OUTWARD BOUND INSTRUCTOR'S KNOWLEDGE OF BASIC ECOLOGY, MINIMAL IMPACT, AND WILDERNESS ISSUES

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Chapter 1

Introduction

Over the last twenty years the field of outdoor education has been divided into many separate parts. This is not and should not be disconcerting, because with the development of any field a certain amount of specialization is necessary. In the past, an outdoor education professional may have considered him/herself part outdoor skills instructor, part naturalist, part environmental/ conservation educator, and part interpreter of natural and cultural history (Hopkins, 1983). Though the roles of an outdoor education professional remain essentially the same today, the variety of outdoor programs places emphasis on one or several specific attributes or skills.

Outward Bound strives to develop individuals in a variety of challenging natural environments. In order to be successful the student must learn outdoor skills, understand and appreciate the environment they are in, and develop the ability to work within a group. The various Outward Bound schools have begun to specialize their curricula. Each school has its strong points and areas of emphasis. Predominantly the programs work in our nation's wildland resources. The delivery of the curriculum while under the umbrella of the respective program's purpose and goals lies in the ability of the outdoor instructors to pass the neccessary knowledge to the students or participants. For instance, the technical skills that are taught between schools vary based on location and include canoeing, sailing, backpacking, or mountaineering. In each course curriculum there are fundamentals of Outward Bound instruction. Some of these are: Outward Bound

history/philosophy/ process, inter/ intrapersonal skills, natural history and environmental education, leadership training, safety, camping skills, wilderness travel, rock climbing, white water paddling, a solo experience, and a service component.

The North Carolina Outward Bound School (NCOBS) has four basic principles that are stressed throughout the course. These principles are the foundation of the program and hence are referred to as the Four Pillars. The Four Pillars are Self Reliance, Physical Fitness, Craftsmanship, and above all else Compassion. The Pillars are typically viewed in a circle so that the idea of Compassion, the most important pillar is at the top. These pillars assist instructors in engaging students in the process of discovering, understanding and caring about the environment in which they travel (Caughron, 1998). In the context of environmental education,

> Outward Bound fosters the following essential aspects of citizenship in relation to the environment and the conservation of natural resources: making informed choices, taking action and accepting responsibility (Caughron, p.287, 1998).

In recent years, the Pillars of Leadership and Wilderness have been suggested for addition.

In a typical 28 day course the students receive over a hundred hours of instruction. This is an enormous amount of teaching time and there are many things that must be taught. Instructors must be capable of teaching a wide variety of activities and do not have equal ability in all areas. NCOBS instructors can specialize in skill activities, group dynamics, challenge course work, rock climbing, white water paddling, nature interpretation and environmental ethics. Each of these areas requires specific skills and knowledge.

Despite differences in expertise and/or personal interests, one factor ties all those activities together: that is the outdoor environment. Some instructors and programs do not specifically teach about the environment. This may be due to the assumption that living and learning in a natural resource is learning enough.

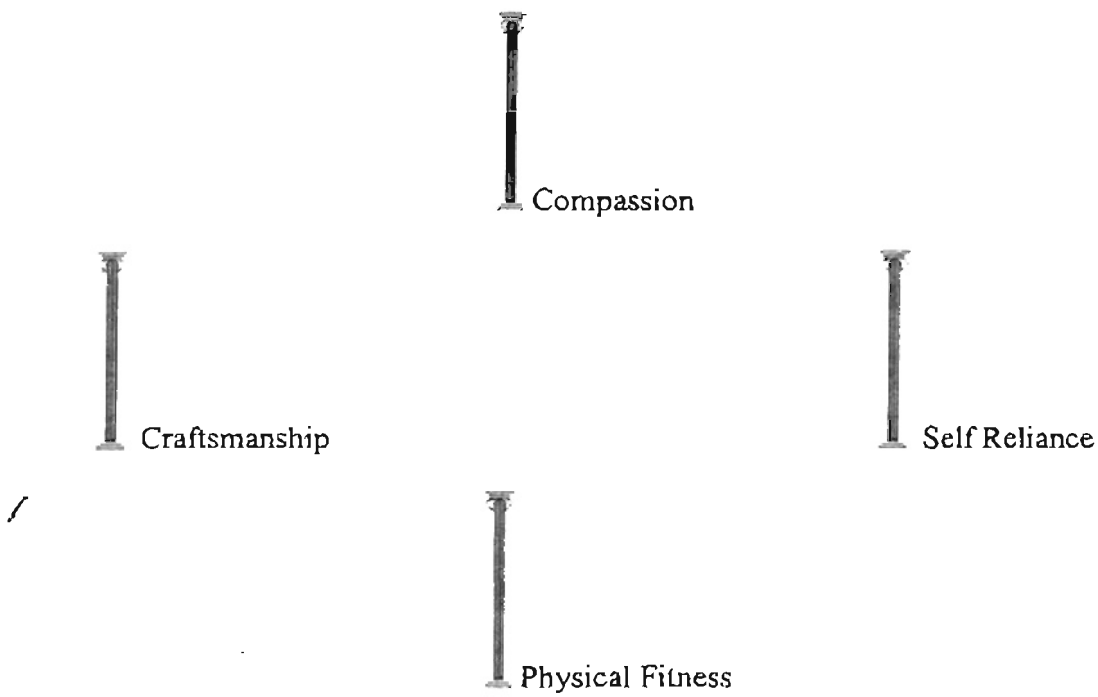

Figure 1. The Four Pillars of the North Carolina Outward Bound School.

This study seeks to gain a more thorough understanding of the knowledge base of North Carolina Outward Bound instructors in ecology, minimal impact, and wilderness issues. Like the skills mentioned in the previously, the areas of ecology, minimal impact, and wilderness require a specific knowledge base and attitude of importance. It is within the concepts of ecology that people learn how they relate to the natural environment around them. With the skills related to minimal impact instructors attempt to develop attitudes and conservative practices in their students. Without understanding wildland

federal designations, history, and current management issues students cannot appreciate the areas through which they travel. NCOBS specifically refers to this component as natural history and environmental education, however they also appear in other curriculum topics such as wilderness travel, low impact camping, sanitation, and natural history.

The idea of minimal impact by outdoor recreationists is not a new idea, but it is a continually developing one. In its essence it is an ethic about how to live in the backcountry without harming it and, thus, saving it for future trips and generations. In *Soft Paths*, Hampton and Cole (1995) write, "The underlying premise of this book is a belief that most damage to wildlands is the result of lack of education, not malice" (p. 3). Indeed, minimal impact practices and the resulting organization known as "Leave No Trace" is an effort to create wildland ethics and practices for its users. It is the responsibility of outdoor instructors to commit their knowledge to teaching this ethic to their students so the students can learn, think and commit their knowledge to action (Hampton and Cole, 1995). Minimal impact practices provide outdoor instructors with a framework for moving through our wilderness and wildlands while tending and caring for them, but more importantly it points to a larger relationship between the wilderness user and the land.

Ecology can be defined as, "the study of the relations of organisms or groups of organisms to their environment, or the science of the interrelations between living organisms and their environment" (Odum, 1971, p. 3). The key point from this definition that is applicable to this study is the relationship to our environment. Of particular interest and in the modern perspective, ecology is viewed as the structure and function of

nature, understanding that humankind is part of nature (Odum, 1971). Ecology is in essence a part of the interpersonal and intrapersonal education that happens in the outdoor classroom. Education is the key process of turning knowledge to action and there is not a better place for teaching the fundamentals of ecology than the outdoor classroom.

In the United States there is a unique way of looking at and understanding land. The wilderness is indeed a very American idea. Roderick Nash (1982) believes that the American interest in preserving these lands was so that the young country had a distinctive quality apart from the Old World. The country had yet to contribute artistic and literary works. It had no monuments from days long ago, but it did have wilderness and there was no European counterpart (Hendee, Stankey, and Lucas 1990). In order to save that legacy of wilderness that the environmental philosophers have provided for, outdoor leaders must educate the citizens about wilderness, the national forests, and the greater outdoors.

Understanding the outdoor classroom in the sense of communities (ecology), preservation of the land through minimal impact practices, and the issues of wilderness management are key parts to a new understanding of the human relationship with earth.

PURPOSE

This research is being done to determine the knowledge base of North Carolina Outward Bound instructors in relation to ecology, minimal impact, and wilderness issues. It will aid in the understanding of who the instructors are and their knowledge base. The instructors' knowledge base will become the foundation of a NCOBS student's future attitude and actions.

STATEMENT OF THE PROBLEM

The focus of the research is to:

1. Determine the sociodemographic and past experience similarities and differences between outdoor instructors in Outward Bound.
2. Assess the basic ecological knowledge of outdoor instructors in Outward Bound.
3. Assess the minimal impact backcountry knowledge of outdoor instructors in Outward Bound.
4. Assess the Wilderness issues knowledge of Outward Bound instructors.

SIGNIFICANCE

This study is significant to the field of outdoor education for these reasons:

1. This research seeks to determine if instructors at NCOBS have the knowledge of ecology, minimal impact, and wilderness issues.
2. If NCOBS wants to continue to operate in the outdoor classroom then it has a responsibility to educate participants and inspire them with knowledge to protect the American public lands.

DELIMITATIONS

This research is delimited to:

1. North Carolina Outward Bound staff working and training for the summer 2002 season.

LIMITATIONS

This study is limited by the following factors:

1. The instructors selected to take the survey will be on a voluntary basis.

2. The school will have different content, practices, approaches, and differing instructor experience in regards to time with students in the back country.
3. The researcher will not be available at each base camp during the time the survey is to be completed.

ASSUMPTIONS

The assumptions of this study are:

1. All subjects will complete the test to the best of their ability.
2. All subjects completed the sociodemographic questionnaires honestly and completely.
3. The three testing instruments are reliable and valid measures of the outdoor professional's knowledge and issues.
4. The school selected is representative of highly trained outdoor educators with extensive field experience.
5. The sample of outdoor educators is representative of the entire population of educators who work in the outdoors.

RESEARCH QUESTIONS

The following research questions are posed:

1. What is the mean Outward Bound instructor's knowledge of ecology and minimal impact?
2. Are there any sociodemographic data that are related to Outward Bound instructor's knowledge of wilderness issues?
3. For an Outward Bound instructor, does more experience in the field correlate to a higher test score in ecological knowledge and minimal impact?

4. Do the ecological and minimal impact test scores directly correlate with wilderness issues scores?

HYPOTHESES

The null hypotheses of this study are:

1. There are no differences in the mean scores of Outward Bound instructors for Basic Ecology and Minimal Impact in regards to high, medium, and low field experience.

2. There are no significant correlations between Wilderness Issues scores and the level of field experience represented by high, medium, and low.

3. The sociodemographic data when cross-tabulated with instructor experience and instructor test scores yields no significant correlations.

4. The mean score of ecological and minimal impact tests show no correlation with wilderness issues scores.

DEFINITION OF TERMS

For the purpose of this research the following definitions have been adopted:

Adventure Education- Adventure education involves educational endeavors, which use outdoor pursuits such as backpacking, whitewater paddling, rock climbing, and sea kayaking to teach individuals about interpersonal and intrapersonal relationships. (Hanna, 1988) Interpersonal relationships are how one relates, communicates, and leads within a group of peers. Intrapersonal relationships are how one relates to themselves via the ideas of self-concept, perceived competence, and self-determination. Adventure education contains elements of real danger (risk), in which the educational outcomes, while often uncertain, are contingent on the actions of the participant interacting with circumstances. (Ewert, 1985)

Ecology- Refers to the whole environmental house in which we live and impact. There is a fundamental assumption here that humankind is a part of nature and though limited to the environmental feedback of it, consequently the actions of humankind have profound consequences on the communities in our ecosystem. As Odum (1971) states, "the study of the relations of organisms or groups of organisms to their environment, or the science of the interrelations between living organisms and their environment"(p.3).

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 (Hanna, p. 9, 1988)

Field- Refers to the classroom in which outdoor educators teach. Depending on the setting, it could mean national forests, Wilderness and public lands.

Professional Outdoor Instructor- Outdoor instructors working in a wild land environment for more than 30 days a year. Outdoor leader, educator, and instructor will be used throughout the research paper in conjunction with this definition.

Outdoor Education – 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). Outdoor education will be considered an umbrella term which will include all types of adventure and environmental education programs (Hanna 1988).

Land Ethic In an essay titled as "The Upshot", Aldo Leopold began the literary development of a land ethic. He was mostly concerned with land ethic in regards to farmers, but in the 21st Century his idea of land ethic is applicable to the work of outdoor educators in the education of our environments and the preservation of our wilderness. Leopold (1966) writes,

> A land ethic, then, reflects the existence of an ecological conscience, and this in turn reflects a conviction of individual responsibility for the health of the land. Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity (p.258).

Land ethic is about developing a conscious community of *Homo sapiens.*

Minimal Impact- "Minimum impact backcountry use is a hands-on, practical approach to caring about both the land and the people who share its richness. Its success hinges on the willingness of the individual user to learn, to think, and then to commit knowledge to action. The resulting techniques are flexible and tempered by judgment and experience. They depend more on attitude and awareness than on rules and regulations. Individuals and organizations must care enough about the land to be willing to change our techniques and attitudes about what is appropriate behavior in the outdoors (Hampton and Cole, 1995, p.3-4).

Wilderness - 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. Though this is the working definition of federal Wilderness for the purpose of this study wilderness will encompass a much broader outlook as well. It will also be considered the classroom through which outdoor educators teach. The context of the

word wilderness in this study refers to the wild lands in our National Parks and Forests, federally designated Wilderness, and other large tracts of land that are remaining in their natural state

Chapter 2

Review of Related Literature

The literature related to outdoor leaders knowledge of basic ecological, minimal impact, and wilderness issues are reported in this chapter. The key aspects of this study originated from Hanna's (1988) research on the theory of reasoned wilderness behavior model and her suggestions for future research about outdoor leaders. An overview of other findings from research about environmental beliefs, attitudes, and intentions is also provided. A distinguishable part of this research involves the use of wilderness. Literature was reviewed concerning past studies of Outward Bound and the most common attributes of outdoor leaders.

THEORY OF REASONED WILDERNESS BEHAVIOR

Hanna (1988) conducted a longitudinal study that sought to find relationships of Reasoned Wilderness Behavior by testing knowledge, attitudes, intentions, and behavior of participants of the Audubon Field Institute and the Colorado Outward Bound School. She based her model of reasoned wilderness behavior on the initial research of Fishbein and Ajzen (1975) about attitudes, beliefs, and intentions of human behavior. They developed a model of reasoned behavior to explain the causal links between attitude and behavior (Fishbein and Ajzen, 1975). This model is illustrated in Figure 2. Fishbein and

Ajzen's work has been applied to many leisure contexts and to adventure education. Iso-Ahola (1980) investigated how leisure influences behavior. Ewert (1989) applied the theory to adventure education by creating a model looking at risk motivation, social orientation, and locus of control. The theory of reasoned behavior emerged as a theme in the meta-analysis of research related to environmental education conducted by Hines, Hungerford, and Tomera (1987).

According to Hanna (1988), the model of Reasoned Wilderness Behavior shows that factors such as demographics and past experiences in wilderness combine with an individual's knowledge of the environment and predict how that individual interacts with

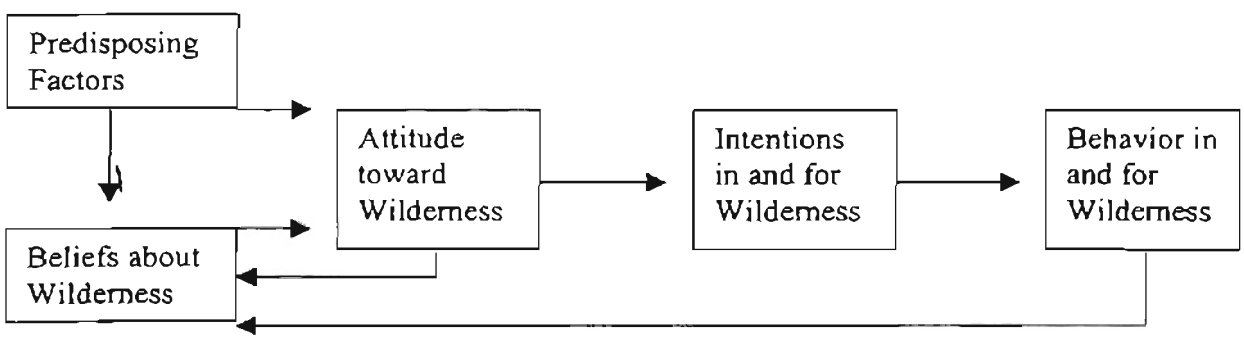

Figure 2: Conceptual Model of Reasoned Wilderness Behavior

it. The synthesis of Hanna's subjects attitudes and knowledge lead to the formation of intentions concerning outdoor recreation/ education and environmental involvement and it is these intentions that manifest themselves into specific behaviors for wilderness (Hanna, 1988).

