

________________________________________________________________________
________________________________________________________________________

Q - 6. Over the last two years, have you happened to belong to any outdoor activity clubs or organizations? NO YES

If yes, please list the one(s) you belong to:
________________________________________________________________________
________________________________________________________________________

Q - 7. Over the last two years, have you happened to belong to any environmental groups or organizations? NO YES

If yes, please list the one(s) you belong to:
________________________________________________________________________
________________________________________________________________________

Q - 8. Over the last two years, did you happen to become actively involved in any environmental issues? NO YES

If yes, please briefly describe the issue and your involvement:

<table>
<thead>
<tr>
<th>Issue</th>
<th>Your Action</th>
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PART II. KNOWLEDGE ABOUT THE NATURAL ENVIRONMENT

Most people have received some ecology related schooling, if only as part of other courses in the curriculum. We recognize that your education in this area may not be very recent. Please try to answer the questions as best you can, giving your most educated guess where you are uncertain. Please try to answer all questions.

A. Basic Ecology
(Circle only one answer for each question)

Example:
1. A Golden Eagle is an example of a:
   a. decomposer
   b. consumer
   c. predator
   d. producer

   1. A food web
   a. is a single sequence of organisms through which energy passes
   b. is a network of food chains
   c. is always initiated with one or more green plants
   d. inevitably ends with human consumers

2. The most stable natural communities are those with the greatest ____?
   a. variety of plants and animals
   b. number of acres
   c. number of small organisms
   d. number of rivers and streams

3. Living plants
   a. put more nutrients in the soil
   b. move nutrients through the soil
   c. replace the nutrients in the soil with other nutrients
   d. take nutrients out of the soil

4. As energy flows from the sun to plants and then to animals
   a. the amount of energy remains the same
   b. most of the energy is lost
   c. the amount of energy remains the same
   d. half of the energy is transformed to heat energy
Basic Ecology continued
(Circle only one answer for each question)

5. A food chain is a
   a. sequence of organisms through which nutrients and energy move
   b. sequence of organisms through which nutrients move
   c. sequence of organisms through which energy moves
   d. sequence of biotic (living) and abiotic (non-living) sources through which energy moves

6. Following a forest fire or clearcutting, most forest land typically passes through successional changes in the following order:
   a. fireweed (shade intolerant herbaceous species), shrubs, shade tolerant tree species (e.g., spruce), shade intolerant tree species (e.g., pine)
   b. shrubs, fireweed, pine, spruce
   c. shrubs, fireweed, spruce, pine
   d. fireweed, shrubs, pine, spruce

7. The ___?___ is currently on the endangered species list in the United States
   a. pine marten
   b. wolverine
   c. black-footed ferret
   d. bighorn sheep

8. The water cycle is powered by
   a. the wind
   b. the sun
   c. gravity
   d. the rain

9. The biomass (total weight of protoplasm) ___?___ in each successive trophic (feeding) level.
   a. increases
   b. stays the same
   c. decreases
   d. may increase or decrease depending on the size of the feeding organism

10. As one progresses upwards in the Rocky Mountains, the following order of ecological communities are encountered:
    a. desert, grassland, coniferous forest
    b. grassland, coniferous forest, subalpine meadows
    c. deciduous forest, coniferous forest, alpine meadows
    d. grassland, deciduous forest, alpine meadows
B. MINIMAL IMPACT TECHNIQUES

Both your knowledge of basic ecological principles and any outdoor education training you may have received over the years will have contributed to establishing what you happen to know about outdoor recreation practices. Circle the letter corresponding to the best answer from the alternatives provided for each question. If uncertain, make your best guess. Please answer all questions.

1. When walking on backcountry trails, one should
   a. carry a 6-8 foot stout pole with which to pole vault over any wet sections of trail
   b. walk around muddy spots on the trail
   c. walk through shallow puddles or mud in order to avoid creating multiple paths
   d. try to short cut on switchbacks in order to climb or descend faster

2. When camping in unrestricted areas in the backcountry,
   a. select a site close to a water source and trail to reduce impact on fragile vegetation
   b. trench around your tent to prevent water seepage under your tent, filling in trenches prior to departure
   c. pitch your tent in meadows as opposed to sandy or forested areas
   d. try not to spend more than a few days in any one site

3. Campfires should
   a. be built in preference to using stoves as wood is a renewable resource and stove fuels are not
   b. be burned down to white ash and the dead coals should be crushed and scattered
   c. be ringed with rocks or built against reflecting rocks
   d. be kept burning through the night to keep wild animals out of camp

4. Latrines
   a. are too much work and rarely worth the effort
   b. are the preferred method of human waste disposal where large groups are camped in high impact areas
   c. should always be used whenever two or more people camp together
   d. are the preferred alternative to individual catholes as these are rarely deep enough to facilitate decomposition

5. Where latrines are used
   a. they should be located well away from water courses and marshes to prevent pollution
   b. they should always be at least a foot deep to ensure adequate decomposition and odor prevention
   c. humus soil should not be mixed with waste, but should be put on top of it as wastes biodegrade more efficiently this way
   d. topsoil covering the waste should not be packed down as this reduces air penetration and slows decomposition
Minimal Impact Techniques continued  
(Circle only one answer for each question)

6. Soap

   a. is fine to use in lakes and streams as the phosphorus released adds to the mineral content of the water  
   b. is only acceptable to use in lakes and streams if it is biodegradable  
   c. is essential to use in washing clothes as it eliminates odors from food stains which will otherwise attract animals  
   d. should never be used directly in lakes and streams

7. In dealing with wastes from cooking

   a. leftover cooking and dishwater should be poured around the campfire to eliminate odors and keep the firesite from spreading  
   b. water wastes should be boiled off until pots are almost dry and solids should be packed out  
   c. leftover food should be spread out on a rock or log for small animals to dispose of  
   d. fish viscera should never be burned as the smell of the cooking fish will attract bears

8. In winter

   a. an ice axe must be carried in order to dig a latrine in the frozen ground  
   b. latrines are always the preferred method of group waste disposal as catholes result in a visual eyesore by spring  
   c. cathole sites should be selected on sites which are far from water  
   d. cathole sites should be selected on top of sites likely to have minimal vegetation cover

9. At high altitude

   a. large groups are safe in the event a grizzly bear is encountered  
   b. in trailless alpine terrain, hike on harder surfaces like rock and snow whenever possible in order to avoid trampling vegetation  
   c. if time permits, leave markers or cairns along an unmarked route so others following will use your trail and avoid creating multiple paths  
   d. it is worth the extra time and effort to find a campsite on soft vegetated ground as opposed to camping on a rock shelf or snow

10. In dealing with wastes at high altitude

    a. waste cooking or dishwater should be liberally splashed around as the nutrients will be very beneficial in this slow growth area  
    b. the energy required to carry garbage out when hiking over 10,000 feet is significant and garbage should be buried in these situations  
    c. sunlight is essential for decomposition and solid human wastes should be left in a sunny spot on the surface in low use areas  
    d. crevasses should never be used as latrines
ANSWER KEY

Part I. KNOWLEDGE ABOUT THE NATURAL ENVIRONMENT

A. Basic Ecology
   1. b       6. d
   2. a       7. c
   3. d       8. b
   4. b       9. c
   5. a       10. c

B. Minimal Impact Techniques
   1. c       6. d
   2. d       7. a
   3. b       8. c
   4. b       9. b
   5. a       10. c
PART III. WILDERNESS ISSUES

You are enrolled in an educational program centered in a mountainous wilderness environment. We are interested in learning how you feel about this type of environment and how it should be managed. There are no right or wrong answers, only differences of opinion. Please respond as honestly as you can; your confidentiality is assured.

Please indicate your level of agreement or disagreement with the statements presented. Use the following scale in identifying your responses:

SD - Strongly Disagree
D - Disagree
A - Agree
SA - Strongly Agree
DK - Don't Know - do not feel you have sufficient knowledge or experience to make a decision regarding the issue statement

STATEMENT Level of Agreement

Example:
Hunting should be allowed in wilderness areas

Interpreparation: The respondent disagrees with the statement.

1. All forest fires should be actively and immediately suppressed.

2. Endangered or threatened species (e.g., grizzly bears, some large predators and raptors) should be afforded the highest level of protection, even if human recreation activities are restricted as a result.

3. Wilderness areas should retain large blocks of backcountry with no facilities, as benchmarks of landscape and natural systems unaltered by human activities.

4. Wilderness lakes should be stocked with native fish species to enhance the quality of sport fishing.

5. Due to the ecological and social impact of large groups, the party size of wilderness travel groups should be limited.

6. Wilderness recreationists should be required to pass a test demonstrating their knowledge of appropriate low impact camping techniques prior to being granted a wilderness travel permit.
Wilderness Issues continued

Response alternatives:
SD - Strongly Disagree   D - Disagree   A - Agree   SA - Strongly Agree   DK - Don't Know

Level of Agreement
Circle your response

7. Travel in wilderness areas should be restricted to designated travel routes (i.e., trails, rivers).

8. Greater numbers and a broader range of visitors (e.g., aged, disabled, etc.) should be accommodated in wilderness through the expansion and development of facilities (e.g., campgrounds, cook shelters, trails, etc.).

9. Wilderness areas should be managed in order to accommodate both non-motorized (e.g., hiking, cross-country skiing, etc.) and motorized (e.g., off road vehicles, snowmobiles, etc.) recreation activities.

10. Only those areas which, following resource inventories (e.g., oil and gas, timber, mineral), show limited commercial potential, should be allowed to be designated and maintained as wilderness.
PART IV. INTENTIONS IN AND FOR WILDERNESS

Participation in the program you took last summer may or may not have affected your future intentions for participation or nonparticipation in wilderness related recreation and/or environmental activities. We are interested in learning more about your tendencies in this area. Please respond as honestly as possible; your confidentiality is assured.

Please read each question and circle your NO/YES response. If you answer NO, please go on to the next question. If you answer YES, please use the space provided to expand as requested.

Example

Q - 1. Do you happen to be planning to travel into a wilderness area(s) over the next six (6) month period? NO YES

If NO, go to Q - 4.

Q - 2. Please list the activity(ies) you are planning to engage in while in that/those area(s).

Interpretation: The respondent is planning on travelling into wilderness over the next 6 months and expects to backpack, camp and engage in nature photography on that (those) outing(s).

Q - 1. Do you happen to be planning to travel into a wilderness area(s) over the next six (6) month period? NO YES

If NO, go to Q - 4.

Q - 2. Please list the activity(ies) you are planning to engage in while in that/those area(s).

Q - 3. If camping is one of your activities, which of the forms described below will you most likely use. (Please circle the response corresponding to your answer)

a. Auto camping: high access campground
b. Survival camping (e.g., natural shelter building, building fires, eating edible plants, etc.)
c. Minimum impact camping: high technology camping (e.g., stoves, tents, etc.)
d. Combination survival and minimum impact approach
e. Other (specify) ________________________________
Intentions continued.

Q - 4. Do you think you are likely to join an outdoor activity oriented club or organization over the next six (6) month period (exclude membership renewals)?
   NO YES
   If NO, go to Q - 6.