Hanna's (1988) results revealed some interesting information. She found that participants wanted an introduction to the basic ecological concepts and recommended that outdoor leaders consider doing so in their orientation. Her results indicated that many of the participants would continue to be involved in wilderness and outdoor

excursions. Because of this continued involvement, she recommended that outdoor instructors take the responsibility of educating their participants in minimal impact practices. Furthermore, place-based education, such as explanation of history and philosophy of wilderness, should be included in the curricula, as well as, discussions of current environmental issues and how participants might become involved will be critical in creating intentions that will promote positive wilderness behavior.

Hanna states,

> "Outdoor leaders themselves must have a basic working knowledge of ecological concepts, current minimal-impact technology, wilderness-related history and philosophy, and environmental issues. They not only must be taught the relevant facts, concepts and skills, they must be trained in effective and efficient processes for delivering these messages in a manner that adds to the overall program experience (1995)."

Hanna's model as applied to outdoor leaders to determine their knowledge base may provide another piece of the picture in the delivery of pro-environmental behavior.

LEISURE THEORIES ABOUT RECREATION EXPERIENCES

Mannel and Kleiber (1997) believe that some recreation activities may continue to be enjoyed throughout the entire life of an individual based on the current research studying the transition from adolescence to adulthood. Mannel and Kleiber assert that there is a lack of research of this transition, in the research that has been done; outdoor activities in particular seem to continue into adulthood.

Bradshaw and Jackson (1979) estimated that about 80% of adults who enjoyed outdoor recreation in their childhood still participate as adults. Their study surveyed 199

eleventh graders and specifically looked at what age leisure activities were introduced and by whom. Significant relationships where found to exist between age of introduction and the frequency of participation.

McGuire, Dottavio, and O'Leary (1987) analyzed data from the Nationwide Recreation Survey to determine if there were differences in late life recreation and to reflect if it was a response from early life leisure patterns. Expander and contractors were analyzed in two groups. Expanders are people who altered their leisure patterns by addition of new outdoor activities and contractors had learned most of their outdoor recreation activities before the age of 21. Stebbin's (1992) took this one step further and stated that yet some of these childhood and lifelong activities may lead to careers in leisure services.

Iso-Ahola, Jackson, and Dunn in their 1994 study on leisure activities over a life span found that the starting of physically demanding and outside the home activities goes down with advancing life stages. However, this not true for outdoor recreation which showed a steady increase through the life span supporting McGuire's (etc.al., 1987) ideas that outdoor recreation is continued throughout the life stages.

ENVIRONMENTAL ATTITUDES, BELIEFS, INTENTIONS, AND BEHAVIORS

Place's (2000) study on the impact of early-life outdoor experiences on environmental attitudes found the most significant variables affecting pro- environmental attitudes were early-life outdoors experiences with family. He based his study on the factors that seemed to affect five historical figures (John Muir, Aldo Leopold, Rachel Carson, Theodore Roosevelt, and Henry David Thoreau) and ten contemporary individuals to become active in the conservation and environmental movements. He

surveyed over 500 students at Indiana University and classified individuals as either eco-centric or anthropocentric. Place (2000) suggested that another way a positive impact could be made on participants was through the use of more family oriented programming.

Schroeter (2000) suggested there is a need for adventure education based programs to incorporate environmental objectives beyond Leave No Trace into programming. She states, " ...findings illustrate to staff/program developers the value of including more extensive environmental ethics, but that they must be incorporated in a training model deliberately and with great care and planning (p.3, 2000)." She showed that the most effective method of programming in her study was spreading interpretation frequently and in small doses throughout the program. The participants involved in her test reported an increase awareness of place. "Trip leader background, group role, and program goals also were found to be significant (Schroeter, p.3, 2000)."

Yerkes and Haras (1997) analyzed several environmental outcome studies on knowledge and attitude. They related a study by Matthews and Riley (1995) that use the knowledge-attitude-behavior change model to see if an increase in knowledge will lead to a change in attitude, which in turn influences behavior. Many studies have been conducted in this manner and have found positive change, though the link between outdoor education and development of positive environmental attitudes and responsibility was found to be weak (Yerkes and Haras 1997).

Gillet, Thomas, Skok and McLaughlin (1991) sought to determine the effect of a six-day wilderness experience on self-concept and the knowledge of and attitude toward the environment in sixty-one twelfth grade students. The focus of their study was more

related to self-concept and self-esteem, but there was a noteworthy increase in scores of the student's environmental knowledge as a result of the six-day wilderness trip.

ECOLOGY, MINIMAL IMPACT, AND APSECTS OF WILDERNESS

Odum (1971) wrote one of the first books used as an introduction to the field of ecology. It is still referred to often today and generally has a very scientific approach to the explanations of the field of ecology. For Odum, an ecosystem referred to the whole environmental house in which living beings live and work. In its very essence for humans it extended beyond our present ecosystem and included the Earth as a whole. Odum (1971) defined ecology as, "the study of the relations of organisms or groups of organisms to their environment, or the science of the interrelations between living organisms and their environment" (p.3). The emphasis of ecology though studies the structure and function of nature, it being understood that humankind is a part of nature (Odum, 1971). Furthermore Odum (1971) writes, "The concept of the ecosystem is and should be a broad one, its main function in ecological thought being to emphasis obligatory relationships, interdependent and causal relationships, that is, the coupling of components to form functional units" (p.9).

Berkowitz (1993) writes in his article "New opportunities for ecology education in the United States",

> The goal of ecology education is to foster ecological literacy, defined as: 1) an understanding of the scientific process as applied in ecology; 2) a familiarity with the ecological processes at work in one's local environment; and 3) sufficient familiarity with ecological principles to be able to understand the basic ecology of environmental problems in other regions (p.46).

Currently in the United States ecology education is placed into a broader category known as environmental education. Environmental education combines all the social and scientific disciplines pertaining to the environment (Berkowitz, 1993). This is significant because somehow when ecology is combined with environmental education it loses some of its basic premises, particularly how communities of living organisms are connected.

Berkowitz (1993) believed that the educational system should mandate what excellence in ecology education means to the educators. He outlined ten opportunities that he believed should be mandated. Of those ten opportunities, having hands-on experience with organisms in their environments; learning the importance of human ecology; studying ecology in student's local environments; learning the relationships between local, regional and global scales; and the transference of skills learned in ecology education to other disciplines and to their everyday lives, are the most relevant to this study and most suited to outdoor adventure education. Berkowitz felt it is important to promote ecology education on the state and national levels, he states that, "educational excellence ultimately is achieved in classrooms, on nature walks, in school yards and at home" (p.56).

Harvey (1993) in "Learning about ecology through contact with vegetation", writes "The call to inculcate an environmental ethic in our children (Seymour and Girardet, 1987), a land ethic (Leopold, 1966; Meine, 1987), or and outdoor ethic (Report of the President's Commission, 1987) is universal" (p.99). Though her research predominantly studies vegetation in the lives of school children she concludes on some valuable ideas. One, the task of teaching this environmental ethic is typically assigned to our school systems through an environmental education component. Harvey states, "But

education does not happen in a vacuum; there may be other, informal and complementary roads to instill environmental ethics in children" (p.99). Two, in her research, she finds that concern for the environment can be stimulated through direct and first hand experiences with nature (Harvey, 1993). The opposite can also happen, negative experiences with nature like vegetation used as an obstacle or task may produce a decrease in positive attitudes to the environment.

In 1974 it was estimated that the total Wilderness visitation equaled 7 million visitor-days. It was evident then that ecological impacts resulting from recreational use would be critical in wilderness and backcountry areas because management objectives for these areas stressed maintaining the highest level of naturalness (Hammit and Cole, 1998). In 1995 when *Soft Paths* was published there were an estimated 20 million visitor-days per year. As backcountry use increased it became apparent that without some guidelines to guide the wilderness user, the wilderness would be continuously overused until it was destroyed.

Hampton and Cole (1995) outlined the basic premises for backcountry minimal impact practices. Their categories included backcountry travel, campsite use and selection, fires and stoves, and sanitation and waste disposal. With the minimal impact and the Leave No Trace organization, it is important to realize that the intent of these practices was to be considered a "living document", and that it would evolve and change according to our ever changing knowledge and wisdom (Hampton and Cole, 1995). Hampton and Cole write, "Practicing a wildland ethic implies wisdom gained from experience. In many ways, such wisdom may be the ultimate goal of responsible

citizenry" (p. xiii). Minimal Impact camping is a step toward establishing a land ethic for the American Wilderness.

In the essay entitled *The Land Ethic*, Leopold (1966) writes,

> "In short, a land ethic changes the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such" (p.240).

In adventure recreation the role of conqueror is all too often played out against the mountains, rivers, and weather. Leopold's ideas can be viewed in outdoor education as the process by which an expedition team begins to live with the land instead of against it. This is the beginning of an acceptance of belonging to the natural environment. The acceptance is a basic premise in the idea of taking responsibility and developing a land ethic within the American mind. This is important to the relation of land and ethics. The single premise that the concepts of ethics rest upon is that an individual is a member of a community made up of many interdependent parts (Leopold 1966). Then the idea of land ethic expands that community to encompass soil, water, plants, animals, wilderness and collectively all the land (Leopold 1966).

For the *Homo sapiens'* community to become conservationist they must be educated and informed about our wildlands and environs. This is the development of Leopold's *Ecological Conscience*. Leopold believed that it was not only the volume of 'conservation education' that needed attention, but the content as well.

Davis (1986) identified 25 wilderness values from legislative language and literature. These values were placed into five distinct categories that Davis (1986) felt applied to all wilderness values: naturalness, ethical, psychological, recreational, and

other values. These wilderness values may be useful in wilderness resource decision-making. Of interest in this research are the value of naturalness and ecological processes; the ethical value of restraint; and the recreational values of primitive and unconfined recreation, solitude, and mental and physical challenge.

Davis states, "Natural ecological processes are allowed to run essentially free in a wilderness and as such they characterize wilderness."(1986, p. 149). This provides an area that is not being changed by the processes of humankind. It is important to understand that these processes are always changing and are not static. The ethical value of restraint can be summarized in the wilderness teaching of doing with less and practicing restraint on the resources so that those resources will be around for future generations. "Wilderness, with prohibitions on machines and the use of certain commodity resources, is of value as a small first step in proving we can do without" (Davis, 1986, P.151). In the recreational values of wilderness, primitive and unconfined recreation does not require vast acreages, but the topography and vegetation is as important. The sense of solitude found in those Wilderness recreation areas is recognized as a strong value and the mental and physical challenge from that solitude. Bob Marshall called the opportunity wilderness provided for self sufficiency the "moral equivalent of war" (Davis, p.153). Davis writes, "The setting is there for fear and pain which we spend most of our life trying to eliminate, yet we may need to occasionally experience these emotions at a time and place of our choosing, for they were important factors in our very evolution" (Davis, p.153).

Phillips, Conner, and Kulhavy wrote that after the 98th US Congress added new wilderness areas to the Wilderness Preservation System it became evident that a plan was

need to answer the arising questions of land managers. A steering committee was formed from the University of Idaho to facilitate the process. Then with broad public input the steering committee developed a program of recommend actions. The program consisted of five key actions: (1) educate the public; (2) education and training of managers; (3) capacity and concentrated use; (4) interagency coordination and consistency; and (5) Wilderness management practices. They conclude that the management of wilderness type areas will continue to be a challenge in our industrialized modern day world. (Phillips, Kulhavy, and Conner, p. 147, 1986)

Hendee, Stankey, and Lucas (1990) in *Wilderness Management*, outlined the current issues affecting the Wilderness Preservation System. In the chapter Wilderness Ecosystems, Franklin and Bloedel (1990) detailed the ecological understanding of our wilderness ecosystems and how mans relationship has and continues to affect it. The aboriginal human in North America unquestionably was part of the shaping process of many of our public lands. They did not have the ability or technology though to control or shape nature as we do today. The aboriginals of North America were part of the system and like all mammals were part of the negative feedback system that kept population in check (Franklin and Bloedel, 1990). Humans in North America now have the ability to avoid the negative feedback loops through our technology, at least for the short term (Franklin and Bloedel, 1990). "To sum up, humans are a natural part of wilderness, but, because of their recent origin, strength, pervasiveness, and ability to buffer rapid feedback, their technology forces are not. We cannot accept modern humans—or more specifically their technology– as a natural component of wilderness (Franklin and Bloedel, 1990, p.243)."

Franklin and Bloedel (1990) in the chapter Wilderness Ecosystems define and categorize the fundamental principles of ecology. They compared and contrasted ecology in relation to our wilderness areas and suggest practices for wilderness managers to better monitor the resource (Franklin and Bloedel, 1990).

Democker (1987) examined the specific roles of history, curriculum, and gender consciousness as mediators of wilderness experience. His thesis was concerned with the modern relationship man has with wilderness. He felt that outdoor education had become the most common form of organized wilderness experience. The mission of the cooperative community was to restore the lost connection between man and his wildness. Democker (1987) believes that outdoor education is missing a critical awareness between culture and the experience of wilderness, and the basic understanding of outdoor teaching has been left unexamined.

In a 1990 USDA Forest Service report, Donaldson (1990) wrote, "A genuine experience of wilderness requires participation of all our senses and a way of knowing more holistic than analytic." The author recommends a playful approach to wilderness, in that play is a paradigm shift away from the view of wilderness as resources or scenery. Play is the ecological connection between humans and animals common to both cultures in a sense. Donaldson (1990) feels that play is a unique opportunity to develop nonverbal interspecific communication with the natural world.

In 1993, Greenway presented a paper to the 5th World Wilderness Congress. In his paper, he saw wilderness as a series of very complex ideas that are profoundly woven into the past and present of our civilization as well as our hopes and fears for a future. He considers the use of wilderness as an answer to the various psychological purposes of

civilization. Considerable confusion exists surrounding the use of wilderness for therapy and the much vaunted "wilderness effect" by Hendee & Brown (1988) (as stated in Greenway, p.205). Greenway(1993) used the concepts of eco-philosophy and deep ecology to seek an underlying model that allows for the same expression as our poets and nature writers in expressing wilderness, the wilderness experience and its relationship between culture and nature.

LaPage and Ranney (1990) wrote that both the productive and cultural sides of American life owed their richness to the land and landscape. The expressions that have arisen from the wildness, vastness, and productivity of our land have evolved into our unique American culture. Wilderness is a somewhat intangible and likely nonrenewable resource that can only be protected and preserved when the American people can understand the magnitude of its contribution. LaPage (Etc. al., 1990) suggests that wildland preservation is a cultural imperative—a source of national vitality and energy.

In a 1987 dissertation, Vest contended that wilderness scholarship has emphasized the anthropomorphic utility of wilderness and largely ignored its moral significance. He argued that Nash's view of wilderness is that of imperialism and that he missed some the central premises of wilderness preservation. Vest argued this point from an environmental ethic grounded on ecological egalitarianism. He continued that wilderness in a mytho-poetic sense actually meant "will of the land". It is in that sense that wilderness has willed its way into our philosophy and legislature. Vest states, "Thus, wilderness praxis may be surmised to include discovery, respect, and preservation of the inherent value of wildness and wilderness" (Vest, p.ii, 1987).

OUTWARD BOUND, WILDERNESS, AND EVIRONMENT

Lemburg (1997) noted that two trends had occurred in outdoor education in the mid 1990s. One, environmental education had become an important step in the education process to develop the ideas of ecological sustainability. Two, at the same time, the use of our nation's wildlands for education and recreation had gained in popularity. Lemburg drew on the idea that beliefs, attitudes, and knowledge learned from a wilderness course with the Colorado Outward Bound School (COBS) could provide positive outcomes in students. She developed an environmental curriculum from the work of fields such as ecopsychology, wilderness philosophy, outdoor education, and deep ecology, which she integrated into COBS courses.

Estes (1990) measured eleven principles of Outward Bound at the North Carolina Outward Bound School (NCOBS) and COBS to determine if Outward Bound's practices were still consistent with the teachings of Kurt Hahn, who was the founder. Environmental awareness was one of eleven principles measured. It was found that COBS staff gave more importance to environmental awareness than NCOBS. Overall her conclusions suggest there is some support for the idea that certain core-values are deemphasized at the level of practice.

The *NCOBS Instructor Handbook* is a staff manual and a basis of knowledge through which an instructor can teach course components to Outward Bound students and reference information about those course components. It has been developing from a wealth of instructor knowledge that has been accumulating for over 30 years. Curricula for all the courses that are currently offered by the school are included in the manual.

Every NCOBS course is structured through the training, main, and final expeditions. Training expedition seeks to provide the students with the opportunity to gain skills, build a team, and introduce these key curricula points: safety, camping skills, and wilderness Travel. Training expedition also includes introductions to the students, NCOBS philosophy and history, giving/receiving feedback, conflict resolution, leadership training, and natural history and environmental education.

Main expedition continues to build on the above skills and will generally cover specific skills such as: solo experience, river expeditioning, rock climbing, and service. The instructor's role begins to change allowing for students to take more leadership roles within the group and the process of preparing for the final expedition begins.