Q - 5. Please name the outdoor organization(s) or note the outdoor activity you are interested in pursuing.
   __________________________________________________________
   __________________________________________________________

Q - 6. Do you think you are likely to join an environmental oriented organization(s) over the next six (6) month period?
   NO YES
   If NO, go to Q - 8.

Q - 7. Please name the environmental organization(s) or note the area of environmental interests you wish to pursue.
   __________________________________________________________
   __________________________________________________________

Q - 8. Do you happen to be planning to take any outdoor pursuit and/or outdoor leadership courses over the next six (6) month period?
   NO YES
   If NO, go to Q - 10.

Q - 9. Please note the outdoor course(s) by title or topic.
   __________________________________________________________
   __________________________________________________________

Q - 10. Do you happen to be planning on taking any environmental or environmental leadership courses over the next six (6) month period?
   NO YES
   If NO, go to Q - 12.

Q - 11. Please note the environmental course(s) by title or topic.
   __________________________________________________________
   __________________________________________________________
Intentions continued.

Q - 12. Do you plan on subscribing to any new outdoor education/recreation magazines or journals over the last six (6) month period (exclude subscription renewals)?

NO YES

If NO, go to Q - 14.

Q - 13. Please note the outdoor publications by title(s) or topic(s).

________________________________________
________________________________________

Q - 14. Do you plan on subscribing to any new environmental magazines or journals over the next six (6) month period?

NO YES

If NO, go to Q - 16.

Q - 15. Please note the environmental publications by title(s) or topic(s).

________________________________________
________________________________________

Q - 16. Do you think you are likely to become actively involved in any environmental issue(s) over the next six month period (e.g., writing newspaper, lobbying government, attending hearings, etc.)

NO YES

If NO, you are now finished this part of the questionnaire.

Q - 17. Please note the environmental issue(s) you are likely to pursue and your most likely course of action.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>
PART V. INVOLVEMENT IN AND FOR WILDERNESS

Participation in the program you took last summer may or may not have affected your engagement or disengagement in wilderness related recreation and/or environmental activity. We are interested in learning more about your behavior in this area since your program. We realize there are many very legitimate reasons we are not always able to do the things we would like to do. Please respond as honestly as possible; your confidentiality is assured.

Please read each question and circle your NO/YES response. If you answer NO, please go on to the question you are directed to. If you answer YES, please answer the next question.

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q - 1. Did you happen to travel into a wilderness area(s) over the last six (6) month period?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If NO, go to Q - 4.

Q - 2. Please list the activity(ies) you engaged in while in that/those area(s).

Interpretation: The respondent did travel into wilderness over the last six month period, engaging in canoeing and camping on that (those) outings.

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q - 1. Did you happen to travel into a wilderness area(s) over the last six (6) month period?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If NO, go to Q - 4.

Q - 2. Please list the activity(ies) you engaged in while in that/those area(s).

Q - 3. If camping was one of your activities, which of the forms described below did you use.

(Please circle the response corresponding to your answer)

a. Auto camping; high access campground
b. Survival camping (e.g., natural shelter building, building fires, eating edible plants, etc.)
c. Minimum impact camping; high technology camping (e.g., stoves, tents, etc.)
d. Combination survival and minimum impact approach
Involvement continued.

Q - 4. Did you happen to join an outdoor activity oriented club or organization over the last six (6) month period (exclude membership renewals)?

NO YES

If NO, go to Q - 6.

Q - 5. Please name the outdoor organization(s) you joined.

Q - 6. Did you happen to join an environmental oriented organization(s) over the last six (6) month period?

NO YES

If NO, go to Q - 8.

Q - 7. Please name the environmental organization(s) you joined.

Q - 8. Did you happen to participate in any outdoor pursuit and/or outdoor leadership courses over the last six (6) month period?

NO YES

If NO, go to Q - 10.

Q - 9. Please note the outdoor course(s) by title.

Q - 10. Did you happen to take any environmental or environmental leadership courses over the last six (6) month period?

NO YES

If NO, go to Q - 12.

Q - 11. Please note the environmental course(s) by title.
Involvement continued.

Q - 12. Did you happen to subscribe to any new outdoor education/recreation magazines or journals over the last six (6) month period (exclude subscription renewals)?

NO YES

If NO, go to Q - 14.

Q - 13. Please note the outdoor publications by title(s).

____________________________________________________

Q - 14. Did you happen to subscribe to any new environmental magazines or journals over the last six (6) month period?

NO YES

If NO, go to Q - 16.

Q - 15. Please note the environmental publications by title(s).

____________________________________________________

Q - 16. Did you happen to become actively involved in any environmental issue(s) over the last six (6) month period (e.g., writing newspaper, lobbying government, attending hearings, etc.)

NO YES

If NO, you are now finished this part of the questionnaire.

Q - 17. Please note the environmental issue(s) you pursued and your activity.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
</table>
DATA CODE NUMBER

To gain the most information from our data collection procedures, it is important that we keep each respondent's three questionnaires together. In order to help us do this while ensuring your confidentiality, we ask that you provide us with a four digit number that you will put on each of the questionnaires you complete. The easiest to remember may be the last four digits of your social security number, but you may choose any four digit number (e.g., the day and month of your birth, the last four digits of your driver's license, school or employer identification number, etc.). Please select a number you won't forget over the next six months. It is important that you use the same code number each time.

My code number is ___ ___ ___ ___.

Please feel free to use this space to make any additional comments you would like to share in relation to the content of this questionnaire.

Thankyou for your participation in this study. Your time and effort were very much appreciated.
LOCATOR CARD

In order to allow us to mail you the follow-up questionnaire and/or summary of the study results, we need to compile a mailing list. No attempt will be made to link this card with your questionnaire. This information will be kept in strictest confidence and destroyed as soon as data collection is complete.

Name ____________________________________________________________
(First) (Last)

Address __________________________________________________________
(Street) (Apartment)
__________________________ ______________________________________
(City/Town) (State)
__________________________ ______________________________________
(Zip Code)

Telephone ____________________________ ____________________________
(Area Code) (Phone number)

I am interested in receiving an executive summary of the results of this study.
(Circle one).

NO YES

(Please detach this page and hand in separately upon completion)
APPENDIX B

INTERVIEW SCHEDULES
INTERVIEW SCHEDULES

PART I. INITIAL INTERVIEW

Introduction - I know you have come to this program with a number of expectations of what you will experience. In the short time you've been here, you have already begun to form perceptions of various aspects of the program and social situation here. We would like to find out more about these expectations and perceptions to help us better meet our clients' needs.

A. Initial question

1. Tell me a bit about yourself:

B. Background Information

1. Why did you enroll in this (Audubon/Outward Bound) mountain course?

2. What past experience(s) have you had that contributed to your decision to come to this particular program?

3. Does this program relate to your present job?

4. Does this program relate to your present recreation patterns?

5. Do you think this program will help you in your future work/recreation plans? How?

C. What are your expectations of this course in relation to:

1. Instruction/Leadership
   (i) - How do you learn best?
   (ii) - Do you expect your future behavior to change as a result of this program?
   (iii) - What do you see as the role of your instructor(s)?

2. Safety (Outward Bound)
   (i) - Do you expect to face real physical risks in this program?
   (ii) - Should your instructor protect you from any real risks/hazards present?

3. Environment
   (i) - What is the role of the environment in this course for you?
   (ii) - What are your expectations in terms of quality of the environment at the site(s) you will visit?
(iii) - Do you expect to have your knowledge about the mountain environment increased?

(iv) - What types of things would you like to learn about the environment?

4. Social

(i) - What do you expect to gain through the social interactions you will experience over this program?

(ii) - Do you have any fears regarding this extended intense social situation?

5. Is there anything else you'd like to share regarding your expectations of this program?
PART II. FOLLOW-UP EVALUATIVE INTERVIEW

Introduction - Early in the program, I asked you a bit about yourself and the experiences which brought you to this particular program. You shared your expectations of the program with regard to instruction, safety, environment and social interactions. Now we'd like to learn more about how the course actually went for you; whether your expectations were realized and what you would have liked to have seen done differently.

What are your evaluations of the course in relation to:

1. **Instruction/Leadership**
   (i) - What role did your instructor(s) (excluding me) play?
   (ii) - In retrospect, did the leadership role(s) assumed meet your expectations? Why or why not?

2. **Safety (Outward Bound)**
   (i) - On a Scale of 1 to 10 (10 being high) (show card with continuum), how would you rate the overall attention to safety over the course?
   (ii) - Were there any specific situations you encountered where you felt your health and/or safety were at real risk?

3. **Environment**
   (i) - On a scale of 1 to 10, with 1 being an urban metropolis and 10 being pristine wilderness (show card with continuum), how would you rate the character of the environment this course occurred in?
   (ii) - Did this program occur in an appropriate environment? If not, where do you think it should have been held?
   (iii) - Did you learn as much as you expected about the environment in which the program occurred? If not, what are some aspects you think need more attention in this type of program?
   (iv) - What did you learn about the environment here that you think will be most useful to you in your future endeavors (i.e., work, environmental activity, recreation?)
   (v) - Do you think your attitude or feelings about the mountain wilderness have changed as a result of your participation in this program? If so, how?
   (vi) - In what way(s) do you think your future behavior will be affected by your participation in this program?
4. **Social Interactions**

(i) - Was this course socially enjoyable for you?

(ii) - Did you encounter much stress due to the extended interpersonal contact resulting from this program?

(iii) - Was there anything your instructor could have done to make the experience more socially enjoyable for you?
APPENDIX C
EXAMPLES OF BEHAVIORS
OBSERVED IN THE FIELD
EXAMPLES OF BEHAVIORS TO BE OBSERVED IN THE FIELD

1. **Wilderness Travel**
   - Appropriate route finding; avoiding excessive trampling of sensitive vegetation
   - Avoidance of multiple trailing
   - Use of contouring to avoid creation of steep erosion channels

2. **Campsite Selection**
   - Durable site; avoidance of sensitive and/or rare vegetation
   - Good drainage at site to minimize impact from soft, wet ground
   - Appropriate distance from major trails and waterways

3. **Solid Waste Disposal**
   - Avoidance of littering; picking up litter encountered on route
   - Packing out all garbage or burning where appropriate

4. **Liquid Waste Disposal**
   - Dishes washed away from waterways
   - Waste water (cooking, dishes) appropriately disposed

5. **Human Sanitation**
   - Bathing away from waterways
   - Avoiding use of soap
   - Use of catholes versus latrines
   - Catholes or latrines an appropriate distance from trails and waterways
   - Dealing with toilet paper refuse

6. **Wildlife**
   - Food stored appropriately to minimize attracting animals
   - Avoidance of areas with definite signs of wildlife (e.g., fresh bear diggings)
7. **Artifacts**
   - Avoidance of the picking of wildflowers
   - Avoidance of the collecting of rocks, fossils or other artifacts

8. **Fires**
   - Building of fires only where wood plentiful; appropriate selection of firewood
   - Proper structuring of firesites
   - Complete extinguishing of any fires made
   - Appropriate disposal of any incompletely burned wood
   - Attention to site reclamation
APPENDIX D

ALL ALONG THE GREAT DIVIDE
ALL ALONG THE GREAT DIVIDE

You get up in the mornin'
Shake the dew off of your mind
As the sun pours like honey
Through the ponderosa pine
You're livin' every moment
As if you've just arrived
Cause you know what it means to be alive.