Final expedition may be different for every group that has experienced an NCOBS course. The goal is to allow the students to take on the full leadership and planning of an expedition. Students are accountable for their decisions and actions without instructor comment. The end of an NCOBS course brings students a personal challenge event, logistical de-issue, feedback for students and instructors, and ceremonies to aid in the transference of the experience for the students.

The Outward Bound Environmental Affairs Committee developed a Six Point Environmental Curriculum that was designed to engage students in the process of discovering, understanding and caring about the environment in which they travel (Caughron, 1998). The Six points are: aesthetics of nature; environmental stewardship; nature of earth and sky; environmental history and philosophy; natural resource management; and cultural history of the land. The committee asserts:

> The ultimate purpose of environmental education at Outward Bound is to help people understand how natural systems are at work in their environment, and to encourage an ethic of care and respect for those systems which sustain all life (Outward Bound Environmental Affairs Committee, 1997).

Outward Bound has typically responded to current social problems, and environmental education should be brought back to the forefront of Outward Bound instruction (Caughron, 1998).

WILDERNESS LEADERSHIP STUDIES

Moore and Russell (2002) compiled 247 research based papers on the use of wilderness for personal growth, therapy, education and leadership development. Moore and Russell (2002) state, "the presence and alleged increases in numbers of such programs, and their competition for use of public land, including wilderness raises important questions with policy implications" (p. 4). They noted that before 1995 much of the research was published in non-peer reviewed publications, but between 1996 and 2001 there has been a growing trend of publication is scientific journals suggesting that the research is better and more broadly accepted. This annotated bibliography used a variety of research reports such as unpublished thesis/dissertations, peer reviewed journals, and government reports (Moore and Russell, 2002).

In a 1986 study, Aguiar compared selected characteristics of successful leaders against those of less successful leaders. His population was a group of instructors from a troubled/ adjudicated youth program. Among these instructors many had worked for Outward Bound and NOLS. Leader competency was analyzed with five categories: (1) professional/administrative; (2) teaching; (3) safety/ technical; (4) interpersonal; and (5)

overall evaluation. The results were analyzed using ANOVA and it was found that the most successful leaders had more years of education and a higher level of field experience.

In a 1981 study, Buell content-analyzed selected print and non-print Outdoor Adventure materials and determined leadership competencies from the text. He used a panel of 60 current to the time outdoor leaders to organize those competencies into 12 categories: (1) philosophical foundations; (2) leadership; (3) counseling; (4) program planning; (5) outdoor skills; (6) environmental awareness; (7) first aid and safety; (8) administration; (9) facilities and equipment; (10) professionalism; (11) evaluation; and, (12) trends and issues. He then polled over 300 outdoor leaders, and using measures of central tendency, found that for entry-level leaders, leadership and first aid/ safety were the highest rated competencies. For experienced leaders it was leadership, administration, and supervision. The most common program format competency for entry-level leader was backpacking (Buell, 1981)

In another 1981 study, Green used the Delphi technique to poll 61 Pacific Northwest based outdoor leaders on what should be included in college based outdoor leader course. The top ten and some of the bottom ten have been selected here to show where emphasis does and does not exist. The top ten were: (1) risk management plans; (2) judgment; (3) wilderness ethics; (4) first aid; (5) analyzing risks; (6) minimum-impact practices; (7) outdoor leadership objectives; (8) hazard analysis; (9) back country first aid; and, (10) minimum impact philosophy. The bottom ten included basic trap and snare techniques, outdoor arts and crafts, anthropology, identification of rocks, history of the environmental movement, and the basic principles of Northwest history.

Vogl and Vogl's (1990) research showed that many wilderness education programs goals were the love of self, others, and the environment. Based on these ideas, wilderness programs should attempt to develop a wilderness ethic, a land ethic, and philosophy of life. They reviewed 24 dissertations dealing with wilderness education programs and found that over 60% of the studies had a positive impact on participants in self-concept and improved social relations. Little had been done regarding wilderness ethics, philosophy of life, or environmental attitudes.

In 1986, Raiola used an interdisciplinary approach to test and evaluate an outdoor leadership curriculum that was not specific to land or water based programs. Anytime a panel of experts determined that an element had a rating of 80% or above it was judged to be important. Those elements of outdoor education were: leadership style; judgment/objective-subjective; trip planning; environmental issues, instructional principles; navigation; group dynamics; and, nutrition. After course evaluation and investigator observations the data from pre and post-test suggested that students had increased their level of skill and competency.

Woodhouse and Knapp (2000) stated that place-based education is a relatively new term, appearing only recently in the education literature. It is deeply connected to outdoor and environmental education especially when considered in the definitions of Knapp. The essential characteristics of place-based education are: (1) the content of the curriculum is specific to geography, ecology, sociology, politics and other dynamics of that place; (2) it is inherently multidisciplinary; (3) it is experiential and in many places includes a service learning component;(4) economics of place can be an area of study: industry and sustainability should be explored; (5) it connects place with self and

community including multigenerational and multicultural dimensions (Woodhouse, etc.al., 2000). Place- based educators believe that education should prepare people to live and work to sustain cultural and ecological integrity of the places they inhabit. "It recaptures the ancient idea of "living to the land" and living and learning in harmony with the earth and with each other" (Woodhouse, 2000).

RELIABILITY AND VALIDITY

Carmines and Zeller (1979) stated that reliability is the tendency toward consistency found in repeated measurements of the same phenomenon. There will always be a certain amount of chance error between measures. For instance, a test measuring an athlete's ability to run a quarter mile may not yield the same time on two different days. It will show however that the person with the fastest time will be among those with the fastest times on the second trial. The more consistent results provided by repeated measure the higher the reliability of the test and conversely the less consistent the results, the lower the reliability. (Carmines and Zeller, 1979).

Validity is a measurement of what an instrument or test is intended to do. "Indeed, strictly speaking, one does not assess the validity of an indicator but rather the use to which it is being put" (Carmines and Zeller, p.12, 1979). For instance, a knowledge test may be used to assess the knowledge of teachers about a particular subject, but it would not be valid as a means to forecast their success for relating that knowledge to their students.

Baumgartner, Strong, and Hensley (2002), suggest that validity is usually determined by a panel of experts. The questions and contents are analyzed by the jury and then revised accordingly.

SUMMARY

Hanna's dissertation that developed a Model of Reasoned Wilderness Behavior was the basis for this study. Her implications suggest that professional outdoor leaders should have knowledge of basic ecological concepts, minimal impact knowledge, wilderness related history, and environmental issues.

Many studies have been done using the attitudes, beliefs, intentions, and behaviors model of Fishbein and Ajzen (1975). Most report positive outcomes from effective outdoor environmental programming, but as Yerkes (1997) points out, the links between outdoor education and the development of positive environmental attitude can be weak.

There is a limited amount of research on the transition of leisure from adolescence to adulthood (Mannel and Kleiber, 1997). However an important finding was that outdoor recreation tends to be carried through the lifetime of an individual (Bradshaw and Jackson, 1979).

There is a large and continuously growing body of research in and for wilderness. Many focus on its therapeutic effects, but the ones that are important to this study deal with ethics, values, experiences, and connections between humans and the wilderness. In America in particular, wilderness is part of our culture and heritage and in its own right deserves the respect and preservation inherent in its value.

Outward Bound has been a source of many studies being one of the meccas of adventure education for more than 60 years. Three of the studies reviewed here involved the Colorado Outward Bound School, North Carolina Outward Bound, their

environmental curriculae and awareness. Participants finishing Outward Bound programs have shown strong environmental intentions.

The relationship maintained between the environment, wilderness, and outdoor leaders is important if an outcome of the program is to increase the awareness of participants about the wilderness and environment. The literature suggests that outdoor leaders do not place wilderness and ecological education high on the list of importance, yet it is not simply dismissed. Much of the research in outdoor education has been focused on participant's outcomes. However, these outcomes rely heavily on the outdoor leader who facilitated the experience, and the leader's level of understanding of wilderness education and ecology may play a crucial role in affecting pro- environmental behavior of participants.

Chapter 3

Methodology

This is a descriptive study designed to gain a greater understanding of ecological, minimal impact, and wilderness issues knowledge base of NCOBS instructors. The study evolved from a dissertation by Hanna (1988), which investigated the outcomes of participants at the Colorado Outward Bound School and the Audubon Field Institute by testing their basic ecological knowledge and their wilderness intent and attitudes before and after courses. However, the focus of this study was the sociodemographic information (past and present) of instructors, knowledge about ecology, minimal impact, and wilderness issues at North Carolina Outward Bound School (NCOBS). The chapter discusses the research setting, instrument development and statistical methods for answering the following research questions:

RESEARCH QUESTIONS

1. What is the mean Outward Bound instructor's ecological and minimal impact knowledge base?
2. Are there any sociodemographic data that are related to an Outward Bound instructors knowledge of wilderness issues?

3. For an Outward Bound instructor, does more experience in the field correlate to higher test scores in ecological knowledge, minimal impact, and wilderness issues?
4. Do the ecological and minimal impact test scores directly correlate with wilderness issues scores?

PROCEDURES

To make this study possible it was necessary to contact the North Carolina Outward Bound School. Contact was made with the appropriate administrators to gain permission to survey the field staff for the summer of 2002.

The research participants were professional instructors from NCOBS. The total possible population was 75. The survey was conducted at the staff trainings of the three mountain base camps. The survey contained five parts, the instructor's sociodemographic information, past experience, and basic ecology, minimal impact, and wilderness issues knowledge. Three instruments were administered to answer various questions about the ecological, environmental, and wilderness issues knowledge base of these professional instructors. Information received from the instruments included nominal, ratio, and interval data. The sociodemographic data yielded nominal data. The basic ecology and minimal impact instruments yielded ratio data, while the wilderness issues instrument resulted in interval data.

The researcher expected the instruments to take approximately fifteen minutes to complete and recommended that the instruments be administered to the instructors all at the same time in hopes of getting maximum return. An agent from the organization administered the instruments and then collected the completed instruments and mailed

them to the researcher via interoffice mail at Outward Bound. The data were collected during the summer of 2002.

SAMPLING

This research is using a purposive and convenience sampling technique. Purposive sampling is studying the basic knowledge of a select group of a population; in this case, professional outdoor instructors at NCOBS. The definition of a professional outdoor instructor in this study is someone currently employed by an outdoor leadership organization and is attaining over 30 days a year instructing in an outdoor environment. Hence, it was necessary to select a purposive sample. NCOBS has a staff orientation or training at the beginning of their busiest season and, therefore, a larger number of instructors were available for this study at that time. NCOBS instructors were a convenient sample group for this research. The researcher has had extensive time at the Outward Bound School and worked there during the summer of 2002.

DEVELOPMENT OF INSTRUMENTS

The specific objectives of the instruments were to gain valuable sociodemographic information, knowledge scores in ecology and minimal impact, and wilderness issues. The research committee was used as a board of experts to determine the content validity of each of the instruments. The development of the appropriate quantitative instruments to the study involved the following processes:

Sociodemographic Instrument

For this study it was necessary to design an appropriate sociodemographic questionnaire because one was not available that met the criteria of this research. Hanna's (1988) instrument served as a base for the development of this instrument

(Appendix B). The research committee served as a panel of experts for the content validity for each instrument. Suggestions from the research committee were taken and the sociodemographic instrument was developed and approved by the committee. After the data was collected and reviewed, gender, age, level of education, and past experiences were deemed to be the significant for this study.

Basic Ecology

The Basic Ecology Knowledge instrument was developed to determine how familiar Outward Bound instructors were with the basic terms and concepts of ecology (Appendix B). Hanna's (1988) instrument for Basic Ecology knowledge test was reviewed for use in this study. Based on suggestions from the research committee the instrument was revised for more current information and adapted for the North Carolina ecosystem. Text from Kroodsma (1975) was reviewed for consistency of terms and questions. Excerpts from Cancilla (1983) and Jett (2000) were used in the revision of the Hanna instrument. The instrument contained ten questions and the correct answers are in bold print under each question in Appendix B.

Minimal Impact Knowledge

The Minimal Impact Knowledge instrument was developed to determine the knowledge base of Outward Bound instructors for minimal impact travel and camping (Appendix B). Hanna's (1988) instrument was reviewed for use in this study. After review by the research committee it was deemed necessary to develop a more current instrument. Questions were selected that were current practice in the western North Carolina mountains. Instruments were collected and developed from Hampton and Cole (1995), unpublished test of Cashel (1999), and online resources of Thorenson (2000).

The instrument was designed to test the basic understanding of the minimal impact principles. It contained ten questions and the correct answers are in bold print under each question in Appendix B.

Wilderness Issues Test

The Wilderness Issues instrument was developed from Hanna's (1988) study to determine the attitude toward wilderness from Outward Bound instructors (Appendix B). The instrument was collected from Hanna (1988) and Bultena (1981) and modified for use in this study. This instrument used a five point Likert Scale to rate from Strongly Disagree to Strongly Agree. It contained ten questions and the preferred direction of response is indicated for each question in Appendix B. It was reviewed and approved by the research committee with suggestions for modification.

INSTRUMENT RELIABILITY

Reliability of the instruments was assessed using the data collected during the summer of 2002 at the NCOBS base camps. Since the researcher only had one administration of the instruments and the tests were relatively short, the data were entered into SPSS (Statistical Program for Social Sciences 11.0) and in the reliability analysis the alpha model was selected which is the equivalent to the Kuder Richardson 20 reliability estimate. This estimate of coefficient equivalence yielded alpha values of 0.5867 for Basic Ecology and 0.3945 for Minimal Impact. The moderate alpha for Basic Ecology was adequate. This estimate is similar to Jett's (2000) alpha of 0.5680 from which the majority of the test instrument was developed. Hanna's (1988) reliability estimate was relatively low at 0.37 though she had a small 'n' of 16 and a homogenous group of outdoor educators whom she expected did not possess ecological knowledge.

The relatively low alpha for minimal impact in comparison to Basic Ecology was not expected and suggests the test needs revision in the future. In addition though the limited number of items in each instrument (10) made it very unlikely that high alphas would be attained on any of the tests (Hanna, 1988).

The Wilderness Issues instrument was applied to the Alpha model in SPSS and an alpha of 0.4372 (standardized item alpha of 0.3907) was obtained. While this is a moderate alpha the relatively limited number of items in the instrument may have contributed to this effect.

Hanna (1988) noted in her research that though the alpha coefficients are not necessarily high, they are adequate for making inferences about groups. They would not be adequate for making any inferences about individuals (Ayer, 1985). Hanna determined that with a sample size of n = 40+ that her instrument reliability was adequate. From this inference, this researcher had an expected 'n' of 75 and was also confident in the instruments reliability.

ADMINISTRATION OF THE INSTRUMENTS

Before the test instruments could be administered to the instructors at NCOBS the research proposal was reviewed by the Institutional Review Board (IRB) at Oklahoma State University. It was submitted as an "exempt" study and the IRB granted permission to begin the study (See Appendix A).

The instruments were delivered to each of the three base camps of NCOBS. An agent was selected to administer the instrument during the annual base camp trainings. A letter was attached at the beginning identifying the study as volunteer basis only and

providing the necessary contact information should someone need to contact the primary researcher. Sixty seven usable instruments were returned.

At completion of the instrument the assigned agent collected the tests and delivered them to the researcher through interoffice mail to the town office. The researcher received the instruments there.

POST DATA COLLECTION PROCEDURES

Once the data were collected and organized, it was determined that gender, education, and age were the important sociodemographic information. Field experience data were collected from the survey and coded into low (1= less than 90 days of field work), medium (2= 91-180 days), and high experience (3= 181-241+ days in the field). At NCOBS, a first year field instructor would have the opportunity to work about 90 days, a second year instructor would be in the medium level range, and three or more years of field work would indicate an instructor with high field experience.

In order to answer Statistical Hypothesis Three, additional hypotheses had to be formulated. The major variables for sociodemographic were determined to be gender, age, and education. These variables were applied to the basic ecology, minimal impact, and wilderness issues tests scores.

STATISTICAL HYPOTHESES

The following hypotheses were tested for significance at an alpha of 0.05:

1. There are no differences (the mean scores are equal) in the mean scores of Outward Bound instructors for Basic Ecology and Minimal Impact scores in regards to high, medium, and low field experience.

2. There are no significant correlations between Wilderness Issues scores and the level of field experience represented by high, medium, and low.
3. The sociodemographic data when cross-tabulated with instructor experience and instructor test scores yields no significant correlations.

    a. Gender and Field Experience Levels are independent of each other.

    b. Gender and Wilderness Issues scores were are independent of each other.

    c. The mean scores of Basic Ecology or Minimal Impact for males or females (Gender) are not greater than the population mean.

    d. The mean age in each level of field experience are not equal.

    e. Age and Wilderness Issues scores are independent of each other.

    f. Age and the scores of Basic Ecology and Minimal do not have a relationship.

    g. The instructors' level of Education and the level of Field Experience are independent of one another.

    h. The level of Education and the instructors' scores on individual questions of the Wilderness Issues instrument are independent on each other.

    i. The level of Education and the scores of Basic Ecology and Minimal Impact is not significant.