Chorus
All along the great divide
Well, few can understand
What it means to be alive
All along the great divide.

The crystal mornin's breakin'
With the cooin' of a dove
And you head on up the trail
To the highlands up above
Where the colors of the rainbow
Are the flowers at your feet
And your heart sings a song with every beat.

Chorus
Well - you tramp along the ridgeline
As the world spreads out below
And you're feelin' like a king
And you're hoardin' all your gold
And you think that if you take
Another breath you'll just explode
And you feel the choir singing in your soul.

Chorus
A red tail on the wing
Cries his warning from the sky
Till you find yourself a starin'
Into a grizzly's lonesome eyes
Before he turns away in boredom
You're frozen by the sight
And you know what it means to be alive.

Chorus
While the sun slowly sets
Into its crimson sea
And the darkness comes a creepin'
Like another life set free
And the heavens like to greet you
With another starry night
And the wonder of the great northern lights.

By Walkin' Jim Stoltz
APPENDIX E

AUDUBON SESSION TWO
COURSE DESCRIPTIONS
AUDUBON SESSION TWO COURSE DESCRIPTIONS

Ecology of Mountain Love Songs
How are tone, melody, pitch and rhythm related to habitat quality, mate choice and reproductive success? Identification of recorded songs (with slides) will be followed by field experiences and group discussions about racial prejudice, cultural learning and virtuosity among songbirds.

Balancing on the Rim
"If the sky turns a color sky never was before, just watch it".
In this course we will attempt to balance our scientific understanding and personal feelings about the natural world. An all day hike (moderately strenuous) to Torrey Rim and beyond will include scientific discussions, individual discovery and group activities. We invite you to join us as we explore our relationship with Mother Earth.

Fossils From Beyond Time
What did Torrey Valley look like 300 million years ago? What creatures prowled its valley floor? A short drive to Ring Lake and some scrambling will bring us face to face with the potential answers. Fossil types and identification will be covered and good fossiling is guaranteed.

Unlocking the Mystery of Plant Keys
Plant identification for beginning and intermediate levels. We will meet at the picnic tables, and take short walks to key out the local wildflowers around camp. Discussions of field guides and key selection will focus on identifying important characteristics of plants that ease identification. You will learn the basics, and have the opportunity to use keys. Independent work on herbarium specimens may follow.
Workshop In Solar Cooking

The sun offers an energy source which is safe and non-polluting. The class will actually build an oven and sample different solar-cooked foods. We will also view a short video tape which shows these ovens being used in Africa and Haiti where the fuel shortage is critical.

Environmental Education

Environmental education is a process aimed at developing a population that is aware of, and concerned about the total environment and associated problems. In this class we will examine various supplementary curriculum materials for teaching environmental education at the elementary and secondary levels. Participants will have a chance to try some activities and everyone will receive references explaining how to obtain these materials.

Sneaky Reptiles Glorified With Hair

A look at the diversity in size, shape, form and function of Torrey Valley mammals, where they live and what they do (THEIR NICHE!!), from the diminuitive water shrew that weighs a few grams to the odd looking moose that weighs half a ton.

'Dem Bones Will Rise Again

Connect the ecology of animal species with constraints placed on them by their structure - bones, joints, etc. Learn to interpret Torrey Valley mammals from skeletons, using the clues you discover to tell you how the animals function on a day to day basis. By the end of this workshop, you will be able to re-create the life history of a mammal from its skeleton.
Torrey Valley Petroglyphs
Did you notice our rock art gallery as you were driving into camp? If not, this is your chance to do so close up. Sketch, photograph and unlock the riddles of these unique figures. Are they signs, histories, magic or just doodling? A casual drive/walk to numerous sites near camp.

A Moth's a Moth: If You've Seen One, You've Seen Them All?
In a slide show and field walk, we'll take a look at the spectacular diversity among lepidoptera, among the world's most sensitive biological indicators. Study the inseparable link between plants, butterflies & moths & discuss coevolution and beauty of the flowering plants & advanced insects.

Pond Ecology
Study the riparian and aquatic habitats of Beck's Pond. From canoes we'll look at the similarities & differences of a pond vs. a stream ecology & see why a pond is "the same only different".

Living the Good Life in the Badlands
On a van trip to the badlands area of the Wind River Basin, we will take a detour up the Jakie's Fork to provide a comparative look at habitat structure, composition and selection, foraging niche and associated geologic processes in two riparian forest habitats. Possibility of seeing prairie falcon, great horned owl, western wood peewee, sage thrasher and nesting great blue herons.

Pollination Ecology
The ecology of plants and insects - pollination - and on plant I.D. using family characteristics.

Mysteries of the Skies
Explore the depth and breadth of the universe, stars, galaxies, nebulae, planets and constellations.
APPENDIX F

HANDOUT FOR AUDUBON FORM/FUNCTION SESSION
MUSCLE ATTACHMENTS OF THE SKULL

Diaphyseal process large
Temporalis large
Cranial absent
Temporalis small
Mmasseter large
Jaw articulation high above tooth row
Mmasseter of jaw in line moderate with tooth row
Digastric
Temporal - closes jaw
Masseter - closes jaw
Neck and shoulder muscles: cleave or turn head
Sternomastoid, clidomastoid, depress or turn head
Digastric - open jaw
Pterygoid - close jaw, pull it medially
Figure 23-5  CONTRAST IN PROPORTIONS AND FOOT POSTURE in the hind leg skeleton of a noncursor (left), moderate cursor (center), and highly specialized cursor (right).
Diggers ( fossorial )
Figure 23.7 SOURCES OF THE LENGTH OF STRIDE OF A FAST-RUNNING CHEETAH shown for half of a cycle. Each factor is repeated in the other half cycle except that flexion of the body substitutes for extension.

Figure 23.8 LUMBAR VERTEBRAE OF LUMBER AND PASSIVELY RIGID SPINE

Figure 23.9 CONTRAST BETWEEN THE FOREARM SKELETONS OF A NON-CURSOR (left) AND A CURSOR (right) shown by the left radius and ulna in lateral view (below) and the same bones at the elbow seen from above and behind (above).
APPENDIX G

WILDERNESS RESEARCH BACKPACKING
MINIMAL IMPACT SESSION NOTES
WILDERNESS RESEARCH BACKPACKING
MINIMAL IMPACT SESSION NOTES

July 6 (Day 2) 3:30 pm.

Daily routine - put up tarps, then tents, group gear to group tarp, get water, hang bear ropes
and dig latrine; o.k. to leave non-food items in tents
- grizzly and cub noted in Five-Pockets area so Audubon not going there this whole season

Low impact camping - definition; little group knowledge apparent
- fires 100' from water, camp away from trails
- biodegradable soap - don't use in water source (at least 100' away)
- leaving little trace, take everything out
- trail etiquette - don't cut switchbacks; slog through mud; horsepackers make multiple
  trails; in alpine spread out or stay on trail, but don't form file off trail; stock has right of way
  so get off trail where horses can see you; don't disturb animals by getting too close; last
  person removes marker net set by leader to mark camp; leave room between hikers
- stream crossings - don't put logs across streams to cross; don't go barefoot; use stick
  and four people linked in deep streams
- campsite choice - 50' away from trail at least; at least 100' from lake and out of view;
- tent sites - tents not on fragile foliage; beauty spots on west slopes (windy); avoid
  windfalls; don't trench around tents; don't move rocks and logs etc.
- cook sites - keep cook area away from tents
- fires - will use existing fire sites, but will dismantle; burn fires to ash, scatter coals in
  woods; will build sod fires for fish; replace sod when finished cooking; are more aware of
  environment around if not having fires.
- trash - take out yours and others; anything burned is fully burned; burn burnables, not
  plastic or foil (e.g., candy wrappers); tampons don't burn.
- fish viscera - have seen others throw them in lake; correct procedure is to spread them out in woods so small animals can eat them.

- if bears in area - walk downtrail and scatter fish viscera up off trail in woods.

- hygiene - dishes - one person puts water into bucket with cup and walks away from stream; use hands, sand, scrubby, etc.; don't dip, put more water in and rinse; bring back to tarp to sterilize with hot water; usually only use soap once.

- what about giardia? allow dishes to dry or use towel; at high altitude, iodine works better than boiling; at low elevation, boil; can't tie up stoves and fuel; everyone brought own water purification tablets.

- washing clothes - don't need soap; just rinse; hang out of sight of trail.

- personal hygiene - don't need soap; don't bathe in water source.

- latrines - depth is determined by trench; soil depth determines - if little or no soil, use sunlight for decomposition.

- toilet paper - don't use toilet paper at all; use leaves (green gentian); take your leaves with you to trench; can use water from water bottle and wash self; handed out baggies for personal trash (e.g., tampons, toilet paper); can use a baggy inside a baggy with used toilet paper inside and clean outside; can use a cloth diaper for washing and drying.
APPENDIX H

OUTWARD BOUND
WILDERNESS ROOTS AND DEEP ECOLOGY SESSION
OUTWARD BOUND: WILDERNESS ROOTS AND DEEP ECOLOGY SESSION

July 27 (Day 4) 8:00 pm

Wilderness Roots

Rob - roots of our wilderness consciousness began in the biblical period (Old Testament)
- wilderness concept evolved out of mid-east
- great prophets in history - Moses, Abraham, Jesus, Mohammed all went into wilderness
to cleanse their souls and relate to God; also went to have visions
- children were cast into the wilderness for 40 years
- the wilderness in the middle-east was harsh - hot; no water; lonely - far from the Garden
of Eden.
- with the advent of Christianity, Europeans adopted Christianity and tenets and dogma of
its faith.
- had dense forests, swamps and primitive people in Europe; seen as a "place of the
devil" where God was absent
- Northern Europe - people did not want to go into wilderness and thought people who
lived there were evil.
- Europeans came to America - puritans who memorized the bible; found a "raging
wilderness"; had an adversarial position; perceived that the land was given to them by
God and that they had to deal with the forest and the Indians; dealt with Indians severely
(systematically slaughtering them) once they learned how to live without them.
- opened the forest to "bring in light of the Lord" during the 17th century - Judeo-
Christian perspective; believed that the land was bountiful and that God gave animals etc.
for man's use.
- moved to the prairies and celebrated escape of the dark east
- settled America and reached the west coast; felled last forests of America (destroyed by
timber barons); burned waste and nothing grew; farmers settled in
Theodore Roosevelt - a great president because he was a visionary who saw the destruction, the erosion of the land into the rivers; 50 years ahead of his time.

- He created some of the largest acreages of public land - 1/3 of U.S.
- Today 3% of U.S. is designated Wilderness; 1% is in parking lots.
- Roosevelt stemmed the tide but many hated him for interfering; however, he planted the seed of the American conservation attitude.

- Clifford Pinchot suggested utilizing the forests, but with conservation in mind.
- John Muir was a preservationist who felt much of wilderness should be preserved so Americans of future generations could see what their forefathers had.