4. The mean score of ecological and minimal impact tests shows no correlation with wilderness issues scores.

STATISTICAL PROCEDURES

Hypothesis One

The mean scores were calculated for the Basic Ecology and Minimal Impact instruments. Field experience data were collected from the instrument and coded into low (1), medium (2), and high experience (3). The mean scores were tested using an Oneway ANOVA in regard to the field experience level (1, 2, or 3).

Hypothesis Two

The data from the wilderness issues survey were entered into SPSS as descriptive data using cross-tabulations and the Chi Square statistic. The wilderness issues scores were run with the level of field experience.

Hypothesis Three

The sociodemographic data of gender, age, and education were tested for relationships in regards to level of field experience, the basic ecology and minimal impact test scores, and the wilderness issues data. Various statistical tests (Oneway ANOVA, T-Tests, Correlation, and Cross tabulation) were used to best represent the data.

Hypothesis Four

Basic ecology and minimal impact test scores were cross-tabulated with Wilderness Attitudes using bivariate cross-tabulation (Pearson's) in SPSS.

Chapter 4

Results

The purpose of this study was to gain a greater understanding knowledge of the ecological, minimal impact, and wilderness issues of professional outdoor instructors in relationship to their sociodemographic data. The researcher believed that these findings will provide a better understanding of the ability of professional outdoor instructors to teach ecology, minimal impact, and wilderness issues. Four instruments, Sociodemographic, Basic Ecology, Minimal Impact, and Wilderness Issues, were used to collect the data from 67 instructors at the North Carolina Outward Bound School (NCOBS). Instruments were administered at three mountain base camps of NCOBS during the respective 2002 base camp trainings.

In this study, four null hypotheses were tested. Significance was found for two of the four hypotheses. This study addressed the following hypotheses:

$H0_1$. There are no differences (the mean scores are equal) in the mean scores of Outward Bound instructors for Basic Ecology and Minimal Impact scores in regards to high, medium, and low field experience.

$H0_2$. There are no significant correlations between Wilderness Issues scores and the level of field experience represented by high, medium, and low.

$H0_3$ The sociodemographic data when cross-tabulated with instructor experience and instructor test scores yields no significant correlations.

$H0_{3a}$. Gender and Field Experience Levels are independent of each other.

$H0_{3b}$ Gender and Wilderness Issues scores are independent of each other.

$H0_{3c}$. The mean scores of Basic Ecology or Minimal Impact for males or females (Gender) are not greater than the population mean.

$H0_{3d}$. The mean age in each level of field experience is not equal.

$H0_{3e}$. Age and Wilderness Issues scores are independent of each other.

$H0_{3f}$. Age and the scores of Basic Ecology and Minimal Impact is not significant.

$H0_{3g}$. The instructors' level of Education and the level of Field Experience is independent of one another.

$H0_{3h}$. The level of Education and the instructors' scores on individual questions of the Wilderness Issues instrument are independent of each other.

$H0_{3i}$. The level of Education and the scores of Basic Ecology and Minimal Impact is not significant.

$H0_4$ The mean score of ecological and minimal impact tests shows no correlation with wilderness issues scores.

This chapter summarizes the data collected from 67 Outward Bound instructors who attended the three base camp trainings held in 2002 by the North Carolina Outward Bound School.

Review of Procedures:

(1) The mean scores were calculated for the Basic Ecology, Minimal Impact, and Wilderness Issues instruments. Field experience data were collected from the survey and coded into low (1 - less than 90 days of field work), medium (2= 91-180 days), and high experience (3= 181-241+ days in the field). The mean scores of Basic Ecology and Minimal Impact were tested using an Oneway ANOVA in regards to the field experience level (1, 2, or 3).

(2) The data from the Wilderness Issues survey were entered into SPSS as descriptive data using cross-tabulations and the Chi Square statistic. The wilderness issues scores were run with the level of field experience.

(3) The sociodemographic data of Gender, Age, and Education were tested for relationships in regard to level of field experience, the Basic Ecology and Minimal Impact test scores, and the Wilderness Issues data. Various statistical tests were used to best represent the data:

a. The Pearson's Chi Square statistic was applied to gender and field experience to determine whether any significance exists.

b. Cross tabulation was used to apply each Wilderness issues score to Gender.

c. The Independent Samples T Test was used to compare Gender to the mean scores of Basic Ecology and Minimal Impact.

d. An Oneway ANOVA was used to determine if any difference existed between Age and levels of Field Experience.

e. Age and the ten question Wilderness Issues instrument were cross tabulated using a Chi Square statistic.

f. The Pearson's Correlation Coefficient was used to measure linear association between Age, Basic Ecology, and Minimal Impact.

g. Pearson's Chi Square statistic was used to determine if any significance existed between Education and Field Experience.

h. Cross tabulation was used to determine whether or not Education and Wilderness Issues were independent of each other.

i. Pearson's Correlation Coefficient was used to the linear association between Education, Basic Ecology, and Minimal Impact.

(4) Basic Ecology and Minimal Impact test scores were cross-tabulated with Wilderness Issues using bivariate cross-tabulation (Pearson's) in SPSS.

SOCIODEMOGRAPHIC VARIABLES

The Sociodemographic instrument provided a vast array of data. Of particular importance to this study is gender, age, education, activities done with family, and prior participation in summer youth programs.

Of the 67 completed instruments, 36 of the instructors were male and 31 female. NCOBS was one of the first Outward Bound schools to have women instructors and hence there has been a long tradition of trying to maintain an equal gender split. These instructors ranged in age from 21 to 35 years of age with the mean at 27. Of the 67 instructors, 12 had earned a high school diploma, 50 a bachelor's degree, 4 a master's degree, and 1 doctorate.

Past Experience

In the second half of the Sociodemographic survey, Outward Bound instructors were asked to answer several questions regarding their past outdoor experiences. The following four options were provided for the activities that OB instructors participated in as children or adolescents: Family Camping (automobile), Family Camping (primitive), Wilderness Travel, and Hunting/ Fishing. The data show that 49 instructors answered yes and 18 answered no to having been car camping with their families. For Primitive Family Camping, 33 instructors had answered yes and 34 no. The number of instructors who participated in travel with their families was 35 and 34 instructors had hunted and fished with their families.

In response to whether or not Outward Bound instructors had been involved in any outdoor education/ recreation programming in their youth the following information was obtained. The available options were Boy/ Girl Scouts, Boys/ Girls Club, YMCA, 4-H, Municipal Camps, Church Camps, School Camps, Outward Bound, National Outdoor Leadership School (NOLS), and Other Camps (Figure 3). In summary, from Outward Bound instructors, the Boy/ Girls Scouts saw the highest rate of participation during their

adolescence at 30%. The other program and camp categories all saw participation below 30%.

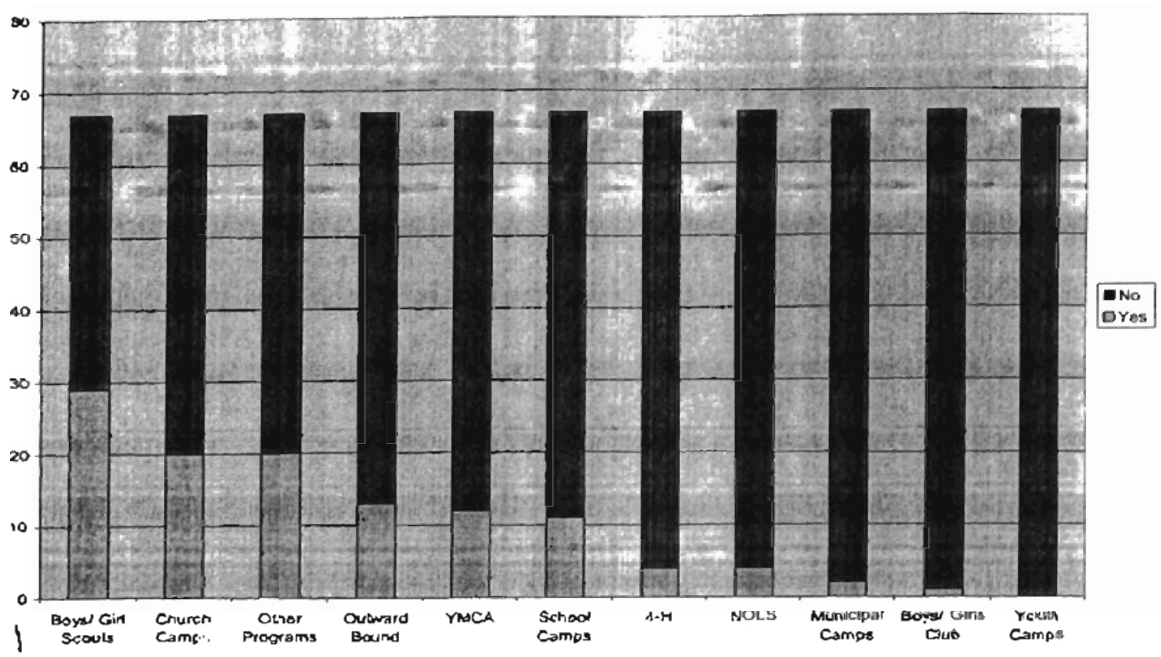

Figure 3. Outward Bound instructors' participation in youth and adolescent outdoor programming

MEANS OF BASIC ECOLOGY, MINIMAL IMPACT, AND WILDERNESS ISSUES

The mean scores and standard deviations were calculated for each of the three instruments to provide an appropriate measure of central tendency for the population of NCOBS' instructors. Both the Basic Ecology and the Minimal Impact instrument contained ten questions each. The mean score for Basic Ecology was 7.24 while the standard deviation was 1.818. For Minimal Impact, the mean was 9.06 and the standard deviation was 1.113. The Wilderness Issues instrument was Likert Scale data and each scale was coded for 1 strongly disagree and 5 strongly agree. The appropriate response was summised and the instrument was recoded so the scale could be treated as ratio data to achieve a mean score for the purpose of making an inference about the population. After

the recoding was completed it was surmised that the closer the scores were to 50 the stronger attitude toward wilderness. The mean score of Wilderness Issues was 38.69 and the standard deviation was 3.12.

BASIC ECOLOGY, MINIMAL IMPACT, AND FIELD EXPERIENCE

Statistical Hypothesis One states, there is no difference (the mean scores are equal) in the mean scores of Outward Bound instructors for Basic Ecology and Minimal Impact scores in regards to high, medium, and low field experience(Baumgartner, Strong, and Hensley, 2002). Basic Ecology and Minimal Impact scores were tested at an alpha level of 0.05 (Table 1).

There was no significant difference between the mean scores of Outward Bound instructors and their level of field experience. The scores are very homogeneous between low, medium, and high field experience. The null hypothesis cannot be rejected. The level of field experienced of an instructor is not related to the instructor's knowledge on the Basic Ecology and Minimal Impact instruments. Instructors with high field experience did not achieve significantly better mean scores than those in the middle or low scales of field experience.

Table 1

Analysis of Variance for Basic Ecology, Minimal Impact and Field Experience

	Sum of Squares	*df*	F	Mean Square	*p*
Basic Ecology	0.620	2	0.091	(0.310)	0.913
Minimal Impact	6.028	2	2.54	(3.014)	0.086

P<0.05

WILDERNESS ISSUES AND FIELD EXPERIENCE

Statistical hypothesis two stated that there were no significant differences or correlations between Wilderness Issues scores and the level of field experience represented by high, medium, and low. Since the Wilderness Issues scores were descriptive data, the Chi Square Statistic was used to determine if any significance existed between these scores and Field Experience. Furthermore, because the Wilderness Issues scores were of Likert type (i.e. strongly disagree, disagree, neutral, agree, and strongly agree), Field Experience was cross tabulated with each question. The null hypothesis was not rejected. No significance was found in any of the ten Wilderness Issue questions when cross tabulated with Field Experience (See Appendix C).

SOCIODEMOGRAPHIC TESTS

The Sociodemographic data of Gender, Age, and Education were tested for relationships in regard to level of Field Experience, Basic Ecology, Minimal Impact, and Wilderness Issues data. Because of the differences in levels of data received from the various instruments, multiple methods of analysis were used to thoroughly examine the data.

Gender

Cross-tabulation of Gender and Field Experience

Using the Pearson's Chi Square statistic, gender and field experience were cross tabulated to determine whether any significance exist. The hypothesis was that gender and the level of field experience were independent of each other (Table 2) (Baumgartner etc.al, 2002). The Pearson's Chi Square statistic was 2.605 and the p value of 0.272. Neither indicates significant correlations were found between gender and low, medium,

and high field experience. Therefore, gender is independent of the level of an instructor's field experience at NCOBS.

Table 2

Gender Division by Field Experience Level

Gender	Low	Medium	High	Total
Female	*20*	*2*	*9*	*31*
Male	*24*	*6*	*6*	*36*

Cross-tabulation of Gender and Wilderness Issues Scores

Again, since the Wilderness Issues scores are descriptive data, the Chi Square Statistic was used to determine if any significance existed between the scores and gender. Furthermore, because the Wilderness Issues scores were of Likert type (i.e. strongly disagree, disagree, neutral, agree, and strongly agree) gender was cross-tabulated with each question. No significance was found in any of the ten wilderness issue questions when cross tabulated with gender (See Appendix D). Therefore the Wilderness issues scores are independent of gender. Instructors at NCOBS do not have stronger or weaker attitudes toward Wilderness based on gender.

Independent Samples T Test Gender and Basic Ecology/ Minimal Impact

The Independent-Samples T Test procedure compares Gender to the mean scores of Basic Ecology and Minimal Impact. The statistical hypothesis is that the mean scores of Basic Ecology or Minimal Impact for males or females are not greater than the population mean (Baumgartner etc.al, 2002). The significance value or p value for the

Levene test was 0.857 for Basic Ecology and 0.224 for Minimal Impact. Since both of these values are higher than the alpha level of 0.05, there are no significant differences between Genders on these test scores. The mean scores are not different from the mean scores of the instructors as a whole; the null hypothesis cannot be rejected. In regard to Gender, the knowledge base for Basic Ecology and Minimal Impact among instructors is homogeneous.

Age

Oneway ANOVA Age and Field Experience Level

Age and Field Experience Level were applied in an Oneway ANOVA to find the amount of variation between group and individual means. The statistical hypothesis was that the mean age in each level of field experience is equal (Baumgartner etc.al, 2002). The results of the Age/ Field Experience analysis are presented in an Oneway ANOVA Table 3. The null hypothesis can be rejected; the mean age between field experience levels is different. There is a significant difference in the age of Outward Bound instructors between low and high field experience.

Table 3

Analysis of Variance of Age and Level of Field Experience

	Sum of Squares	*df*	F	Mean Squares	*p*
Age	101.603	2	5.447	50.801	0.007*

* $p < 0.05$.

For further investigation the Tukey test was applied to the variables (Table 7). The Tukey revealed that between low and high field experience the mean difference was -3.00 with a standard error of 0.913 and the significance was 0.005. The age of

instructors between low and high field experience are not equal. While statistically significant, it is expected that older instructors will have more field experience than younger ones.

Table 7

Tukey HSD with Age as Dependent Variable

					95% Confidence Interval	
Field Experience(I)	Field Experience(J)	Mean Difference (I-J)	Standard Error	*p*	Upper Bound	Lower Bound
Low	High	-3.00	0.913	0.005	-5.19	-0.81

Cross-tabulation of Age and Wilderness Issues Scores

The Chi-Square measures test the hypothesis that Ages of Outward Bound instructors and Wilderness Issues variables in a cross-tabulation are independent (Baumgartner et.al., 2002). Questions 1- 10 in the Wilderness Issues scores show no significance in terms of being dependent to Age (See Appendix E).

Correlations Age and Basic Ecology and Minimal Impact Test Scores

Pearson correlation coefficients assume the data are normally distributed. The Pearson correlation coefficient is a measure of linear association between Age and Basic Ecology test scores and Age and Minimal Impact test scores (Howell, 1987). The closer the correlation coefficient is to 1 or -1 the stronger relationship age has in the test scores of Basic Ecology and Minimal Impact (Table 5). Age is not related to test scores of Outward Bound instructors. The null hypothesis cannot be rejected.

Table 5

Pearson's r-Age, Basic Ecology, and Minimal Impact

		Age
Basic Ecology	Pearson Correlation	0.144
	Sig. (2-tailed)	0.246
	N	67
Minimal Impact	Pearson Correlation	0.099
	Sig. (2-tailed)	0.423
	N	67

Education

Education and Field Experience

Using the Pearson's Chi Square statistic, Education and Field Experience were cross-tabulated to determine whether any significance exist between the two variables. The hypothesis was that Education and Level of Field Experience were independent of each other (Baumgartner etc.al, 2002). The Pearson's Chi Square statistic was 9.259 and the significance or *p* value was 0.160. A low significant value of 0.05 or less would have indicated that Education and Field Experience were dependent. The null hypothesis cannot be rejected; Education and the Level of Field Experience are independent of each other. At NCOBS the instructors Education has no relationship to the amount of field experience they have obtained.