- American character was forged on the American west pioneer spirit - carving out a piece of the land.

- Grant gave us our first National Park (Yellowstone in 1872), but he continued to pillage the continent's natural resources.

- A variety of east coast intelligentsia read Thoreau, Muir, etc. and began to believe that wilderness was precious because it was becoming scarce.

- Ranchers, timber interests in wilderness regressed to time 2,000 years ago (Greek time).

- 1964 - Wilderness Act finally passed; with tremendous opposition in America because people saw it locking away northern forests; saw the last bit of America stolen from them.

- Primary opponents - timber, mining, Northern Rifle Association (hunters), and ranchers (grazing) who collectively owned much of the land in wilderness.

- Continued to allow hunting, grazing and mineral exploration on public land.

- Therefore, don't really have wilderness at all; it's a big ripoff, a real tragedy; you can't find wilderness in America like your forefathers had; you can thank your political system and your corporate interests.

- Prospects for change are negligible; chances are they will become weaker, allowing more resource development.
Sam - consider the Gates of the Arctic and the oil development there; Gates of America oil will provide one years worth of oil to the U.S. and American people think "I'll never go there so why preserve it".

Rob - the idea of National Parks is one of America's greatest contributions to the world

- the first National Park in England was established in 1948

Sam - if you've travelled Europe, they've preserved monuments to their history; they wouldn't tear down Buckingham Palace if there were a shortage of bricks. I don't think any other people would destroy the spirit of their culture. In America this comes from the wilderness legacy. Read The Sand County Almanac and Wilderness and the American Mind.

- Deep Ecology - your life can't be much unless it is lived in balance; American life is so out of balance, its a tragedy.

- we have such an impact on the world through our consumerism; e.g., Banana Republics; chopping down rainforest to produce beefburgers

- we are terribly smug; we know it all; "the idiot scheik"; "what the fuck do we care about what's going on in Brazil".

- it requires time and energy to change; we can only change ourselves; consider the body inside the skin and the exobody (e.g., trees).

- but there's an attitude that even if I care for them, someone else won't, so why bother; we must learn to care.

- we cast monetary votes as a consumer.

- Mondale v. Reagan = Pepsi v. Coke - Big Deal!

- not down on market economy, but people can make a difference.

- companies are very sensitive to their public image (e.g., successful boycott against Nestle's).

- starting to really learn about your food is important because your food is your link to the land; be aware of insensitive ways of production
Jane - I joined the Sierra Club and only received information about negatives and destruction of our country so I dropped out. People don't want to be associated with losers.

Rob - Sierra Club is a bunch of yuppies anyway. I don't belong to any organizations; I can do more within my life and my family; I don't want anyone making my decisions for me. I do a lot of public service talks, etc.

- sending money is like poor box; we feel guilty so we pay
- but every individual can make an important contribution by thinking of the ecology of products - e.g., coffee; growing cotton results in 50% of our use of pesticides; even gorp (contains chocolate, raisins, nuts, etc.).

- you can improve your health and the world economic situation.
APPENDIX I

OUTWARD BOUND GROUP JOURNAL:
SELECTED THOUGHTS AND QUOTES
OUTWARD BOUND GROUP JOURNAL:
SELECTED THOUGHTS AND QUOTES

DAY 3

...The Geneva Lake we hit at about noon was just too inviting! So we just had to take a quick dip.

Tonight, God, the feeling of my freedom is a silent conversation between you and I. Here I can feel the power of your hand: the mountains, the stars, the very air. Here then is my cathedral. Here then I believe.

In the city, amongst man and his puny sculptures of concrete and metal and glass, I sometimes lose sight of the magnificent mountains or forget to watch the lazy moon cross the sky. It is then that I sometimes lose sight of you.

From Doug Lindstrand's Alaskan Sketchbook

Come into the mountains, dear friend.
Leave society and take no one with you
But your true self.
Get close to nature.
Your everyday games will be insignificant.
Notice the clouds spontaneously forming patterns,
And try to do that with your life.
I remembered one morning when I discovered a cocoon in the bark of a tree, just as the butterfly was making a hole in the case and preparing to come out. I watched awhile, but it was too long appearing and I was impatient. I bent over it and breathed on it to warm it. I warmed it as fast as I could and the miracle began to happen before my eyes, faster than life. The case opened, the butterfly started slowly crawling out and I shall never forget my horror when I saw how its wings were folded back and crumpled. The wretched butterfly tried with its whole trembling body to unfold them. Bending over it, I tried to help with my breath. In vain. It needed to be hatched out patiently and the unfolding of the wings should be a gradual process in the sun. Now it was too late. My breath had forced the butterfly to appear, all crumpled, before its time. It had struggled desperately, and a few seconds later, died in the palm of my hand.

That little body, is I do believe, the greatest weight I have on my conscience.

For I realize today that it is a mortal sin to violate the great laws of nature.

We should confidently obey the external rhythm.

I sat on a rock to absorb this New Year's thought. Ah, if only the little butterfly could always flutter before me to show me the way.

Nikos Kazantzakis

Zorba the Greek
Day 6

To those who have struggled with them, the mountains reveal beauties they will not disclose to those who make no effort. That is the reward the mountains give to effort. And it is because they have so much to give and give it so lavishly to those who will wrestle with them that men (women) [journal writer's addition] love the mountains and go back to them again and again...The mountains reserve their choice gifts. For those who stand upon their summits.

Sir Frances Youngblood

A Prayer For The Mountain Flowers

I am sorry Lord for the many flowers that fell beneath my feet on the way to the summit; their beauty stared up at me these past days; They kept me company and sparkled energy and warmth when my own resources were waning;

Even so Lord there were times when my feet and the feet of my brothers and sisters cut short their dance with the wind;

So for me and those who went with me to the summit of your glorious mountain, I pray your blessing for those flowers who fell along the way.

Paul A. Mathew

COBS, 448A, 1987
The mountain received our grumblings, and so not even grumblings could mar the beauty and grandeur we looked back upon as we left our two day campsite at Snowmass. The penetrating blue and green of the lake as we looked down reminded us of why we tormented so, carrying our heavy packs into the wilderness. Our trek down was steep and criss-crossed the side of the mountain, bringing us to the welcome shade of an aspen meadow... Further down the bouquet of rocks were a nice distraction as one could observe purple, blue, sometimes green and orange rocks arranged among curry colored stones.
BACKCOUNTRY CARE HANDBOOK: MOUNTAIN AREAS

MOUNTAIN AREAS: BACKCOUNTRY CARE

1. Choosing the Route

   a. In the spring, travel across snow and rocks as much as possible; mountain soils are very fragile and subject to erosion during the thaw.
   b. Use existing trails when available; do not further erosion by cutting across switchbacks; hike in single file to avoid creating multiple lanes.
   c. For travelling across country without trails (especially tundra or meadow areas), the group should fan out rather than walk one behind the other; ten people tramping in a row can crush fragile plant tissue beyond recovery and create channels for erosion.
   d. On first ascents or when bushwacking, leave no cairns, blazes, markers or signs; you enjoyed being first; allow others the same pleasure.
   e. Consider that lug-soled boots can tear and break open the fragile alpine surface; once there is an opening, wind action can continue to unravel the ground cover; in the summer when there's no snow, smooth-soled boots or tennis shoes are to be recommended for hiking.
   f. Travel quietly in the backcountry; avoid clanging cups and cook pots on the outside of backpacks; noise pollution lessens the chance of seeing wildlife and also lowers the enjoyment of other hikers.
   g. Any bird or animal which is spotted should be left alone; enjoy watching wildlife from a distance and respect their need for undisturbed territory.
   h. Avoid removing items of interest (such as rocks, flowers, wood, antlers, etc.); leave these in their natural state for others to see.
i. Pick up any litter along the route; have one pocket of your pack available for trash.

j. Wear "earth colors" to lessen your visual impact.

2. Locating a Campsite

a. Use an existing campsite whenever possible, in order to minimize the number of areas which look "used".

b. Choose a "hard" site or sandy terrain or the forest duff, rather than the lush but delicate soil of meadows or streamsides.

c. Camp back away from the edge of lakes and streams; so many people camp right on the shore, destroying fragile plant communities, cutting animals off from their supply of water, and keeping others from enjoying the shoreline.

d. Consider the effect of your presence on other hikers; to enhance their wild country experience, camp out of sight of trails, and avoid brightly colored equipment.

e. If other parties are close to where you want to camp, choose your campsite so that terrain features insure privacy (vegetation or small knolls can cut noise by a great deal).

f. Keep noise level low at the campsite, out of respect for any nearby campers.

g. Leave the site as you would like to find it; avoid trenching, brush removal, cutting boughs, picking flowers, etc.

h. Check with local public land management agency (i.e., Forest Service or BLM) about which areas may be receiving high impact from campers and hikers; then plan your trip to avoid these areas.

i. On the other extreme, avoid taking large groups into unusually remote and pristine valleys which have not had much prior human impact.

j. Avoid overcamping in one location, which tends to create a permanent, established campsite where one did not exist before. Move your camp before your impact becomes noticeable. Wear soft soled shoes around camp. Choose a particularly resilient spot for your cooking and group activity areas.
k. If you pitch a tarp or tent, carry small tent pegs that can be removed without leaving a sign or damage to the forest floor. If you have to move rocks, be sure to replace them in their original location and attitude; otherwise you will be crushing live vegetation, as well as leaving an ugly hole. Remove stock stakes if you use them.

3. Fires

a. Due to the small amount of rainfall in Colorado, wood is a limited resource. The dead and decaying wood is needed by the forests to replace soil nutrients and to provide organic matter. In many areas, wood is being used faster than it is grown. Therefore, fires should be considered a luxury to be used only for special evenings, in time of unusual cold or wet conditions, and for teaching the art of fire building. A fire certainly is not necessary every evening.

b. Use a small backpacking stove for cooking all meals.

c. Have fires only in areas with plentiful wood and rapid resource replenishment. (For example, it would have much less impact to use firewood from a stand of lodgepoles than to use wood from close to timberline).

d. Build only small “squaw” fires which people can gather closely around, rather than bonfires.

e. Use an existing fire pit if available.

f. To build a fire in a new area:

Pit Method:

(1) Choose a spot away from overhanging branches, tree roots or reflector rocks.

(2) Carefully remove sod covering an area; keep this sod moist and protected; use it to cover fire scar when breaking camp.

(3) Dig a hole down through the humus layer and into the mineral soil for a base for the fire; humus soil can smoulder and burn underground and surface elsewhere to cause
forest fires; make sure that the hole is substantially larger than the planned fire; clear dried grasses or other volatile tinder away from the hole.

(4) It is not necessary to make a ring of rocks around a fire pit. They will not break the wind or prevent a ground fire, and will only permanently blacken the rocks.

(5) Take firewood first from loose branches and sticks on the ground and secondly from downed trees; avoid taking limbs and branches from living trees to keep a natural appearance to the campsite and prevent damage to the tree.