Education and Wilderness Issues Scores

The Chi-Square tests the hypothesis that Education of Outward Bound instructors and Wilderness Issues variables are independent of each other. Questions 1- 8 and 10 in the Wilderness Issues scores show no significance in terms of being dependent to education (See Appendix F). However, question 9 returned results that indicate that the level of education was dependent.

Question 9 states, "Wilderness areas should be managed in order to accommodate both non-motorized (e.g., hiking, mountain biking, etc.) and motorized (e.g., off road vehicles, motorcycles, etc.) recreation activities." The Pearson's Chi-Square statistic is 13.425 and the p value was 0.037. This suggested the level of Outward Bound instructors Education played an important part in how they answered question 9(Table 13). Instructors with high school and a bachelor's degree would tend to disagree with allowing motorized access into Wilderness areas. The null hypothesis can be rejected.

Education, Basic Ecology, and Minimal Impact

Pearson correlation coefficients assume the data are normally distributed. The Pearson r is a measure of linear association between Education and Basic Ecology test scores and Education and Minimal Impact test scores (Howell, 1987). The Pearson's r for Education and Basic Ecology was -0.085 and the significance value were 0.492. For Education and Minimal Impact, the Pearson's r was -0.066 and the significance value was 0.594. An increase or decrease in the level of education of an instructor did not increase or decrease an instructors test scores.

SUMMARY OF FINDINGS FOR SOCIODEMOGRAPHICS

The Sociodemographic data of Gender, Age, and Education were tested for relationships in regard to level of Field Experience, Basic Ecology, Minimal Impact, and Wilderness Issues data. Hypothesis three will be rejected if any of the sub hypotheses are rejected. While Gender of NCOBS instructors yielded no significant differences or correlations, Age and Education did. Age directly correlates with the level of field experience and Education with Wilderness Issues 9. The null hypothesis is rejected (Table 6, p. 57); the sociodemographic data when cross-tabulated with instructor experience and instructor test scores does yield significant correlations in Education for Wilderness Issues question 9.

BASIC ECOLOGY, MINIMAL IMPACT, AND WILDERNESS ISSUES

The Pearson's Correlation was applied using the mean scores of Basic Ecology and Minimal Impact, and the descriptive data of the Wilderness Issues instrument. Significance was found between Wilderness Issues (WI) 1 and Basic Ecology test scores (Appendix G).

The mean scores of Basic Ecology were correlated with question 1 on the Wilderness Issues instrument; "all forest fires should be actively and immediately suppressed." The correlation coefficient for Wilderness Issues 1 and Basic Ecology was -0.30. The significance level or p-value is 0.013 which indicates significance at a level of 0.05. The significance level indicates that the Wilderness Issues 1 and Basic Ecology are significantly negatively correlated.

The null hypothesis states that Ecological and Minimal Impact test shows no correlation with Wilderness Issues scores. The mean scores of Basic Ecology do

negatively correlate with Wilderness Issues 1. Instructors who score well on Basic Ecology also tended to disagree with fire suppression. The null hypothesis is rejected; knowledge of basic ecology is related to the agreement of wilderness issues 1, fire suppression.

Table 6

Summary of Hypotheses for Sociodemographic Variables

H0	Statistical Hypotheses	Failed to Reject	Rejected
$H0_3$	The sociodemographic data when cross-tabulated with instructor experience and instructor test scores yields no significant correlations.		X
$H0_{3a}$	Gender and Field Experience Levels are independent of each other.	X	
$H0_{3b}$	Gender and Wilderness Issues scores are independent of each other.	X	
$H0_{3c}$	The mean scores of Basic Ecology or Minimal Impact for males or females (Gender) are not greater than the population mean.	X	
$H0_{3d}$	The mean age in each level of field experience was not equal.		X
$H0_{3e}$	Age and Wilderness Issues scores are independent of each other.	X	
$H0_{3f}$	Age and the scores of Basic Ecology and Minimal do not reveal a relationship.	X	
$H0_{3g}$	The instructors' level of Education and the level of Field Experience are independent of one another.	X	
$H0_{3h}$	The level of Education and the instructors' scores on individual questions of the Wilderness Issues instrument were independent of each other.		X
$H0_{3i}$	The level of Education and the scores of Basic Ecology and Minimal Impact do not reveal a relationship.	X	

SUMMARY OF FINDINGS

The sociodemographic instrument yielded some valuable information about NCOBS instructors. NCOBS as an organization has done an excellent job keeping its staff near equal in gender in a male dominated field. Outward Bound instructors tended to range in age between 21 and 35, while the far majority was 25 to 30. Most have a bachelor's degree and participated in some type of family camping while growing up. Of interest is the relatively small percentage who never attended Outward Bound or other outdoor education / camp programs. Of these programs Boys and Girl Scouts showed the most frequent participation.

Statistical Hypothesis One stated that there were no significant differences between the mean scores of Basic Ecology, Minimal Impact, and Field Experience levels. The mean scores between the three levels of field experience are not significantly different. The null hypothesis could not be rejected (Table 7). The level of an instructors' field experience is not related to their test scores.

Cross tabulations were used to determine if there were any relationships between field experience and wilderness issues scores for statistical hypothesis two. Using the chi square statistic no significance was found in any of the ten wilderness issues scores, therefore the null hypothesis cannot be rejected (Table 7).

For statistical hypothesis three, the sociodemographic of Gender, Age, and Education were tested for relationships with Field Experience, Basic Ecology and Minimal Impact. Two significant results were found. Age when cross tabulated with Field Experience yields a significant difference between Low and High Field Experience. Education when cross tabulated with Wilderness Issues 9, Wilderness areas should be

managed for both non-motorized and motorized recreation activities, suggested that instructors with bachelor's degrees and high school diplomas tended to disagree with allowing motorized access in Wilderness areas. The null hypothesis can be rejected (Table 7). Older Outward Bound instructors tend to have more field experience than younger ones and education plays an important part in instructor's attitudes toward not allowing motorized vehicles in Wilderness areas.

Statistical Hypothesis 4 stated that there was no correlation between the mean scores of Basic Ecology and Minimal Impact applied to Wilderness Issues. Though there were some significant correlations between different Wilderness Issues, the null hypothesis can be rejected because Wilderness Issues 1 and the mean scores of Basic Ecology are significantly negatively correlated. Instructors who scored high in Basic Ecology also tended to disagree with fire suppression in Wilderness (Table 7).

The significance of the results presented in this chapter is discussed in detail in Chapter V. Conclusions and recommendations for future studies are presented.

Table 7

Statistical Hypotheses

H0	Statistical Hypotheses	Failed to Reject	Rejected
$H0_1$	There is no difference (the mean scores are equal) in the mean scores of Outward Bound instructors for Basic Ecology and Minimal Impact scores in regards to high, medium, and low field experience.	X	
$H0_2$	There are no significant correlations between Wilderness Issues scores and the level of field experience represented by high, medium, and low.	X	
$H0_3$	The sociodemographic data when cross-tabulated with instructor experience and instructor test scores will yield no significant differences or correlations.		X
$H0_4$	The mean score of ecological and minimal impact tests showed no correlation with wilderness issues scores.		X

Conclusions, Implications, and Recommendations

The purpose of this study was to gain sociodemographic background information on Outward Bound instructors and to test their knowledge base in regards to Ecology, Minimal Impact, and Wilderness Issues. Data were gathered from the instructor pool of the North Carolina Outward Bound School (NCOBS) and were grouped according to low, medium, and high field experience. Of the expected 75 completed surveys the researcher received 67 for a completion rate of 89%.

CONCLUSIONS

The sociodemographic questionnaire yielded some interesting information about Outward Bound instructors. At NCOBS, a typical instructor is between the ages of 21 and 35 years of age with a mean age of 27. The percentage of instructors who have earned Bachelors degrees was 73%. As stated on the NCOBS (2003) website, "The average age of the instructional staff who work here is just under thirty years old; generally, new hires for instructional positions tend to be 24 or older." In a field that is typically thought to have a male majority, the gender split at NCOBS was surprisingly close to equal. The data revealed that of the instructors who completed the survey, 36 were male and 31 female. The school has a long history of pursuing gender equality

among instructors and forums and trainings are typically scheduled during the annual base camp trainings. A bachelor's degree is not a requirement to be hired at NCOBS, though having an outdoor leadership resume' is necessary. In fact, when looking at education, 12 instructors have a high school diploma as their highest level of education. This is a dramatic second to 50 instructors who have attained Bachelor's Degrees.

The later half of the sociodemographic questionnaire dealt with the past experiences of NCOBS instructors. There were two sections of questions, the first group dealt predominantly with family experiences during instructors' youth and adolescence. The second explored their participation in camp and outdoor programs.

NCOBS instructors were asked if they had participated in Family Car Camping, Primitive Camping, Travel, and Hunting/ Fishing activities as children or adolescents. The most meaningful was Family Car Camping with 73% of instructors having participated in this type of activity. McGuire, Dottavio, and O'Leary's (1987) research asserted that childhood outdoor recreation lays the foundations for outdoor leisure and recreation behavior in one's later life. Furthermore, this researcher's finding are consistent with Bradshaw and Jackson's (1979) findings that about 80% of adults who actively enjoy recreation, participated in these activities during childhood and adolescence (Mannel & Kleiber,1997). This is also consistent with Stebbins' (1992) idea that some people's leisure activities may become careers in the recreation field and those people develop life long interests and commitments to the activity.

For Primitive Camping, 49.3% of the instructors answered. For Hunting/ Fishing, 50.7% answered yes. Additionally, 52.2% of the instructors participated in Travel during their youth and adolescences. While these findings are not as meaningful as those for

Family Camping they do continue to show support for the idea that outdoor recreation done in youth continues in adult life (McGuire, Dottavio, O'Leary, 1987; Mannel & Kleiber, 1997).

NCOBS instructors were asked if they had been involved in any outdoor education or recreation programming in their childhood or adolescence. The list included Boy or Girl Scouts, Boys or Girls Club, YMCA, 4-H, Municipal Camps, Church Camps, School Camps, Outward Bound, National Outdoor Leadership School, and Other Camps. This researcher assumed many Outward Bound instructors would have participated in some type of outdoor programming in their youth due to their current profession. The Boy/ Girl Scouts had the highest percentage, with 43% of NCOBS instructors having answered yes to participation. The rest of the categories maintained percentages below 30% participation. This includes Outward Bound; only 19% of NCOBS instructors had taken an Outward Bound course in their adolescence. This was surprising because the literature states that childhood experiences in recreation can be observed throughout adulthood and while this was seemingly true for family activities, it does not appear true for organized outdoor programming. Furthermore, it does not directly support Stebbin's (1992) claim that recreation in a person's adolescence may stimulate a leisure career. It also suggests that the skills that necessary to work at Outward Bound where either obtained through family outdoor recreation or obtained as young adults (18+).

Hypothesis one and two dealt with whether or not the instructor's level of field experience had any relationship with the mean of Basic Ecology, Minimal Impact, and Wilderness Issues. No statistical significance was found among any of the variables.

The researcher hypothesized that when the ANOVA was applied for the variables

of Field Experience, Basic Ecology, and Minimal Impact increased field experience would lead to more thorough understanding of ecology and minimal impact. This was not the case however; the level of instructors' field experience showed no significant impact on their knowledge base when applied to the mean scores of Basic Ecology and Minimal Impact. An underlying thought was that new instructors coming into OB were more thoroughly trained through 4 year institutions and thus may have a better understanding of ecology and minimal impact.

The mean score for the Basic Ecology knowledge test was 7.24 from a possible range of 10. The tests were ten questions each. The instructors at the North Carolina Outward Bound School are not mandated by the curriculum to teach ecology. They do teach natural history and environmental education, and therefore, some knowledge of ecology is implied. The researcher was impressed that the mean score was 7.24 and that the knowledge is available within the population of instructors to teach the basic premises of ecology.

The researcher expected the mean score of the Minimal Impact tests to be much higher than that of Basic Ecology. NCOBS works very hard to limit their impact on their environment and it is of constant discussion among instructors and administrators. NCOBS operates in the Pisgah National Forest in western North Carolina which has one of the highest concentrations of summer camps in the nation. Impact on the area is very evident both from these programs and the individual users of the National Forest. The NCOBS curriculum does mandate instructors to teach Leave No Trace (LNT), and in fact, many instructors had participated in a LNT course the spring of 2002. The mean

score of OB instructors in Minimal Impact was 9.06 from a possible range of 10, which indicated a strong understanding of the concepts of minimal impact travel and camping.

Wildernesses Issues score were Likert type data and therefore each question was entered into SPSS on an individual basis (WI 1-10). No significance was found between each of the questions and the level of field experience. However, when a total score was applied to the Likert scale and it was treated like ratio data, it was surmised that the closer an instructor's score was to 50, the stronger the attitude toward Wilderness. The mean score for the population was 38.68 from a possible range of 10 to 50 which indicated a positive attitude to Wilderness in general.

Hanna (1995) stated in her conclusion, "outdoor leaders themselves must have a basic working knowledge of ecological concepts, current minimal-impact technology, wilderness-related history and philosophy, and environmental issues." The data from this research confirm that Outward Bound instructors indeed do possess basic ecological, minimal impact knowledge and have a strong understanding and attitude of current Wilderness Issues.

Gender, Age, and Education when applied to Field Experience, Basic Ecology, Minimal Impact, and Wilderness Issues revealed significance. Age and Field Experience when cross tabulated were significant at 0.007. Specifically, when Age and Field Experience were applied in an Oneway ANOVA, age being the dependent variable, Low and High Field Experience revealed that there is a significant difference between ages. While this is a statistically significant finding, it is logical that the field experience of an instructor increases with age. Though examining this further the results offer that the

older instructors at NCOBS started in their twenties and have stayed with NCOBS for an extended time. For NCOBS, this is impressive since adventure education as a field is often seen as temporary work, but this would suggest a number of experienced instructors had maintained employment with the school for a long duration of time.

Wilderness Issues question 9, when cross tabulated with Level of Education, was statistical significance at 0.037. This statistic suggests that an instructor's education influenced their attitude against allowing motorized access to Wilderness areas. This is consistent with the idea that education affects environmental behavior and support for Wilderness (Matthews and Riley, 1995; Yerkes and Harras, 1997). Further evaluation might reveal support for Place's (2000) study that early life outdoor education experience's affect pro environmental attitudes.

When correlations where applied to the mean scores of Basic Ecology, Minimal Impact, and Wilderness Issues , significance was found between Wilderness Issues 1, fire suppression, and the mean scores of Basic Ecology. Instructors who scored high on Basic Ecology also disagreed with suppressing fire in Wilderness. The null hypothesis was rejected based on this significance.

IMPLICATIONS

The results of this research were encouraging for the North Carolina Outward Bound School. NCOBS' has consistently hired well trained and educated instructors for adventure education. In a survey of current NCOBS literature, the sociodemographic data of the instructors is consistent with NCOBS website and school catalog.

The current curriculum being used at NCOBS includes natural history, environmental education and Leave No Trace. The key elements of ecology emphasize

the connections between organisms and Odum (1971) stressed how it is reshaping our business, political, and consumer thinking. Leave No Trace is the organization that has taken minimal impact practices to new levels and has set an ethical standard for traveling in wildland environments. There is no NCOBS curriculum point that specifically covers federally designated Wilderness. However, it may, and often does fall under the natural history element of the curriculum.

The instructors at the school have a high understanding of Basic Ecology, Minimal Impact, and favorable attitudes about current Wilderness Issues. Instructors scored strongest on the minimal impact instrument. When Hampton and Cole (1995) wrote *Soft Paths*, they stated that they intended it to be a stepping stone for the formation of a land ethic. Leopold (1966) writes that wilderness recreation connects the American people to primitive arts that connect us to our past. Leopold even goes as far as stating that the individual responsibility is tied to the ecological consciousness. He states:

> A land ethic, then, reflects the existence of an ecological consciousness, and this in turn reflects a conviction of individual responsibility for the health of the land (Leopold, p.258, 1966).

This research did not test how much of this knowledge is transferred to students in the field, but the researcher's experience is that the concepts of minimal impact camping are stressed over and over again to OB groups. Individual responsibility is represented at NCOBS via the Pillar of Self Reliance. Furthermore, responsibility and conviction imply the commitment to quality of the Pillar of Craftsmanship. While the end result may be that an ethic is instilled upon OB students, the researcher would argue the students would also need to understand how they are connected to the land and ecosystem.

This transfer of ecological knowledge is one of the basic implications of environmental education (Berkowitz, 1993). Odum (1971) details twelve concepts that humans could embrace to live more ecologically. These concepts range from the deeply political and economic to family planning and education. Odum was implying a need for the reform of our society in order to live within the constraints of our ecosystem. An expedition teaches students to live within the constraints of their resources and NCOBS Pillars are essentially values to live by. Outward Bound has often been looked at as a tool for social change, and ecology has been embraced by environmentalist as a catalyst for change as well. Furthermore, by taking a closer look at the premises of adventure education, and the ideas of self, interpersonal, and intrapersonal education it can easily be surmised that indeed NCOBS teaches human ecology.

Leopold's (1966) inclusion of Wilderness in the essays from the Upshot was not by mistake. He outlines a land ethic and talks in great detail about conservation and, perhaps sees wilderness as a savior for our culture in that it could increase our understanding of natural systems. Vest (1987) argues that Wilderness in a mythopoetic sense actually means "will of the land". For Leopold though, it is preservation though that is the founding premise of his idea of wilderness.

Instructors have a strong attitude about Wilderness and must be charged with bringing those issues to their students while educating and enlightening them with current Wilderness thought. Democker (1987) believed that outdoor education had become the most common form of organized Wilderness experiences. When Phillips, Kulhavy, and Conner (1986) first outlined a plan for land managers to manage Wilderness, education was second in importance. Harvey (1993) believes that there might be other roads

outside the typical public school system for teaching ecology education. The responsibility lies with adventure education programs like NCOBS. Hanna asserted that outdoor educators must be trained in ecology, minimal impact techniques, and informed about Wilderness issues and philosophy. This research asserts that NCOBS' instructors have that knowledge.

The literature suggests over and over again that adventure educators must begin teaching environmental education as a core part of their curricula. It cannot be ignored and the mountains don't speak for themselves. If outdoor educators cannot instill an ethic of preservation into their students and subsequently tie that into the students' everyday lives, they may loose the very classroom in which they work. The knowledge is available, the attitudes are present and the curriculum should reflect a solid push toward the teachings of ecology, the movement from minimal impact to a land ethic, and the ideas and fundamental beliefs behind the Wilderness Preservation System.

RECOMENDATIONS

The sociodemographic instrument revealed that 43% of OB instructors had had some experience in their youth with the Scouting. Only 19% of the instructors attended Outward Bound in their youth. A more in-depth look revealed that many OB instructors had no experience in their youth with organized camping. This brings some interesting questions to the forefront for discussion. Without prior exposure in their youth to organized camping programs, at what point or how does an instructor choose this field? Where did Outward Bound instructors obtain their skills to work in adventure education? The instrument did not ask instructors about their experiences as young adults, so it may be that many discovered OB as adults and then pursued it as a profession. It is generally

thought though that childhood experience leads to choice of profession (Stebbins, 1992; McGuire, Dottavio, and O'Leary, 1987).

Though gender has not been the focus of this research, it would be interesting to see if the divisions in hunting, fishing and travel were influenced by gender. These variables all showed a 50/50 split which mimics the gender split at NCOBS.

Also, NCOBS may want to investigate having a closer relationship with Scouting. Some programs exist to help get Scouts on an Outward Bound course, but this may be worth NCOBS investigating closely since 43% of their instructors had some experience with Scouting. NCOBS may find that there is a market and need for training of Boy Scout and Girl Scout leaders as well as that working closely with Scouting might provide more diverse clientele and provide instructors for the future.

Another area of interest for future research was that 12% of the instructors were 30 years of age. This is impressive in this field where most of the field staff is generally in their mid-twenties. Potential research in this area might include how much field time they acquire each year, income, lifestyle. time of entry in the field, and what keeps them working outside.

Another area to investigate is how much of the concepts of basic ecology, minimal impact, and wilderness issues are currently being taught in the field under the current curriculum at NCOBS. What is the delivery system for this information? The knowledge exists to provide this information to the students and it is being taught by some instructors and in some form. How much though and when? What are the instructor's perceptions on student interest on these subjects? How much knowledge do

the instructors believe is passed on to the students? How much of the course is devoted to these topics? Do instructors believe these topics to be important?

Future research could be repeated at different outdoor schools and with different levels of instructor experience. The instruments would benefit from pretest validity tests to ensure that they are actually a strong measurement for ecology, minimal impact, and wilderness issues. Though there is currently little research on instructor testing, there is a large body or research on teacher testing and future research would benefit from reviewing that literature.

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Appendix A Institutional Review Board Approval

Oklahoma State University
Institutional Review Board

Protocol Expires: 5/23/03

Date Friday, May 24, 2002 IRB Application No EQ0211J

Proposal Title PROFESSIONAL OUTWARD BOUND INSTRUCTOR'S KNOWLEDGE OF BASIC ECOLOGY, MINIMAL IMPACT AND WILDERNESS ISSUES

Principal Investigator(s)

Christine Cashel
111 Colvin Recreation Center
Stillwater, OK 74078

Mick Daniel
119 Colvin
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research project must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

Appendix B Questionnaire and Instruments

Part I. Sociodemographic Information
A. Personal Data

1. What is your sex?

1 Male
2 Female

2. What is your age? _____

4. Please list the name of the town, state, and zip code in which you graduated from high school?

_____

5. What is the highest level of education you have completed; if it is a college degree please write the name of your degree in the space provided?

1 High School
2 Bachelor's Degree _____
3 Master's Degree _____
4 Doctoral Degree _____

6. How many field days have you worked at NCOBS as an instructor? Please select the category that best fits your estimated amount of field days. This should include all field time including days as a climber and paddler as well as any location (Everglades, Costa Rica, Chile, etc.)

1. 0-30
2. 31-60
3. 61-90
4. 91-120
5. 121-150
6. 151-180
7. 181-210
8. 211-240
9. 241 + Days

7. How many years have you worked at NCOBS as a field instructor? If this is your first year, please answer 1. _____

B. Past Experience

In addition to your personal background, your past experiences may help explain your present interest. Please circle the letters corresponding to all 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.

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
d. Hunting/ fishing

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. Outward Bound
j. NOLS
k. Other formal camp experience: _____

3. Did your high school, college or university coursework include any of the following:

(Please circle all that apply)

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
l. Outdoor Education/ Recreation Leadership
m. Other natural science or outdoor leadership courses:
(Specify)

_____

Please circle your No/ Yes response for each question and use the space below to provide more detail as requested.

4. When away from the base camp, do you recycle?

(1) Yes
(2) No

5. Do you drive an environmentally responsible vehicle?

(1) Yes
(2) No

6. When in the backcountry on your own time, do you use any form of technology such as cell phones, personal digital assistants, GPS, music player, etc.

(1) Yes
(2) No

7. On average, when not working for Outward Bound or similar organizations, would you say that you spend more than 30 days a year on federally designated lands (National Parks and Forests, BLM Land, Wild and Scenic Rivers, and Wilderness).

(1) Yes
(2) No

Basic Ecology

Most people have received some education related to ecology during school or through various professional trainings. 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 provide an answer for all of the questions.

(Note: The correct answers are in bold print.)

1. The place in an ecosystem that a specific organism and only that organism fills is called a:
   - A. Habitat
   - **B. Niche**
   - C. Community
   - D. Interaction

2. A plant or other organism considered to be at the bottom of the food chain is called a:
   - A. Successional Producer
   - B. Climax producer
   - **C. Primary producer**
   - D. Secondary Producer

3. An interaction that occurs when two living organisms associate closely with each other and both receive benefit from the relationship is called:
   - A. Predation
   - B. Neutralism
   - **C. Symbiosis**
   - D. Tertiary interaction

4. When a community of living organisms has reached a stable stage and does not undergo any further major changes:
   - A. This is called ecological succession
   - B. This becomes an ecological community
   - C. This becomes a habitat
   - **D. This becomes a climax community**

5. A Peregrine Falcon is an example of
   - A. Decomposer
   - B. Consumer
   - **C. Predator**
   - D. Producer

6. A food web is:
   A. A single sequence of organisms through which energy passes
   B. A network of food chains
   C. Always initiated with one or more green plants
   D. Inevitably ends with human consumers

7. The hydrologic cycle is powered by
   A. The wind
   B. The sun
   C. Gravity
   D. The rain

8. The biomass (total weight of protoplasm) _____ in each successive trophic (feeding) level in a food chain.
   A. Increases
   B. Stays the same
   C. Decreases
   D. May increase or decrease depending on the size of the feeding organism

9. One of the most common topics in ecology is the study of populations. The word used to define the maximum population a habitat can support is:
   A. Biotic potential
   B. Carrying capacity
   C. Critical mass
   D. Exponential growth rate

10. Our very existence is dependent on the ability of organisms to capture energy and convert it into a form that is usable for our consumption. Those organisms that can convert inorganic chemicals or sunlight into organic molecules are called:
    A. Decomposers
    B. Heterotrophy
    C. Consumers
    D. Autotrophs

Minimal Impact Knowledge Test

Most outdoor leaders have received some amount of instruction on minimal impact techniques. Please answer the questions to the best of your ability giving your most educated guess when you are uncertain. Please provide an answer for all the questions.

(Note: The correct answers are in bold print.)

1. Camp on durable sufaces means:

   A. Choose an established legal campsite
   B. Bring some plywood to sleep on
   C. Stay in town
   D. Sleep on the softest vegetation around

2. On the trail, a person should:

   A. Stay on designated trails and walk in a single file
   B. Take the shortest route even if it means leaving the trail
   C. Use map and compass to eliminate the need for markers
   D. Step to the downhill side and talk softly when encountering horses
   E. All of the above
   F. A, B, and C
   G. A, C, and D

3. Pack it in, Pack it out:
   A. Is a popular marching song?
   B. Means leaving trash and garbage behind
   C. Protects animals from getting used to human food
   D. Refers to the piece of equipment we carry on our backs

4. Proper disposal of what cannot be packed out includes:
   A. Depositing human waste in cat holes that are 6-8 inches deep and at least 200 feet from water
   B. Leaving toilet paper under bushes
   C. Leaving soapsuds in streams and lakes
   D. Burning other people's trash

5. Fires can cause impact by:
   A. Scarring the ground
   B. Sterilizing the soil
   C. Leaving marks on rocks
   D. Forcing people to snap branches off trees

E. All of the above

6. The reasons we leave what we find in the backcountry is:
   A. Everyone should have the fun of discovery
   B. We should treat our national heritage with respect
   C. Making chairs and tables is a neighborly thing to do
   D. All of the above
   E. A and B

7. If fires are used:

   A. Use an established fire ring
   B. Use only dead, downed and "smaller than your wrist" wood
   C. Scatter unburned wood and ashes when fire is done
   D. Put out campfire completely
   E. All of the above

8. You have been planning for quite some time where you are going to camp, what equipment you want to bring and who you are going to hike with. It is time to decide what you will bring to eat and how you will transport your food supplies. The most environmentally friendly way to pack your food is in:

   A. Paper bags that can be burned after you use them.
   B. Original containers in which the food was purchased.
   C. Reusable containers.
   D. None of the above.

9. You have made it into the backcountry, selected an environmentally friendly campsite and erected your tent; it is time to clean off the layers of dirt you have accumulated during the day. The best way to do this is to:

   A. Take a quick plunge in the lake or stream using biodegradable soap.
   B. Haul water away from the natural water source for washing and cleaning.
   C. Take a sponge bath at the shore of the lake or stream.
   D. Take a sponge bath with paper towelettes.

10. What a night! The stars were spectacular and sleep enveloped you as softly as your down sleeping bag. Your gear is packed and you are ready to move on. But wait! Before you go, you should:
   A. Replace all rocks and twigs you may have moved while preparing your campsite.
   B. Eliminate all but one fire ring and restore the area to its natural state as much as possible.
   C. Disassemble any built items such as benches or chairs.
   D. All the above.

Wilderness Issues

As a professional outdoor leader your classroom is a wildland environment. We are interested in learning a how you feel about this type of environment and how it should be managed. There are no right or wrong answers, only difference 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
N- Cannot agree or disagree based current knowledge of issues
A - Agree
SA – Strongly Agree

Statement	Level of Agreement Circle your response
Example: Hunting should be allowed in wilderness areas.	SD D N A SA
Interpretation: The respondent disagrees with the statement.	

(Note: The desired direction of response is in bold print.)

1 All forest fires should be actively and immediately suppressed.	SD D N A SA
2 Endangered or threatened species should be given the highest level of protection, even if human recreation and education activities are restricted as a result.	SD D N A SA
3. Wilderness areas should retain large blocks of backcountry with no facilities, as benchmarks of landscape and natural systems unaltered by human activities	SD D N A SA
4. Wilderness rivers and streams should be stocked with native trout species to enhance quality of sport fishing.	SD D N A SA
5. Due to ecological and social impact of large groups, the party size of wilderness travel groups should be limited.	SD D N A SA

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. SD D N A SA

7. Travel in wilderness areas should be restricted to designated travel routes (i e., trails and rivers) SD D N A SA

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., off road vehicles, snowmobiles, etc.) and recreational activities. SD D N A SA

9. Wilderness area should be managed in order to accommodate both non-motorized (e.g., hiking, mountain biking, etc.) and motorized (e.g., off road vehicles, motorcycles, etc.) recreation activities. SD D N A SA

10. Only those areas which, show limited commercial potential, should be allowed to be designated and maintained as wilderness. SD D N A SA

Appendix C Wilderness Issues Cross tabulations with Field Experience

For question one in the Wilderness Issues test, all forest fires should be actively and immediately suppressed, there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDERNESS ISSUES 1				
			strongly disagree	disagree	neutral	agree	Total
Field Experience Level	low	Count	15	19	8	2	44
		% within FIELDEXL	34.1%	43.2%	18.2%	4.5%	100.0%
		% within WILDER1	83.3%	54.3%	66.7%	100.0%	65.7%
		% of Total	22.4%	28.4%	11.9%	3.0%	65.7%
	medium	Count	3	5			8
		% within FIELDEXL	37.5%	62.5%			100.0%
		% within WILDER1	16.7%	14.3%			11.9%
		% of Total	4.5%	7.5%			11.9%
	high	Count		11	4		15
		% within FIELDEXL		73.3%	26.7%		100.0%
		% within WILDER1		31.4%	33.3%		22.4%
		% of Total		16.4%	6.0%		22.4%
Total		Count	18	35	12	2	67
		% within FIELDEXL	26.9%	52.2%	17.9%	3.0%	100.0%
		% within WILDER1	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	26.9%	52.2%	17.9%	3.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig (2-sided)
Pearson Chi-Square	10.474	6	.106
Likelihood Ratio	16.273	6	.012
Linear-by-Linear Association	1.409	1	.235
N of Valid Cases	67		

For question two in the Wilderness Issues test, endangered or threatened species should be given the highest level of protection, even if human recreation and education activities are restricted as a result, there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER2				Total
			disagree	neutral	agree	strongly agree	
FIELDEXL	low	Count	2	1	18	23	44
		% within FIELDEXL	4.5%	2.3%	40.9%	52.3%	100.0%
		% within WILDER2	100.0%	50.0%	66.7%	63.9%	65.7%
		% of Total	3.0%	1.5%	26.9%	34.3%	65.7%
	medium	Count			5	3	8
		% within FIELDEXL			62.5%	37.5%	100.0%
		% within WILDER2			18.5%	8.3%	11.9%
		% of Total			7.5%	4.5%	11.9%
	high	Count		1	4	10	15
		% within FIELDEXL		6.7%	26.7%	66.7%	100.0%
		% within WILDER2		50.0%	14.8%	27.8%	22.4%
		% of Total		1.5%	6.0%	14.9%	22.4%
Total		Count	2	2	27	36	67
		% within FIELDEXL	3.0%	3.0%	40.3%	53.7%	100.0%
		% within WILDER2	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	3.0%	3.0%	40.3%	53.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.591	6	.597
Likelihood Ratio	5.261	6	.511
Linear-by-Linear Association	.693	1	.405
N of Valid Cases	67		

For question three in the Wilderness Issues test, wilderness areas should retain large blocks of backcountry with no facilities, as benchmarks of landscape and natural systems unaltered by human activities , there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER3				Total
			disagree	neutral	agree	strongly agree	
FIELDEXL	low	Count			9	35	44
		% within FIELDEXL			20.5%	79.5%	100.0%
		% within WILDER3			69.2%	67.3%	65.7%
		% of Total			13.4%	52.2%	65.7%
	medium	Count			1	7	8
		% within FIELDEXL			12.5%	87.5%	100.0%
		% within WILDER3			7.7%	13.5%	11.9%
		% of Total			1.5%	10.4%	11.9%
	high	Count	1	1	3	10	15
		% within FIELDEXL	6.7%	6.7%	20.0%	66.7%	100.0%
		% within WILDER3	100.0%	100.0%	23.1%	19.2%	22.4%
		% of Total	1.5%	1.5%	4.5%	14.9%	22.4%
Total		Count	1	1	13	52	67
		% within FIELDEXL	1.5%	1.5%	19.4%	77.6%	100.0%
		% within WILDER3	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	1.5%	1.5%	19.4%	77.6%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig (2-sided)
Pearson Chi-Square	7.511	6	.276
Likelihood Ratio	6.800	6	.339
Linear-by-Linear Association	3.096	1	.078
N of Valid Cases	67		