(6) It is best to let a fire burn down to gray ash, which can be buried or widely dispersed on the ground. If a hot fire is extinguished, then black charcoal and charred sticks will remain, and these are difficult to dispose of easily and invisibly. A good system is to have a fire only in the evenings so that it will burn to ash overnight, which can easily be dispersed. Use a stove for morning and mid-day cooking.

Another advantage of letting a fire burn down completely to white ash is that there is less residue to dispose of. A fire put out by mixing it with dirt creates a large-volume mess of ash, charcoal and dirt that is difficult to get rid of. The result is a big mess compared to a small pile of fluffy ashes that can be dispersed in the wind. Similarly, a fire extinguished with water results in a pasty goo that is very difficult to disperse or conceal easily, short of burying.

(7) Fire must be thoroughly out that it is cold to the touch; be sure there are not smouldering roots or humus; black charcoal must be finely crushed and then may be either buried or dispersed widely on the soil; do not dispose of ashes in any water source. Burned charcoal chunks have a tendency to float to the surface over time.

(8) Replace soil and sod or ground cover; scatter the fuel you have gathered but not used; any scarred rocks should be returned black side down to their original locations. Standing dead trees are a scenic attraction; don't burn them or their branches, or knock them down.
4. Latrines

a. Latrines are important because human disease can be transferred through our wastes; it is possible to carry dormant diseases and be unaware of it.

b. Have one spade for every eight to ten people.

c. For individual comfort stops and single nights in lightly used areas, a person can make a small hole, taking care to dig down into, but not below, the humus layer. Rolling a rock for an impromptu latrine is discouraged.

d. For one or more nights' use by a group, dig a latrine in a regularly used campsite. Locate it on a hillside at least 300 feet from any stream or lake or marsh area, so that the human waste will be filtered through the soil and sand.

e. Dig the trench down into the humus (organic) layer of the soil; this is where the decomposers are active; the depth will vary from 4 to 10 inches, depending on soil conditions. Ideal dimensions are 6-8 inches wide, by 2-3 feet long. Base the size of the trench on the number in the group and the length of stay.

f. Burn or carry out all paper articles used in the latrines (e.g., toilet paper, tampax, etc.). When possible, use snow or other natural toilet paper substitutes, such as smooth stones, sticks, conifer cones, or leaves of carefully selected plants.

g. Keep the spade by the latrine and spread a layer of dirt over the waste after each use.

h. When leaving campsite, replace the layer of sod and cover with a large rock or log to prevent animals digging up the area.

i. Urinate away from trails and water sources; in areas where there is good humus and avoiding vegetation.

5. Washing

a. Do not use ANY soap in streams or ponds or lakes for any purpose; even biodegradable detergent causes pollution to drinking water.
b. To clean dishes, clothes, or self, wash in a pot, well up on shore and away from water supply; pour out the soap and break it down.

c. Use biodegradable soap or Ivory because the soil can break it down much more rapidly than ordinary soaps.

d. The best soil for breaking down soap is vegetated and absorbs water slowly; sand which absorbs water rapidly does not break soap down or filter it out.

e. Too much soap in one place overtaxes the ability of any soil to break down the soap; if a group of people are all washing at the same time, they should spread out and dispose of the soapy water in scattered places.

f. Do not use soap or dispose of soapy water in tundra areas; the soil layer is too thin in the tundra to act as an effective filter, and much destruction of delicate plant life can result.

g. The Forest Service recommends that the distance for disposing of soap is as far as practical from the water source.

6. Trash

a. Pack it in, pack it out! When possible, carry out more than your share.

b. Carry out all cans, glass, foil; remember that aluminum can be recycled; paper may be burned or carried out. Do not bury these items. Animals may dig them up, making a mess and get cut in the process.

c. Nothing should be left behind; food scraps like egg and peanut shells and orange peels take a long time to decompose and serve as visual pollution for other hikers.

d. Careful food planning should prevent any leftover food; if there is any cooked food left over, it should be buried in the latrine.

e. Mountain streams and lakes do not have the decomposers necessary to break down food scraps; so be careful not to get any scraps into them.
Reference

APPENDIX K

INTERVIEW DATA

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INTERVIEW DATA

AUDUBON

1. Initial Interview

Donald - high environment/high outdoor, male, under 35

Personal description - I teach third grade. I’ve been in education for about 10 years. I’ve done freelance writing on all sorts of issues. I’ve done a fair amount of environmental work; at hearings, energy issues, water issues, air issues, nuclear power issues. Strong bent in that direction which I attribute to lots of interaction as a kid, through scouting and going into the woods myself and to going to a summer place in New Hampshire. I’m interested in seeing more people have those experiences as children because I see how important it is to what they do later on. On the other hand I see people that have been in those situations, like growing up on a farm, who don’t have those attitudes at all, so there must be more to it than just growing up in those kinds of environments.

Recreation - I ski x-c and downhill, and do photography. I’ve been building a solar heated house which has preoccupied my life for the last 5 to 10 years. My 2 kids improved my leisure time because I find myself doing more things with them for fear that they’re going to grow up without doing those things. I started playing tennis last year, and we go horseback riding a lot. One son is into 4-H and he knows more about horses than I do.

Why enrolled - I heard about it through a photography instructor, applied and got a scholarship. I’m more interested in learning now. I took biology for four years in college and took one field trip in that whole time. I was discouraged with that so I saw this course as a chance to make up for a little lost time.

Course relation to job - Very definitely. I’m teaching every day and I’d like to expose them to and teach them about more of the natural world and the interconnections in it and this looked like an excellent way to do it. I reach a lot of kids.
Course relation to leisure - Yes, a lot of times when I go out in the field or just out around my house, we've got five acres and I want to know more about the natural world. One of my favorite writers is Aldo Leopold. He's always talking about how we ought to be able to go into an area and study it and he gives a lot of examples, but it's not the same as telling someone how to do that. I feel that this course is giving me a real understanding of how to go into an area and approach it for the interactions. But, I really need to study it more.

Course relation to future - I'm also getting involved with scouts. I'm really dismayed at the direction I see scouts going; it's still the clear cut mentality so to speak. This will really help me when I go on outings to be able to show them what to look for on bird behavior and how to study insects and plant life. It'll be a real help in the near future, as soon as I go back.

Learn best by - By doing and particularly by doing things where I have to create. Like if I'm looking for new ideas and to explain things. I'm also more of a visual learner than auditory, seeing things and learning about concepts. I'm not too big on facts and forget the rules but if I have a conceptual framework, I can hang onto that forever.

Expectations to change following program - Yes, with scouts, teaching, continue to look for things, energy flows, distribution of biomass, etc. and I'm sure I'll be more attuned to birds. For example, rather than sitting in a parking lot I'll be looking at birds. I probably won't become more environmentally active because it's almost a religion now.

Instructor role - Spreading enthusiasm for the natural world and awareness of it. Transfer of knowledge and asking questions, provoking thought and trying to show us that man has a role as an active participant in the biosphere.

Environment role - I see this valley as one of the last pristine areas left; roughly pristine area. They're becoming just harder and harder to find. To be able to study nature or wilderness closer to what it's been like after millions of years of evolution. That's part of the reason for a place like this; so you wouldn't have to go clear to northern Alaska where you couldn't get participants. I also thought as I was driving in that it's going to be awfully hard for them to pull in interesting things...
when there's nothing here, for them to do that in an area like this is going to make me much more conscious of more vegetated and inhabited areas, areas with more plant and animal life. I think you're going to be much more appreciative of what's going on there.

**Expectations of environmental quality here** - My definition of quality would be "untouched" and there's obviously lots of signs of man around here. It looks as though nothing's been so disrupted that a lot of the original elements of the ecosystem have been totally lost, a few, but most of them still seem to be here from what I can see. My preference would be for absolutely pristine wilderness; the less man screws it up the better.

**Knowledge increase expectations** - Yes, it already has. I want to learn about the interrelationships of the animals. I would like to see some emphasis on the evolutionary aspects; I'm extremely interested in evolution; I'd like to see it laced among the other topics. It seems like there is a vast store of knowledge in the instructors, but it seems like they back off on some issues they could go into. Maybe they do that because of the limitations of time, but I'd like to see more of it.

**Social Expectations** - It would be worth it to me just to be here to talk to the people; especially knowing that the people here are going to have the same kinds of interests; the same kind of well, I hesitate to call them biases because I view environmental concern as just a sign of intelligence. So I guess intelligent, caring people give me a reason to look forward to being there.

**Conflict Potential** - A little bit. I used to be very obnoxious myself; you know a flaming environmentalist. By being that way you alienate people. Everyone has a sleeping environmentalist in them. I have sympathy and understanding and I continually try to tone down my own views just to talk to people and I find a suprising amount in common with people who are on the surface I would seem not to. I find that a lot of their views are suprisingly close to mine. I think that in a lot of those cases, their thought processes just haven't gone quite far enough. They're going in the right direction, but if they go a little further, they'll come out to a more environmentally oriented outlook. If people start getting alienated and polarized I'm not happy with that. I've read that a lot of the foremost thinkers in international wildlife issues are agreeing that
we've got to solve the problem of feeding and clothing homo sapiens before we start saving rainforest for example. People are going in poaching in wildlife areas in Africa because their families are starving. That's got to be dealt with. You can't just shut them out. You've got to deal with those really human problems before you're going to succeed in the others. Anything short of that is a temporary fix. I hate to compromise on what I feel are our life support systems, but we must make some concessions if we hope to have more people come around. I also think that the question for me 10 years ago was how heavy was environment, how much could it take before being squashed and I've come to think it's a lot harder than I used to think. I know there's some weak links like the ozone layer and nuclear weapons that could set things back a bit, but on the whole I think the earth has an amazing ability to recover which I think some people overrate, but other people underrate. I think we need a more accurate understanding of what the tolerances of it are; I don't think we really understand it yet. I'm not in favor of destroying it and then finding out, but I've seen things grow back, like in the Alta ski area. I saw some pictures from its early mining days a hundred years ago and it was a vast wasteland. But its made a tremendous recovery, inspite of the high elevation. I think that if we can change human attitudes now then we can change things just incredibly.

Other comments - Everybody should be required to take a program like this in their high school days just as a condition for growing up as an adult human being.

Linda - low environment/low outdoor, female, over 35

Personal description - I'm from Colorado. I'm a doctor. I'm married with two kids.

Recreation - For recreation, I play volleyball, softball and play games and spend time with people.

Why enrolled - I've done some backpacking and hiking, but not for quite a while though, and just living in Colorado, I like the outdoors but I've never done anything intensely in the area. I've just had classes here and there. I saw this would be a good way to develop my knowledge and decide if its something I really want to pursue or I'll just do in in a leisurely kind of way.
Past experiences - A friend of mine told me about it. I like to do something every summer that's different. I've taken outdoor courses before, in college.

Relation to job - I take my children out and do a lot of stuff and I think knowing more about it makes it more interesting to share.

Relation to present recreation - I wouldn't say a lot. I think that if I have a better appreciation of it, I'll be more likely to pursue it.

Relation to job in future - No.

Future behavior - I imagine some effects, I have no idea how yet. Just more awareness.

Instructor role - To share their appreciation of nature and to convey that to others and their knowledge. To share themselves.