For question four in the Wilderness Issues test, Wilderness Rivers and streams should be stocked with native trout species to enhance quality of sport fishing, there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER4				
			strongly disagree	disagree	neutral	agree	Total
FIELDEXL	low	Count	9	17	15	3	44
		% within FIELDEXL	20.5%	38.6%	34.1%	6.8%	100.0%
		% within WILDER4	64.3%	60.7%	83.3%	42.9%	65.7%
		% of Total	13.4%	25.4%	22.4%	4.5%	65.7%
	medium	Count	1	4	1	2	8
		% within FIELDEXL	12.5%	50.0%	12.5%	25.0%	100.0%
		% within WILDER4	7.1%	14.3%	5.6%	28.6%	11.9%
		% of Total	1.5%	6.0%	1.5%	3.0%	11.9%
	high	Count	4	7	2	2	15
		% within FIELDEXL	26.7%	46.7%	13.3%	13.3%	100.0%
		% within WILDER4	28.6%	25.0%	11.1%	28.6%	22.4%
		% of Total	6.0%	10.4%	3.0%	3.0%	22.4%
Total		Count	14	28	18	7	67
		% within FIELDEXL	20.9%	41.8%	26.9%	10.4%	100.0%
		% within WILDER4	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	20.9%	41.8%	26.9%	10.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.620	6	.467
Likelihood Ratio	5.668	6	.473
Linear-by-Linear Association	.126	1	.723
N of Valid Cases	67		

For question five in the Wilderness Issues test, due to ecological and social impact of large groups, the party size of wilderness travel groups should be limited , there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER5				Total
			disagree	neutral	agree	strongly agree	
FIELDEXL	low	Count	1	1	14	28	44
		% within FIELDEXL	2.3%	2.3%	31.8%	63.6%	100.0%
		% within WILDER5	100.0%	100.0%	56.0%	70.0%	65.7%
		% of Total	1.5%	1.5%	20.9%	41.8%	65.7%
	medium	Count			2	6	8
		% within FIELDEXL			25.0%	75.0%	100.0%
		% within WILDER5			8.0%	15.0%	11.9%
		% of Total			3.0%	9.0%	11.9%
	high	Count			9	6	15
		% within FIELDEXL			60.0%	40.0%	100.0%
		% within WILDER5			36.0%	15.0%	22.4%
		% of Total			13.4%	9.0%	22.4%
Total		Count	1	1	25	40	67
		% within FIELDEXL	1.5%	1.5%	37.3%	59.7%	100.0%
		% within WILDER5	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	1.5%	1.5%	37.3%	59.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.199	6	.519
Likelihood Ratio	5.675	6	.461
Linear-by-Linear Association	.515	1	.473
N of Valid Cases	67		

For question six in the Wilderness Issues test, wilderness recreationists should be required to pass a test demonstrating their knowledge or appropriate low impact camping techniques prior to being granted a wilderness travel permit, there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER6					Total
			strongly disagree	disagree	neutral	agree	strongly agree	
FIELDEXL	low	Count	2	5	8	20	9	44
		% within FIELDEXL	4.5%	11.4%	18.2%	45.5%	20.5%	100.0%
		% within WILDER6	66.7%	50.0%	72.7%	71.4%	60.0%	65.7%
		% of Total	3.0%	7.5%	11.9%	29.9%	13.4%	65.7%
	medium	Count	1	1	2	1	3	8
		% within FIELDEXL	12.5%	12.5%	25.0%	12.5%	37.5%	100.0%
		% within WILDER6	33.3%	10.0%	18.2%	3.6%	20.0%	11.9%
		% of Total	1.5%	1.5%	3.0%	1.5%	4.5%	11.9%
	high	Count		4	1	7	3	15
		% within FIELDEXL		26.7%	6.7%	46.7%	20.0%	100.0%
		% within WILDER6		40.0%	9.1%	25.0%	20.0%	22.4%
		% of Total		6.0%	1.5%	10.4%	4.5%	22.4%
Total		Count	3	10	11	28	15	67
		% within FIELDEXL	4.5%	14.9%	16.4%	41.8%	22.4%	100.0%
		% within WILDER6	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	4.5%	14.9%	16.4%	41.8%	22.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig (2-sided)
Pearson Chi-Square	7.721	8	.461
Likelihood Ratio	8.472	8	.389
Linear-by-Linear Association	.056	1	.812
N of Valid Cases	67		

For question seven in the Wilderness Issues test, travel in wilderness areas should be restricted to designated travel routes (i.e., trails and rivers) , there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER7					
			strongly disagree	disagree	neutral	agree	strongly agree	Total
FIELDEXL	low	Count	4	19	13	6	2	44
		% within FIELDEXL	9.1%	43.2%	29.5%	13.6%	4.5%	100.0%
		% within WILDER7	50.0%	61.3%	81.3%	75.0%	50.0%	65.7%
		% of Total	6.0%	28.4%	19.4%	9.0%	3.0%	65.7%
	medium	Count	1	5	1		1	8
		% within FIELDEXL	12.5%	62.5%	12.5%		12.5%	100.0%
		% within WILDER7	12.5%	16.1%	6.3%		25.0%	11.9%
		% of Total	1.5%	7.5%	1.5%		1.5%	11.9%
	high	Count	3	7	2	2	1	15
		% within FIELDEXL	20.0%	46.7%	13.3%	13.3%	6.7%	100.0%
		% within WILDER7	37.5%	22.6%	12.5%	25.0%	25.0%	22.4%
		% of Total	4.5%	10.4%	3.0%	3.0%	1.5%	22.4%
Total		Count	8	31	16	8	4	67
		% within FIELDEXL	11.9%	46.3%	23.9%	11.9%	6.0%	100.0%
		% within WILDER7	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	11.9%	46.3%	23.9%	11.9%	6.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.207	8	.735
Likelihood Ratio	6.060	8	.640
Linear-by-Linear Association	.574	1	.448
N of Valid Cases	67		

For question eight in the Wilderness Issues test, 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., off road vehicles, snowmobiles, etc.) and recreational activities, there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER8				
			strongly disagree	disagree	neutral	agree	Total
FIELDEXL	low	Count	17	14	10	3	44
		% within FIELDEXL	38.6%	31.8%	22.7%	6.8%	100.0%
		% within WILDER8	60.7%	73.7%	76.9%	42.9%	65.7%
		% of Total	25.4%	20.9%	14.9%	4.5%	65.7%
	medium	Count	4	1	2	1	8
		% within FIELDEXL	50.0%	12.5%	25.0%	12.5%	100.0%
		% within WILDER8	14.3%	5.3%	15.4%	14.3%	11.9%
		% of Total	6.0%	1.5%	3.0%	1.5%	11.9%
	high	Count	7	4	1	3	15
		% within FIELDEXL	46.7%	26.7%	6.7%	20.0%	100.0%
		% within WILDER8	25.0%	21.1%	7.7%	42.9%	22.4%
		% of Total	10.4%	6.0%	1.5%	4.5%	22.4%
Total		Count	28	19	13	7	67
		% within FIELDEXL	41.8%	28.4%	19.4%	10.4%	100.0%
		% within WILDER8	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	41.8%	28.4%	19.4%	10.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.760	6	.575
Likelihood Ratio	5.138	6	.526
Linear-by-Linear Association	.007	1	.935
N of Valid Cases	67		

For question nine in the Wilderness Issues test, wilderness area should be managed in order to accommodate both non-motorized (e.g., hiking, mountain biking, etc.) and motorized (e.g., off road vehicles, motorcycles, etc.) recreation activities, there was no significance when cross tabulated with field experience levels of low, medium, and high

Crosstab

			WILDER9			
			strongly disagree	disagree	agree	Total
FIELDEXL	low	Count	27	12	5	44
		% within FIELDEXL	61.4%	27.3%	11.4%	100.0%
		% within WILDER9	69.2%	60.0%	62.5%	65.7%
		% of Total	40.3%	17.9%	7.5%	65.7%
	medium	Count	5	1	2	8
		% within FIELDEXL	62.5%	12.5%	25.0%	100.0%
		% within WILDER9	12.8%	5.0%	25.0%	11.9%
		% of Total	7.5%	1.5%	3.0%	11.9%
	high	Count	7	7	1	15
		% within FIELDEXL	46.7%	46.7%	6.7%	100.0%
		% within WILDER9	17.9%	35.0%	12.5%	22.4%
		% of Total	10.4%	10.4%	1.5%	22.4%
Total		Count	39	20	8	67
		% within FIELDEXL	58.2%	29.9%	11.9%	100.0%
		% within WILDER9	100.0%	100.0%	100.0%	100.0%
		% of Total	58.2%	29.9%	11.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.274	4	.370
Likelihood Ratio	4.109	4	.391
Linear-by-Linear Association	.094	1	.759
N of Valid Cases	67		

For question ten in the Wilderness Issues test, only those areas which, show limited commercial potential, should be allowed to be designated and maintained as wilderness, there was no significance when cross tabulated with field experience levels of low, medium, and high.

Crosstab

			WILDER10				
			strongly disagree	disagree	neutral	agree	Total
FIELDEXL	low	Count	37	4	1	2	44
		% within FIELDEXL	84.1%	9.1%	2.3%	4.5%	100.0%
		% within WILDER10	68.5%	40.0%	100.0%	100.0%	65.7%
		% of Total	55.2%	6.0%	1.5%	3.0%	65.7%
	medium	Count	7	1			8
		% within FIELDEXL	87.5%	12.5%			100.0%
		% within WILDER10	13.0%	10.0%			11.9%
		% of Total	10.4%	1.5%			11.9%
	high	Count	10	5			15
		% within FIELDEXL	66.7%	33.3%			100.0%
		% within WILDER10	18.5%	50.0%			22.4%
		% of Total	14.9%	7.5%			22.4%
Total		Count	54	10	1	2	67
		% within FIELDEXL	80.6%	14.9%	1.5%	3.0%	100.0%
		% within WILDER10	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	80.6%	14.9%	1.5%	3.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig (2-sided)
Pearson Chi-Square	6.484	6	.371
Likelihood Ratio	6.733	6	.346
Linear-by-Linear Association	.033	1	.856
N of Valid Cases	67		

Appendix D Gender Cross tabulated with Wilderness Issues

Gender and Wilderness Issues 1

Crosstab

			WILDERNESS 1				
			strongly disagree	disagree	neutral	agree	Total
GENDER	male	Count	12	15	7	2	36
		% within GENDER	33.3%	41.7%	19.4%	5.6%	100.0%
		% within WILDER1	66.7%	42.9%	58.3%	100.0%	53.7%
		% of Total	17.9%	22.4%	10.4%	3.0%	53.7%
	female	Count	6	20	5		31
		% within GENDER	19.4%	64.5%	16.1%		100.0%
		% within WILDER1	33.3%	57.1%	41.7%		46.3%
		% of Total	9.0%	29.9%	7.5%		46.3%
Total		Count	18	35	12	2	67
		% within GENDER	26.9%	52.2%	17.9%	3.0%	100.0%
		% within WILDER1	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	26.9%	52.2%	17.9%	3.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.701	3	.195
Likelihood Ratio	5.490	3	.139
Linear-by-Linear Association	.001	1	.981
N of Valid Cases	67		

Gender and Wilderness Issues 2

Crosstab

			WILDERNESS 2				
			disagree	neutral	agree	strongly agree	Total
GENDER	male	Count		1	13	22	36
		% within GENDER		2.8%	36.1%	61.1%	100.0%
		% within WILDER2		50.0%	48.1%	61.1%	53.7%
		% of Total		1.5%	19.4%	32.8%	53.7%
	female	Count	2	1	14	14	31
		% within GENDER	6.5%	3.2%	45.2%	45.2%	100.0%
		% within WILDER2	100.0%	50.0%	51.9%	38.9%	46.3%
		% of Total	3.0%	1.5%	20.9%	20.9%	46.3%
Total		Count	2	2	27	36	67
		% within GENDER	3.0%	3.0%	40.3%	53.7%	100.0%
		% within WILDER2	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	3.0%	3.0%	40.3%	53.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.481	3	.326
Likelihood Ratio	4.229	3	.238
Linear-by-Linear Association	2.898	1	.089
N of Valid Cases	67		

Gender and Wilderness Issues 3

Crosstab

			WILDERNESS 2				Total
			disagree	neutral	agree	strongly agree	
GENDER	male	Count		1	13	22	36
		% within GENDER		2.8%	36.1%	61.1%	100.0%
		% within WILDER2		50.0%	48.1%	61.1%	53.7%
		% of Total		1.5%	19.4%	32.8%	53.7%
	female	Count	2	1	14	14	31
		% within GENDER	6.5%	3.2%	45.2%	45.2%	100.0%
		% within WILDER2	100.0%	50.0%	51.9%	38.9%	46.3%
		% of Total	3.0%	1.5%	20.9%	20.9%	46.3%
Total		Count	2	2	27	36	67
		% within GENDER	3.0%	3.0%	40.3%	53.7%	100.0%
		% within WILDER2	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	3.0%	3.0%	40.3%	53.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.570	3	.312
Likelihood Ratio	4.333	3	.228
Linear-by-Linear Association	.523	1	.469
N of Valid Cases	67		

Gender and Wilderness Issues 4

Crosstab

			WILDERNESS 4				Total
			strongly disagree	disagree	neutral	agree	
GENDER	male	Count	6	16	9	5	36
		% within GENDER	16.7%	44.4%	25.0%	13.9%	100.0%
		% within WILDER4	42.9%	57.1%	50.0%	71.4%	53.7%
		% of Total	9.0%	23.9%	13.4%	7.5%	53.7%
	female	Count	8	12	9	2	31
		% within GENDER	25.8%	38.7%	29.0%	6.5%	100.0%
		% within WILDER4	57.1%	42.9%	50.0%	28.6%	46.3%
		% of Total	11.9%	17.9%	13.4%	3.0%	46.3%
Total		Count	14	28	18	7	67
		% within GENDER	20.9%	41.8%	26.9%	10.4%	100.0%
		% within WILDER4	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	20.9%	41.8%	26.9%	10.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.780	3	.619
Likelihood Ratio	1.815	3	612
Linear-by-Linear Association	.796	1	372
N of Valid Cases	67		

Gender and Wilderness Issues 5

Crosstab

			WILDERNESS 5				Total
			disagree	neutral	agree	strongly agree	
GENDER	male	Count	1		10	25	36
		% within GENDER	2.8%		27.8%	69.4%	100.0%
		% within WILDER5	100.0%		40.0%	62.5%	53.7%
		% of Total	1.5%		14.9%	37.3%	53.7%
	female	Count		1	15	15	31
		% within GENDER		3.2%	48.4%	48.4%	100.0%
		% within WILDER5		100.0%	60.0%	37.5%	46.3%
		% of Total		1.5%	22.4%	22.4%	46.3%
Total		Count	1	1	25	40	67
		% within GENDER	1.5%	1.5%	37.3%	59.7%	100.0%
		% within WILDER5	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	1.5%	1.5%	37.3%	59.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.156	3	161
Likelihood Ratio	5.933	3	.115
Linear-by-Linear Association	1.569	1	210
N of Valid Cases	67		

Gender and Wilderness Issues 6

Crosstab

			WILDERNESS 6					Total
			strongly disagree	disagree	neutral	agree	strongly agree	
GENDER	male	Count	3	5	9	12	7	36
		% within GENDE	8.3%	13.9%	25.0%	33.3%	19.4%	100.0%
		% within WILDER	100.0%	50.0%	81.8%	42.9%	46.7%	53.7%
		% of Total	4.5%	7.5%	13.4%	17.9%	10.4%	53.7%
	female	Count		5	2	16	8	31
		% within GENDE		16.1%	6.5%	51.6%	25.8%	100.0%
		% within WILDER		50.0%	18.2%	57.1%	53.3%	46.3%
		% of Total		7.5%	3.0%	23.9%	11.9%	46.3%
Total		Count	3	10	11	28	15	67
		% within GENDE	4.5%	14.9%	16.4%	41.8%	22.4%	100.0%
		% within WILDER	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	4.5%	14.9%	16.4%	41.8%	22.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.763	4	.101
Likelihood Ratio	9.244	4	.055
Linear-by-Linear Association	2.712	1	.100
N of Valid Cases	67		

Gender and Wilderness Issues 7

Crosstab

			WILDERNESS 7					Total
			strongly disagree	disagree	neutral	agree	strongly agree	
GENDER	male	Count	6	18	7	3	2	36
		% within GENDER	16.7%	50.0%	19.4%	8.3%	5.6%	100.0%
		% within WILDER1	75.0%	58.1%	43.8%	37.5%	50.0%	53.7%
		% of Total	9.0%	26.9%	10.4%	4.5%	3.0%	53.7%
	female	Count	2	13	9	5	2	31
		% within GENDER	6.5%	41.9%	29.0%	16.1%	6.5%	100.0%
		% within WILDER1	25.0%	41.9%	56.3%	62.5%	50.0%	46.3%
		% of Total	3.0%	19.4%	13.4%	7.5%	3.0%	46.3%
Total		Count	8	31	16	8	4	67
		% within GENDER	11.9%	46.3%	23.9%	11.9%	6.0%	100.0%
		% within WILDER1	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	11.9%	46.3%	23.9%	11.9%	6.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.201	4	.525
Likelihood Ratio	3.285	4	.511
Linear-by-Linear Association	2.194	1	.139
N of Valid Cases	67		