Role of valley - I don't know. I see it as a pretty typical environment. The same things could be done in any environment.

Environmental quality expected - I haven't really thought about expectations. I'd like some variety and I'd like to get more intensely into it. You know how you walk through an area and you just see what you see, but the more you know the more you know.

Knowledge increase expected - I don't think there's any specific area of interest.

Social expectations - I really enjoy the people; probably more than nature. I like to watch people and where they're from and what they're doing with their lives and how they got to be where they're at. I think people who are into nature are just more unique people.

Conflict potential - No, I like the variety. It allows you to be where you're at.

Cheryl - low environment/high outdoor, female, under 35

Personal description - I live in White Plains New York. I'm an interpreter for the U.N.; mostly conferences in French and Spanish.
Recreation - As much hiking (backpacking) as I get a chance to do on weekends and some photography. And outdoor activities. I started x-c skiing recently, and I do some mushroom picking in the fall. I just like being outdoors and I've spent lots of time there.

Why enrolled - Partly because I've never been to this part of the country before. And partly because I could combine my interest in the outdoors. I'd be learning about the outdoors; I could do some photography here. Also, some of the hiking I do, it's not really in mountains, just hills (older mountains). Here, the mountains are younger and it'll help me understand more of what I'm seeing back home.

Past experiences - This is my second Audubon course. I did field ornithology out in Maine and I found it very well organized and very good so I'm expecting something similar here.

Relation to job - No

Relation to recreation - Definitely.

Future relation - Certainly in future recreation plans. I'll be more observant of what's around me and also I'm getting more and more involved in the outdoors so I need to learn what my impact is. I might at some point want to lead hikes. I do recreational hikes, but I enjoy hikes the most when the leader is pointing out things along the way.

How learn best - I think practical, tactical, experiential as opposed to reading a text.

Future behavior - I don't know. I try right now.

Instructor role - I think the enthusiasm is contagious. Imparting the information that they have.

Environment role - It's the specific environment that we're studying and by studying it we can also apply things we learn here to other environments that we visit. It provides a base to work on.

Environmental quality expected - That it would be much closer to a pristine environment. The population would be very low so there wouldn't be as much human impact as there is in areas back east where I am. I'd love to see a pristine wilderness, but I'm not particularly against human impacts as long as they're well controlled. Back home we have well marked trail systems, and I enjoy that very much and I think its better that that's there.
**Knowledge expectations** - Definitely. I think geology is very interesting, what created these mountains; the rock structure.

**Social expectations** - I thought it would be pretty much what it is. Everyone seems to share common interests so that it makes it very pleasant. And also the fact that you’re having meals together and classes in smaller groups.

**Conflict potential** - I think it’s good to have diversity so I don’t think there’ll be much conflict.

Rick  
- high environment/low outdoor, male, over 35

**Personal description** - I live in Atascadero, California. I live on 3 acres. I teach high school biology and life science. I’m the department chairman for biology and natural science.

**Recreation** - I hike a bit for professional and personal enjoyment. I bird watch. There’s a lot of different environments that I go to, a lot of areas to explore. I bike and jog, garden, do carpentry and try to go out and have a good time socially.

**Why enrolled** - 15 years ago I joined Audubon. Before that I was always a birder, but I frowned upon organized natural history groups. I went to some meetings and I got on the education committee. I got interested in the education program and found out how much more I could learn. I was actually on the committee that chose people for the Audubon Camp for the West 15 years ago, so was aware of it back then. I finally decided to apply for a scholarship.

**Past experiences** - This program specifically. I have a dozen or so friends who’ve attended here and every one was excited about it. I feel I can be self taught, so I may be contradicting myself. I’d been out west of here in the Tetons a number of times and the Winds appealed to me.

**Relation to job** - Definitely, so far I’ve been keeping my notebook for the credit situation and grabbing any handouts I can. It’s changed my philosophy. I’m in a transition in school, I’ve revamped my curriculum and I’ve taught lots already, but I can apply all of the skills I learn to teaching.
Recreation - It expands my knowledge in natural history. Part of my recreation is working at the natural history museum and also leading field trips for Audubon. I feel like I'm growing.

Future relation - I've been influenced by the leaders. Their interpretation techniques. I wouldn't mind finding out about doing a research assistantship out here next summer. I'd like to come back.

Learn best - I'm a slow learner. I learn by my senses, visualizing, sight, smell and repetitions help me alot. Being overwhelmed by a technique or method or story helps me.

Future behavior - I went through a phase. I was conservation chair for awhile and president for 4 years. I was so overwhelmed with everything and for me the two most important things in conservation are actively writing letters and being knowledgeable and aware of conservation.

Instructor role - They're like a leader, most people know where the trail is at. But the instructors are like different paths and as you go down the trail of knowledge, their function is to bring out the awareness and put the dinner on the table and each person can eat as much as they want. They are the transition between a person with intellect and mind and nature, so they facilitate to make it easier for people.

Environment role - Realistically, this could be any habitat. If this was in the desert or the seashore or on a chaperal; if that were an Audubon camp, then those naturalists would pull out all the elements of the ecosystem. Even though a site may not be so profound as this; this is a beautiful site because of the animals and the drainage and the geology and all of the biotic and abiotic factors. Those factors are anywhere else, but this area is significant to influence people, to motivate people. Its next to a wilderness area, it has a lot of advantages. But other sites would have the same thing and some people neglect to see that. An Audubon camp could be in a city park, the same concepts and philosophies could be taught there.

Environmental quality expected - Being a naturalist, I like to see things in a natural state. With little human impact I think we can reach nature more easily that way. If there is human impact, you don't get that true nature experience because its not natural. And so the badlands and glaciers and
upper area in the Fitzpatrick Wilderness and places like that I'm looking forward to. Most places I like to go to are pristine.

**Knowledge expectations** - I know it will. I have a wholistic approach to this program and I can get into any session and enjoy it as much as I can. I'm looking forward to learning more about everything and build up on that.

**Social expectations** - The camp atmosphere is very important. People networking with people with common interests, share something as we're here for the two weeks. I'm going to gain unforgettable friendships and a lot of knowledge and techniques in the subjects taught here.

**Conflict potential** - There shouldn't be any conflict. Each person has his own values and goals. If there are conflicts I think that creates a little better awareness of the Yin and Yang, the black and white, always knowing that there's another side to the story. And each person, if you respect them, hopefully you can influence them. They can present their ideas and you can present yours, maybe they'll change or maybe I'll change.
Audubon Post Interview

Donald

Instructors role taken - Made us aware of relationships of organisms; of plants and animals. They communicated specific knowledge about some of those relationships. Most important, they kept up the enthusiasm for everyone's interest in the whole out-of-doors.

Leadership expectations met - Yes, they were what I expected.

Environmental quality - 6-7 on scale of 10. In Torrey Valley area, there was a fair amount of impact with roads and trails going in to the end of the valley, rocks had been picked over, sulphur dioxide and nitrous oxides were coming in from out of town. Out of this area, e.g., up near Union Pass where we went today, there were cowpies everywhere and there was clearcutting in there. The effects of cattle attracting flies was significant; they were everywhere. The clearcutting is effecting the lake.

Environmental appropriateness - I think it occurred in an appropriate environment. In fact I can't think of one more appropriate because the vegetation isn't so dense as to be overwhelming. It's spread out quite nicely so you get a chance to look at it and see things individually from others whereas in a denser environment it would be harder to sort things out.

Knowledge gain adequacy - Given the people that they had, it was just about perfect. They could have done a bit better if they'd had a bit more rigor in natural coursework; more handouts maybe; more interrogation of the students to keep them on their toes; more guaranteed interaction, but not grades. It would have been helpful to have some handouts given out the night before just to go over for the next day. I think that they all could think of more activities so maybe they would rotate from 20 minutes lecture, 20 minutes hands on instead of looking at notes. Boris did that nicely, others could have done better to keep students engaged more continuously.

Usefulness of learnings - Awareness of details. The particulars that you have to start looking for rather than charging up a mountain. Now I feel it's much more interesting to sit down, to scrutinize the rocks and plants right around me and trying to think about them. An awareness of the
incredible volume in even a seemingly barren stream, the variety of plants there; butterflies in alpine fields and glaciers. Awareness that life is there and you just have to open your eyes to look at it. I thought I had this before but it's deepened considerably.

**Social expectations met** - Definitely enjoyable.

**Conflict** - I would have if there were four in the cabin, but not with two. The breaks after meals was good so you could get away if you wanted to; the time breakdown was impressive.

Linda

**Instructor role** - They were fantastic. The most enjoyable thing for me was just watching these instructors who were obviously so enthused about what they're doing. Even if you didn't enjoy the topic, you were drawn in listening to these people and their life stories.

**Leadership expectations met** - They were very well prepared.

**Environmental quality** - 7, there were people around all the time and cabins and people tramping all over the place. It wasn't pristine wilderness, that's for sure. It's still far from urban. It was about as wilderness as you could get considering there's all these people around.

**Environmental appropriateness** - I think its pretty appropriate.

**Knowledge gain adequacy** - There was plenty of information about the area and life around here. There was more information than I could process. I would have liked a little more about the history because that's my interest. Charlie Beck did a bit, but I could have had more.

**Usefulness of learnings** - Appreciation of the interaction of everything will go with me wherever I go for the rest of my life. The awareness that I've gotten. Your reality changes when you have more of an education. What's one thing now is a lot more, you see a lot more and my awareness changes and I'll convey that with my children. I already spend enough time outdoors but I'll enjoy it more.
Social - There were plenty of opportunities for social interaction. There could have been more playtime, more visiting time. Didn't feel that I could just sit and enjoy because I didn't want to miss anything.

Conflict - I did reach a point where I wanted to be alone. It didn't seem like I could find that opportunity. They said you could just go up on the rock, but even then there were people walking by, watching with their binoculars. I never felt alone and I missed that. Maybe shorter classes would have helped.

Cheryl

Instructor role - They played a very important role. They did exactly what I said earlier that they should do. They provided a lot of motivation; a lot of enthusiasm and shared a lot of information.

Leadership expectations met - Yes. Human ecology was a bit weak. Others were all great.

Environmental quality - Torrey Valley 6 and as we went further away from Torrey Valley, it was getting much closer to wilderness. We were right next to a wilderness area. 7-8 for these areas.

Environment appropriateness - It was held in a perfect environment there were so many habitats here. You're not confined to a small space; you can get out and hike which I think is important if you are going to be in a place for two weeks.

Knowledge gain adequacy - I'm seeing this place in a completely different way from when I first arrived, which is wonderful. I remember one of the instructors saying the first night, "you'll realize you're learning when you start feeling at home here". It really happened. I'm recognizing what I'm seeing, I'm noticing what's growing where and why. It's a great feeling.

Usefulness of learnings - Most useful in terms of recreation. I'll be able to enjoy the outdoors more because I'll be more observant. I'm not sure if I'll become more environmentally active, but I'll use my photography to put together shows to share.

Social expectations met - It was enjoyable.

Conflict - I had time to get away. I had no guilt about getting away.
Instructor role - The instructors were very knowledgeable and their role was to convey the knowledge and to mediate the knowledge and environment to the campers. They would actually go out and interpret the environment.

Leadership expectations met - Quality of instruction was excellent; they overwhelmed me. 80% were very intelligent, well organized, good at communication and conveying the concepts. Maybe the 20% who didn't meet my expectations would be good next year because they needed a little more experience.

Environmental quality - 8 on the whole; the Valley would be less because it was used. To me pristine wilderness would be 10 miles back in. Although it wouldn't be near the trail. Even in that respect, you could walk 10 feet off the trail and it would be pristine also. So its hard to make a good evaluation of all those areas, but generally a 7-8 and maybe a 10 in some of the backcountry areas.

Environmental appropriateness - I mentioned before that I thought any environment would be worthwhile and I still believe that concept. But, after spending two weeks here, this environment had so much to offer; the diversity of plant communities, the geological history, the botanical community, the zoological diversity. I think that being at this elevation and being able to go up the mountain or down the road gave you a great variety of habitats. For people to just get out and walk and reflect on what they learned during the day; there were a lot of places where you could do that.

Knowledge gain adequacy - The instructors were very thorough on the whole. I took all the courses and maybe the botany was weak. The astronomy could probably have been improved and the human ecology was a little weak.

Usefulness of learnings - All the different concepts related to birdwatching; song, identification, behavior, fitness; the riparian study; aquatic insects; pollenization; butterflies and moths, geology; all of these were just excellent. And everytime I took notes, I thought about ideas for how to apply them to school. Environmentally, as an interpreter and a naturalist leading public walks, some of
the instructor's techniques were really good. I gained a lot from their methods. Recreationally, I get out a lot anyway.

Social expectations met - Yes, it was what I expected. The people were wonderful. I hope to continue the friendships I've made here.

Conflict - The first session I cut was today. I didn't have time before that. I sort of like to share nature with one or two people, not dozens, so maybe smaller sessions could have been organized to level of knowledge to eliminate some of the basics.
OUTWARD BOUND

1. Initial Interview

Karen - high outdoor/high environment, female, under 35

**Personal description** - I'm 32, not married and with no kids. I live in Madison, Wisconsin. I have a Masters in Social Work and for the last three years I've worked for a private non-profit alcohol and drug abuse prevention agency. I do training and consultation with people; kids, adults, schools, teachers, college students, the whole range.

**Recreation** - I spend a lot of time socializing with friends when I'm in town. A lot of time I do outdoor things. My normal routine is I bike ride, go to my aerobics class and in the summer I go hiking and camping. I usually take one major trip a year. I was a probation officer and, along with an Outward Bound instructor, I was hired to take delinquent youth out in the woods. Those were three day trips usually, cross-country ski and camping trips all out of Colorado Springs. Then I took one raft trip, a community leaders trip to recruit interest from community agency people. That was ten years ago.

**Why enrolled** - Because I wanted a vacation in the mountains that would be challenging. And I wanted to do something more rigorous than I would do on my own probably. I chose a course because I didn't figure out friends I would do this with. I wanted to meet with people. I'm also always toying with how I might incorporate more outdoor stuff in my career.

**Relation to job** - In the sense that I promote these sorts of things as an alternative to drug use for kids and that in Madison I'm somewhat of a good resource person for outdoor programs in general. I'm actually incorporating these ideas into a curriculum that I'm writing. My masters research was on evaluating Outward Bound.

**Relation to leisure** - It gives me more skill and it's what I like to do best, backpacking.

**Course relation to future** - Yes, it's helping me clarify what I want to do, how I might want to incorporate it into my future. I'm a year or less away from a job change out of drug and alcohol abuse prevention.
Learn best by - I learn best by doing. I learn best by seeing something done and then doing it and talking about it at the same time. I enjoy exchanging ideas; developing and creating ideas rather than being a receptacle.

Expectations to change following program - Yes, I think I'll continue my exercising more consistently. I think that I'll more actively pursue what am I going to do next by talking to people more and getting more information. I've been avoiding that to now, partly because I've been developing my own job and I've been very comfortable with my need to do that. I'm kind of a pusher and now I'm wondering what's next?

Physical risks expected - No, I think its managed pretty well.

Instructor protection from risks - Yes, actually there are real risks but actually the chances of being hurt are remote.

Environmental role - It is a 'reflector'. Its an integral part of the whole experience. I don't think its the same as if I were to do an urban Outward Bound kind of thing. Its the air and the smells and the things you can see that are as important to me as the physical.

Environmental quality expectations - About a 7-8.

Knowledge increase expectations - Not significantly; that hasn't been my experience with Outward Bound before. I didn't expect to learn a lot about the vegetation and wildlife and rocks and stuff.

Desired knowledge - I'd like to learn about the connections. I like things explained in very simplistic non-technical terms. I'd like to learn about how the geography formed, but not the scientific names. I'm more interested in how these things grow together, like why we have this certain plant in this area.

Social expectations - That's one of the surprises for me. I expect to gain insight into myself and to make friends. I expect to gain some challenges to my learning points; things that I need to improve on, for example, impatience.

Conflict potential - Yes, that I won't be liked; that I won't join in; that I won't get enough time alone.
Gerry - low outdoor/low environment, male, over 35

**Personal description** - I'm from Fort Wayne, Indiana. I'm part owner of an office supply business.

**Leisure** - For fun I've always been a sports minded individual. I do lots of weight training, triathlons, biking, volleyball; I used to be a competitive tennis player.

**Why enrolled** - I heard about the program a number of years ago. This program intrigued me because I had never had this kind of experience before. I'd been rafting and canoeing and that kind of thing. I also wanted to see what Colorado looked like.

**Past experiences** - One of the reasons I chose it was because I looked at it as a physical and mental challenge. I've done other things that have been a challenge to me; I did a marathon earlier this year and I've done triathlons. I like that challenge.

**Relation to job** - I think it will. It will help me learn more about working with people. I mean, here we are, thrown together with strangers and we have to learn to work together.

**Relation to recreation** - No.

**Future relation** - I think it will. This kind of thing isn't like being on a cruise or something. It's a really neat feeling being out in nature and I think I'm going to do more of this kind of thing.

**Learn best by** - Probably by doing. I've self taught myself to do lots of things. I have an old house I own and I've learned how to do a lot: roofing, siding, electrical. Sometimes I get some help, but I really like to just get in there and do it.

**Expected behavior changes** - It's hard to answer now.

**Instructor role** - Primarily as a teacher. I haven't done many of these things before.

**Risks expected** - When I signed up I expected a certain amount of risk; exactly how much I don't know.

**Instructor role in safety** - Yes, they should make it as safe as possible, doing everything they can to limit the risks.

**Environment role** - One of being a teacher also; learning how to live in this environment and how to appreciate it.
Environmental quality expected - I expect a 10, from what I'm used to in Indiana.

Knowledge increase expected - Yes, since I knew nothing coming into it I expect to learn a few things.

Knowledge desired - Basically, how to survive. I would like to learn enough to feel comfortable enough to do this again. Environmentally, I would like to gain some general knowledge about things that occur at different heights, ecosystems and things like that.

Social expectations - A lot of times in our normal lives we pigeon hole people, judge them by their job or whatever it is that they are. I hope this will give me new insight to do it on a different level.

Conflict potential - No.

Jane - low environment/high outdoor, female, over 35

Personal description - I live in Denver, Colorado and I sell computer software. I travel a lot around the states through my job. I’ve been divorced about 10 years and I have two kids, grown up.

Leisure - My house is what I play with most. I like to remodel. I read a lot; don’t watch much T.V.

Why enrolled - About 15 years ago my nephew came out and took the course and I thought it was neat. I always felt that you could learn to understand how far you can go and that that was important in starting a young person off in their life quest. There’s a lot of things we have to do that require reaching limits and if we can push those limits back I think that’s real good. The same thing applies to me. When I moved to Denver, I wanted my own son to take the course so I picked up the literature and information and as I was reading through it I saw this ten day course and thought it would be good for me. I wanted to expand myself.

Past experiences - I’ve done some camping. I grew up in a family that was outside a lot although we didn’t camp a lot. We did a lot of water skiing and we stayed on the river a lot. I don’t think I’ve ever backpacked before.

Relation to job - No

Relation to recreation - No
Future relation - I think every time you expand yourself, it helps you. Maybe the stick-to-itiveness, teamwork, learning personalities and your own patience for them. There are things you've become intolerant of and things others are intolerant of and you work them out and I think that helps you in your work situation. Recreationally, I've always wanted to do more hiking and backpacking and I have lots of plans to do cross-country skiing.

Learn best by - I have a lot of ways of learning. I'm a feeling sort of person. I learn in wholes; if I get the whole picture I can remember it and do things with it. I'm not good at remembering detail.

Expected behavior change - No, I expect to expand it but I've always been one to push my limits.

Instructor role - I would like to see the instructor educate, laying things out so we understand them and then letting us execute them. I don't want the instructor doing things for me, but making clear what he's going to do and making clear what kinds of situations we can run into that we need to avoid.

Risks expected - If you term real by logical, then no because I have faith in the program and that's one of the reasons I was able to come.

Instructor role in safety - I sure do. He's the one I'm trusting and he needs to know what is happening. I'll take responsibility for myself, for using caution and trying to understand a dangerous situation, but it's up to him to keep me out of the things I don't understand.

Environmental role - It's the setting; the vehicle with which we are using to express this teamwork. I expect it to be beautiful. I expect it to be dangerous. I expect it to be awesome. I expect it to be quiet. I expect it to be grounding; calming.

Environmental quality expected - I wouldn't be here if I wasn't looking forward to the pristine environment, to the cleanliness. I think there are some things to learn about appreciating the urban environment too. Here, it's cleanliness and having it isolated that is important to me. I think that getting away from the city is important to me. I want a 10.

Knowledge increase expected - Definitely.
Knowledge desired - I like to learn everything. I want to know how the mountains got there. I'd like to know about the flowers and the birds and the animals. Maybe the most interesting to me is the techniques for survival; what kinds of things you can eat; what kinds of places make good campsites.

Social expectations - I figure I'll get close to people because it's unavoidable when you share experiences with them.

Conflict potential - No

Other - I don’t mind pushing my limits but I don't want to push to the point where I'm hurting my body. I think I can push my limits without wiping myself out.

Mitch - high environment/low outdoor, male, under 35

Personal description - I'm from New Orleans. I'm a medical student. I am only a couple of courses short of my masters degree in biology, but I probably won't finish it.

Leisure - I like to spend time with my family and friends. Probably hourswise, I spend more time playing soccer than anything else.

Why enrolled - I've been interested in spending time in the mountains for a vacation. I've spent a lot of summers up in North Carolina and I enjoyed it. I've been wanting to get back into the mountains; it's been years. I wanted to think of something that would get me into the mountains and give me a good physical and mental challenge and it was all going to have to fit into the small gap I had for a vacation. Outward Bound came up in conversation with a friend.

Past experiences - Time in the mountains in North Carolina; summer camp where I got a little exposure to hiking and rock climbing. At the same time I went to school in Virginia in the mountains. I get a kick out of seeing mountains on the horizon and to be in the middle of them is a real thrill.

Relation to job - No

Relation to recreation - No
Future relation - Not directly. Indirectly in terms of spiritual development, having the self-confidence and mental stamina to overcome obstacles it will be a big help.

Learn best by - Depends on type of learning. Book leaning by studying my ass off. Out here by asking questions. I have an active curiosity and I like to soak up as much as I can. The second step is that I have to have hands on experience. In one of my medical books, there's a quote that says, "you watch one, you do one, you teach one" and that hands on emphasis is the same in this sort of program.

Risks expected - Sure, rock climbing has a certain amount or risk involved. The risk is well-contained by the instructors and experienced people and also by the attitude of the people involved, but we are involved in some risky activities.

Instructor role in safety - Yes, in this sort of introductory course. It's a judgment call as to where you draw the line between risk and real risk. There are some risks that we could conceivably expose ourselves that we shouldn't, for example exposure up high on a mountain. On the other hand, if we don't undertake some risks we lose part of what the program is about.

Environment role - It represents a certain grounding for me. It puts me back in touch with a side of myself that I think has a bigger perspective on life and on the world. It's something that is very hard to come by in the day to day rat race urban kind of setting, especially while in pursuit of a professional career. You have to jump through the hoops of fire all the time, one after the other. And you don't, unless you really make a special effort, keep track of our position in the world and as a part of nature. You lose our position in the environment unless you actively expose yourself to it at times.

Environmental quality expected - 8 and 1/2 to 9. I think we're going to get into an area that's about as pristine as you can get with a couple of days of amateur hiking and with heavy packs. For all practical purposes, we're in as remote an area as we can get to given all the other things we're trying to incorporate into the program.
Knowledge increase expected - Yes, part of the increase in knowledge will come from the teaching that gets done; the standard information that is passed from instructors to students. But, with my active curiosity, I hope to learn more than that.

Knowledge desired - Top of the list for me would be outdoor skills so I can go and experience the outdoors myself with good common sense and good ecological conservation practices. And secondly, more of the things along the line of understanding the environment; some of the basics like understanding the trees and understanding ecosystems I'm interested in the ecology because I'd like to have a much better appreciation for it.

Social expectations - I think an emphasis on teamwork. I'm trusting people I've never met before. I'm putting my life in their hands and they're putting theirs in mine for at least moments at a time, for example rock climbing. I think having everyone in an unusual experience which you share, that with the right attitude we can open up to a group of relative strangers and talk to them more openly and perhaps better than we can with people we've known for years.

Conflict potential - No. Only if several members were selfish, but we don't have that problem in this group.
Outward Bound Post Interview

Karen

Instructor role - Teacher and option giver. I mean that in ways other than the skills we’re doing now. His numerous talkings on world affairs has given me a lot of things to think about, careerwise and in terms of lifestyle options. He was a provoker, provoking feelings.

Expectations of instructor met - At the beginning, he went over skills to be taught very quickly and not very methodically. We got some double messages, like in rock climbing, and he could have been more methodical and organized in teaching the skills.

Safety rating - 8. Some real risk in rock climbing when people not really prepared to belay us, but it worked.

Environmental quality rating - 8.

Environmental appropriateness - Yes, it was appropriate. A couple of the camps weren’t really good. We’ve been a little sloppy in the group campsites we’ve been in.

Adequacy of knowledge gained - I learned as much as I expected although at times I found myself too far back in the line to hear what was being said, so I missed things. Or I was thinking about something else so I wasn’t listening to something said about the environment, which I was disappointed about.

Usefulness of learnings - The whole connectedness idea and the concepts of ecology; just looking at things in a new way and learning about different environmental efforts in terms of organizations; the things that people do. Especially what Rob was saying; some of that history helps me put a perspective on how I might involve myself; that I don’t need to go join Sierra Club to do it, but that there are a lot of other options to become more involved. I think that I will; it’s been on my agenda and it’s interesting that this came along to give me the options. I think I’ll get actively involved in some issues now.

Changes in attitude to mountain wilderness - It’s a less scary environment to me. I didn’t think I’d really enjoy going up on the snow and doing all that stuff and I really started thinking that “this isn’t
so unattainable”. It gave me a more methodical view at how I could live out here and things I can do. I could go out on my own now and not wreck the wilderness and know how to take care of myself. That feels really good because I’d thought about going out on my own or with some friends and decided no, that I didn’t really have my skills together, but now I do.

**Future behavior affected** - I think I’m a more energetic person, but it’s easy for me to be influenced by people who want me to do something mild or passive for entertainment and I’m always kind of laying back. I think I’m going to choose my friendships more carefully so I can be with people who want to be more active. I need both kinds of friends, but I need a few more who are more adventurous.

**Social expectations met** - Very enjoyable.

**Conflict** - Some. I went through periods of feeling like I was a dull, boring person because I was feeling quiet a lot of the time. At other times, I didn’t know a lot about some of the issues that were talked about. That’s stressful for me because I want to be interesting. Some conflicts arose surrounding the levels of sharing of other people and how committed I was to processing. At times I was right in there and at other times I wasn’t. I’m not out here to have therapy and at times that was stressful.

**Instructor improvements** - I thought he did an excellent job. Being adults, I think that’s our job. If we were younger, a teen group, then I think he’d have a bigger responsibility for guiding the group. The balance on the whole was totally enjoyable.

**Other** - I thought we could have had more feedback on our leadership style. Only the first few leaders got any and then we seemed to get too busy. I think it was very helpful to structure in time to give and get feedback on leadership styles.

Gerry

**Instructor role** - At the beginning he was more of a teacher. As the course progressed, he became more of a group member.
Leadership expectations met - Yes. I was hoping it wouldn't be a really formal teaching situation and it wasn't like that.

Safety rating - 9. There were some risks when we climbed up Snowmass Mountain, but I wasn't really scared; they didn't really bother me.

Environmental rating - 10.

Environmental appropriateness - Definitely an appropriate environment.

Adequacy of knowledge gained - Being a 10 day intensive course, I think we learned about as much as we could. I think that if you went on a longer course, say a 23 day course, you could learn a little more about nature; about plants and flowers and trees and that sort of thing.

Usefulness of learnings - Gaining a greater appreciation of how all the different ecosystems work together and we have to keep everything in equilibrium. If we destroy one part, then everything gets out of balance.

Changes in attitude to mountain wilderness - Definitely. This was my first time really being in the mountains. Before, they were always somewhere out there and I was on the flatlands. I have that appreciation for nature and for God's world.

Future behavior affected - I think the biggest way will be how we interacted as a group. We're out of our normal roles and we judge people differently, rather than where they are, what they do for a living or how much money they make. I feel like I will be a little more insightful rather than just looking at things on the surface.

Social expectations met - Yes

Conflict - No.

Instructor improvements - No

Other - I highly recommend this course. I will take another one sometime.
Jane

Instructor role - He was a teacher, guide and counsellor. He tended to interfere a lot. He had difficulty explaining our options and letting us make the decision. He tended to word things in such a way that there was only one way to do it instead of letting the group's dynamics take over. I think he dominated conversations.

Leadership expectations met - Yes, I felt that he was competent. I felt secure with him. He did all of the roles well. He was knowledgeable.

Safety rating - 8. Coming off Snowmass, my legs were too tired to go down the hill as fast as I was being asked to go down and that concerned me.

Environmental rating - 8. I'm surprised the wilderness has as much people activity. I didn't realize that this sort of wilderness would have so many people. This detracted some from my experience.

Environmental appropriateness - Very appropriate

Adequacy of knowledge gained - About what I expected.

Useful learning - I developed a higher comfort zone in the mountains. I don't know that I learned anything new.

Changes in attitude to mountain wilderness - Not about the mountain environment; I love it.

Future behavior affected - I learned a lot about my physical strengths. I'm not as scared of being cold as I was. I was scared to death of being cold. I think I learned confidence that will extend into my business world. Specifically, I have more courage to do the remodelling I want to do on my house inspite of other people's protests.

Social expectations met - Yes

Conflict - Yes, I got really tired of listening to Sam talk. It got so I just wanted to get away. There was actually less stress than I expected.

Instructor improvements - No

Other - We should have been given more direction in packing our backpacks. There should be more concern to the amount an individual is carrying for their size and condition. I think it's totally
unnecessary and probably not even very smart to stress our physical limits the way we did with the weight. More basic knowledge about how much food we needed could have helped. We took too much food and overburdened ourselves. I felt more rushed and pushed with no control over it here than I did back home. Rushing from place to place is what we do in our everyday world and I didn't want to do that here. I did basically enjoy the course though.

Mitch

**Instructor role** - He acted as a guide as much as an instructor. He instructed us in some basic skills and at the same time guided us into some different activities, into certain group interactions, sort of acting as a catalyst for certain group interactions that took a life of their own.

**Leadership expectations met** - The only thing I would have done differently would have been a bit more teaching; a little more emphasis on concrete skills. On the other hand, the less tangible kind of leadership role that he played he did much better than I would have expected. He stimulated social interaction; he was a good listener; he included those in the conversation who seemed to be on the outside. Those are more difficult kinds of leadership roles and I thought he did those much better than I would have expected.

**Safety rating** - 9. Perhaps climbing the peak of Snowmass, but there was nothing the instructor could have done. It just happened to be a risky situation.

**Environmental quality** -8

**Environmental appropriateness** - It was appropriate.

**Adequacy of knowledge gained** - I learned about as much as I expected to. In conversations among Sam and Rob a lot of topics were covered that I wasn't expecting that I enjoyed learning about. Even if I would have written up an expected agenda of the ecological topics that I thought might be covered, it would have just been speculation. So, I felt I learned a lot.

**Usefulness of learnings** - Unless I shift my career emphasis to include environmental medicine, there won't be any direct application. As far as recreation goes, I'll have gained some insight and
some information and some skills related to spending time outdoors that will let me get more out of the trips I might take in the future.

Changes in attitude to mountain wilderness - My appreciation and understanding the importance of mountain wilderness is much more heartfelt than it was before. There was sort of a seed of that within me and it's greatly intensified over the trip.

Future behavior - I'd like to be more involved in environmental issues. I haven't been very involved in them in the past and I'd like to change that. I want to keep an open mind about diversifying my career to including some aspect of environmental medicine. And I think that I'll put as a much higher priority getting out in the wilderness and enjoying it for fun.

Social expectations met - Very, extremely.

Conflict - Only minimally and less than I would have expected. I think that has everything to do with the group that formed this particular patrol. Given almost any other group or patrol there might have been more interpersonal stress just because of the luck of the draw. We happen to have been real lucky in this group.

Instructor improvements - Possibly to do more along the lines of formal exercises in group interaction. For example, a friend of mine went on a longer Outward Bound course and said that they spent a lot of time doing group trust exercises, which sounded very interesting. Things along those lines. A little more along the lines of the first exercise we did where we had to get to know someone other than by occupation. A little more of that might have added some spice. On the other hand there was more social interaction and stimulation from the instructor on an informal basis than I would have expected and I found that most enjoyable. And so, all things considered, the learning that I've done and the social interaction that I've been a part of have been a good bit better than I'd expected, including the instructor.
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