Gender and Wilderness Issues 8

Crosstab

			WILDERNESS 8				
			strongly disagree	disagree	neutral	agree	Total
GENDER	male	Count	17	9	5	5	36
		% within GENDER	47.2%	25.0%	13.9%	13.9%	100.0%
		% within WILDER8	60.7%	47.4%	38.5%	71.4%	53.7%
		% of Total	25.4%	13.4%	7.5%	7.5%	53.7%
	female	Count	11	10	8	2	31
		% within GENDER	35.5%	32.3%	25.8%	6.5%	100.0%
		% within WILDER8	39.3%	52.6%	61.5%	28.6%	46.3%
		% of Total	16.4%	14.9%	11.9%	3.0%	46.3%
Total		Count	28	19	13	7	67
		% within GENDER	41.8%	28.4%	19.4%	10.4%	100.0%
		% within WILDER8	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	41.8%	28.4%	19.4%	10.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.960	3	.398
Likelihood Ratio	3.002	3	.391
Linear-by-Linear Association	123	1	726
N of Valid Cases	67		

Gender and Wilderness Issues 9

Crosstab

			WILDERNESS 9			
			strongly disagree	disagree	agree	Total
GENDER	male	Count	21	10	5	36
		% within GENDER	58.3%	27.8%	13.9%	100.0%
		% within WILDER9	53.8%	50.0%	62.5%	53.7%
		% of Total	31.3%	14.9%	7.5%	53.7%
	female	Count	18	10	3	31
		% within GENDER	58.1%	32.3%	9.7%	100.0%
		% within WILDER9	46.2%	50.0%	37.5%	46.3%
		% of Total	26.9%	14.9%	4.5%	46.3%
Total		Count	39	20	8	67
		% within GENDER	58.2%	29.9%	11.9%	100.0%
		% within WILDER9	100.0%	100.0%	100.0%	100.0%
		% of Total	58.2%	29.9%	11.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.360	2	.835
Likelihood Ratio	363	2	.834
Linear-by-Linear Association	116	1	.734
N of Valid Cases	67		

Gender and Wilderness 10

Crosstab

			WILDERNESS 10				
			strongly disagree	disagree	neutral	agree	Total
GENDER	male	Count	31	4	1		36
		% within GENDER	86.1%	11.1%	2.8%		100.0%
		% within WILDER10	57.4%	40.0%	100.0%		53.7%
		% of Total	46.3%	6.0%	1.5%		53.7%
	female	Count	23	6		2	31
		% within GENDER	74.2%	19.4%		6.5%	100.0%
		% within WILDER10	42.6%	60.0%		100.0%	46.3%
		% of Total	34.3%	9.0%		3.0%	46.3%
Total		Count	54	10	1	2	67
		% within GENDER	80.6%	14.9%	1.5%	3.0%	100.0%
		% within WILDER10	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	80.6%	14.9%	1.5%	3.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.236	3	.237
Likelihood Ratio	5.378	3	.146
Linear-by-Linear Association	1.966	1	.161
N of Valid Cases	67		

Appendix E Age Cross tabulated with Wilderness Issues

Age and Wilderness Issues 1

Crosstab

Count

		WILDERNESS 1				
		strongly disagree	disagree	neutral	agree	Total
AGE	21			2		2
	22	3	2	1		6
	23	2	1			3
	24	2	1	2		5
	25	3	7		1	11
	26	1	4	1		6
	27		4	2		6
	28		3	2		5
	29	3	3	1		7
	30	2	7			9
	31	2	1			3
	32		1			1
	33				1	1
	34		1			1
	35			1		1
Total		18	35	12	2	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	72.032	42	.003
Likelihood Ratio	50.474	42	.173
Linear-by-Linear Association	.338	1	.562
N of Valid Cases	67		

Age and Wilderness Issues 2

Crosstab

Count

		WILDERNESS 2				
		disagree	neutral	agree	strongly agree	Total
AGE	21			2		2
	22			2	4	6
	23	1		1	1	3
	24			1	4	5
	25			7	4	11
	26				6	6
	27			3	3	6
	28			3	2	5
	29		1	2	4	7
	30	1	1	4	3	9
	31			1	2	3
	32				1	1
	33				1	1
	34				1	1
	35			1		1
Total		2	2	27	36	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.592	42	.707
Likelihood Ratio	34.128	42	.801
Linear-by-Linear Association	.014	1	.907
N of Valid Cases	67		

Age and Wilderness Issues 3

Crosstab

Count

		WILDERNESS 3				
		disagree	neutral	agree	strongly agree	Total
AGE	21			1	1	2
	22			1	5	6
	23			1	2	3
	24			1	4	5
	25			3	8	11
	26				6	6
	27	1		1	4	6
	28		1	1	3	5
	29			1	6	7
	30			2	7	9
	31				3	3
	32				1	1
	33				1	1
	34				1	1
	35			1		1
Total		1	1	13	52	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.247	42	.861
Likelihood Ratio	20.728	42	.998
Linear-by-Linear Association	.010	1	.920
N of Valid Cases	67		

Age and Wilderness Issues 4

Crosstab

Count

		WILDERNESS 4				
		strongly disagree	disagree	neutral	agree	Total
AGE	21	1	1			2
	22	2	3	1		6
	23		2		1	3
	24		1	4		5
	25	3	4	4		11
	26		4	1	1	6
	27	1	3	2		6
	28	1	1	1	2	5
	29	3	2	2		7
	30	2	4	2	1	9
	31		2		1	3
	32	1				1
	33				1	1
	34			1		1
	35		1			1
Total		14	28	18	7	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	46.472	42	.293
Likelihood Ratio	46.213	42	302
Linear-by-Linear Association	.651	1	.420
N of Valid Cases	67		

Age and Wilderness Issues 5

Crosstab

Count

		WILDERNESS 5				
		disagree	neutral	agree	strongly agree	Total
AGE	21			1	1	2
	22			2	4	6
	23			1	2	3
	24			2	3	5
	25			3	8	11
	26			2	4	6
	27			1	5	6
	28			4	1	5
	29	1			6	7
	30			5	4	9
	31		1	1	1	3
	32				1	1
	33			1		1
	34			1		1
	35			1		1
Total		1	1	25	40	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	46.353	42	.297
Likelihood Ratio	30.778	42	.900
Linear-by-Linear Association	3.420	1	.064
N of Valid Cases	67		

Age and Wilderness Issues 6

Crosstab

Count

		WILDERNESS 6					
		strongly disagree	disagree	neutral	agree	strongly agree	Total
AGE	21				2		2
	22		1	2	2	1	6
	23			1	2		3
	24				3	2	5
	25	1	2	1	5	2	11
	26		1		3	2	6
	27	1			3	2	6
	28		2	1	1	1	5
	29	1		2	2	2	7
	30		2	2	3	2	9
	31				2	1	3
	32		1				1
	33			1			1
	34			1			1
	35		1				1
Total		3	10	11	28	15	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	47.326	56	.789
Likelihood Ratio	47.587	56	.781
Linear-by-Linear Association	1.534	1	.216
N of Valid Cases	67		

Age and Wilderness Issues 7

Crosstab

Count

		WILDERNESS 7					
		strongly disagree	disagree	neutral	agree	strongly agree	Total
AGE	21		1	1			2
	22		3	2	1		6
	23			2		1	3
	24		3	1		1	5
	25		6	3	2		11
	26		3	1	2		6
	27	2	3	1			6
	28	1	2	1	1		5
	29	3	1	3			7
	30	1	4	1	1	2	9
	31	1	2				3
	32		1				1
	33				1		1
	34		1				1
	35		1				1
Total		8	31	16	8	4	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	51.962	56	.628
Likelihood Ratio	52.886	56	.594
Linear-by-Linear Association	1.687	1	.194
N of Valid Cases	67		

Age and Wilderness Issues 8

Crosstab

Count

		WILDERNESS 8				
		strongly disagree	disagree	neutral	agree	Total
AGE	21	1		1		2
	22		3	1	2	6
	23	3				3
	24	2	1	2		5
	25	6	2	2	1	11
	26	3	1	1	1	6
	27	1	2	3		6
	28	2		2	1	5
	29	4	3			7
	30	3	4	1	1	9
	31	1	1		1	3
	32	1				1
	33		1			1
	34	1				1
	35		1			1
Total		28	19	13	7	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	37.448	42	.671
Likelihood Ratio	44.223	42	.378
Linear-by-Linear Association	.737	1	.391
N of Valid Cases	67		

Age and Wilderness Issues 9

Crosstab

Count

		WILDERNESS 9			
		strongly disagree	disagree	agree	Total
AGE	21		2		2
	22	5	1		6
	23	3			3
	24	3	1	1	5
	25	6	4	1	11
	26	3	1	2	6
	27	2	4		6
	28	1	2	2	5
	29	7			7
	30	5	3	1	9
	31	2	1		3
	32	1			1
	33			1	1
	34	1			1
	35		1		1
Total		39	20	8	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	37.431	28	.110
Likelihood Ratio	38.492	28	.089
Linear-by-Linear Association	.316	1	.574
N of Valid Cases	67		

Age and Wilderness Issues 10

Crosstab

Count

		WILDERNESS 10				
		strongly disagree	disagree	neutral	agree	Total
AGE	21	2				2
	22	5	1			6
	23	3				3
	24	3		1	1	5
	25	9	2			11
	26	5	1			6
	27	4	1		1	6
	28	3	2			5
	29	7				7
	30	8	1			9
	31	3				3
	32		1			1
	33	1				1
	34	1				1
	35		1			1
Total		54	10	1	2	67

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.141[a]	42	.509
Likelihood Ratio	29.627	42	.925
Linear-by-Linear Association	.043	1	.836
N of Valid Cases	67		

a.

Appendix F Education Cross Tabulated with Wilderness Issues

EDUCATION and WILDERNESS 1

Crosstab

			WILDERNESS 1				
			strongly disagree	disagree	neutral	agree	Total
EDUCATIOI	high school	Count	5	5	2		12
		% within EDUCAT	41.7%	41.7%	16.7%		100.0%
		% within WILDER	27.8%	14.3%	16.7%		17.9%
		% of Total	7.5%	7.5%	3.0%		17.9%
	bachelor's degre	Count	13	27	8	2	50
		% within EDUCAT	26.0%	54.0%	16.0%	4.0%	100.0%
		% within WILDER	72.2%	77.1%	66.7%	100.0%	74.6%
		% of Total	19.4%	40.3%	11.9%	3.0%	74.6%
	master's degree	Count		2	2		4
		% within EDUCAT		50.0%	50.0%		100.0%
		% within WILDER		5.7%	16.7%		6.0%
		% of Total		3.0%	3.0%		6.0%
	doctoral degree	Count		1			1
		% within EDUCAT		100.0%			100.0%
		% within WILDER		2.9%			1.5%
		% of Total		1.5%			1.5%
Total		Count	18	35	12	2	67
		% within EDUCAT	26.9%	52.2%	17.9%	3.0%	100.0%
		% within WILDER	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	26.9%	52.2%	17.9%	3.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.334[a]	9	.706
Likelihood Ratio	7.374	9	.598
Linear-by-Linear Association	2.077	1	.150
N of Valid Cases	67		

a. 12 cells (75.0%) have expected count less than 5. The minimum expected count is .03.

EDUCATION and WILDERNESS 2

Crosstab

			WILDERNESS 2				
			disagree	neutral	agree	strongly agree	Total
EDUCATIO	high school	Count	1		6	5	12
		% within EDUCA	8.3%		50.0%	41.7%	100.0%
		% within WILDEF	50.0%		22.2%	13.9%	17.9%
		% of Total	1.5%		9.0%	7.5%	17.9%
	bachelor's degr	Count	1	2	17	30	50
		% within EDUCA	2.0%	4.0%	34.0%	60.0%	100.0%
		% within WILDEF	50.0%	100.0%	63.0%	83.3%	74.6%
		% of Total	1.5%	3.0%	25.4%	44.8%	74.6%
	master's degree	Count			3	1	4
		% within EDUCA			75.0%	25.0%	100.0%
		% within WILDEF			11.1%	2.8%	6.0%
		% of Total			4.5%	1.5%	6.0%
	doctoral degree	Count			1		1
		% within EDUCA			100.0%		100.0%
		% within WILDEF			3.7%		1.5%
		% of Total			1.5%		1.5%
Total		Count	2	2	27	36	67
		% within EDUCA	3.0%	3.0%	40.3%	53.7%	100.0%
		% within WILDEF	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	3.0%	3.0%	40.3%	53.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.836[a]	9	.654
Likelihood Ratio	7.326	9	.603
Linear-by-Linear Association	.049	1	.825
N of Valid Cases	67		

a. 13 cells (81.3%) have expected count less than 5. The minimum expected count is .03.

EDUCATION and WILDERNESS 3

Crosstab

			WILDERNESS 3				
			disagree	neutral	agree	strongly agree	Total
EDUCATIO	high school	Count	1		2	9	12
		% within EDUCA	8.3%		16.7%	75.0%	100.0%
		% within WILDER	100.0%		15.4%	17.3%	17.9%
		% of Total	1.5%		3.0%	13.4%	17.9%
	bachelor's degr	Count		1	9	40	50
		% within EDUCA		2.0%	18.0%	80.0%	100.0%
		% within WILDER		100.0%	69.2%	76.9%	74.6%
		% of Total		1.5%	13.4%	59.7%	74.6%
	master's degree	Count			1	3	4
		% within EDUCA			25.0%	75.0%	100.0%
		% within WILDER			7.7%	5.8%	6.0%
		% of Total			1.5%	4.5%	6.0%
	doctoral degree	Count			1		1
		% within EDUCA			100.0%		100.0%
		% within WILDER			7.7%		1.5%
		% of Total			1.5%		1.5%
Total		Count	1	1	13	52	67
		% within EDUCA	1.5%	1.5%	19.4%	77.6%	100.0%
		% within WILDER	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	1.5%	1.5%	19.4%	77.6%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.260	9	.414
Likelihood Ratio	7.455	9	.590
Linear-by-Linear Association	.024	1	.877
N of Valid Cases	67		

EDUCATION and WILDERNESS 4

Crosstab

			WILDERNESS 4				
			strongly disagree	disagree	neutral	agree	Total
EDUCATIO	high school	Count	4	5	3		12
		% within EDUCAT	33.3%	41.7%	25.0%		100.0%
		% within WILDER	28.6%	17.9%	16.7%		17.9%
		% of Total	6.0%	7.5%	4.5%		17.9%
	bachelor's degre	Count	10	19	14	7	50
		% within EDUCAT	20.0%	38.0%	28.0%	14.0%	100.0%
		% within WILDER	71.4%	67.9%	77.8%	100.0%	74.6%
		% of Total	14.9%	28.4%	20.9%	10.4%	74.6%
	master's degree	Count		3	1		4
		% within EDUCAT		75.0%	25.0%		100.0%
		% within WILDER		10.7%	5.6%		6.0%
		% of Total		4.5%	1.5%		6.0%
	doctoral degree	Count		1			1
		% within EDUCAT		100.0%			100.0%
		% within WILDER		3.6%			1.5%
		% of Total		1.5%			1.5%
Total		Count	14	28	18	7	67
		% within EDUCAT	20.9%	41.8%	26.9%	10.4%	100.0%
		% within WILDER	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	20.9%	41.8%	26.9%	10.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.684	9	.670
Likelihood Ratio	9.150	9	.424
Linear-by-Linear Association	.802	1	.371
N of Valid Cases	67		

EDUCATION and WILDERNESS 5

Crosstab

			WILDERNESS 5				
			disagree	neutral	agree	strongly agree	Total
EDUCATIOI	high school	Count			5	7	12
		% within EDUCAT			41.7%	58.3%	100.0%
		% within WILDER			20.0%	17.5%	17.9%
		% of Total			7.5%	10.4%	17.9%
	bachelor's degre	Count	1	1	18	30	50
		% within EDUCAT	2.0%	2.0%	36.0%	60.0%	100.0%
		% within WILDER	100.0%	100.0%	72.0%	75.0%	74.6%
		% of Total	1.5%	1.5%	26.9%	44.8%	74.6%
	master's degree	Count			1	3	4
		% within EDUCAT			25.0%	75.0%	100.0%
		% within WILDER			4.0%	7.5%	6.0%
		% of Total			1.5%	4.5%	6.0%
	doctoral degree	Count			1		1
		% within EDUCAT			100.0%		100.0%
		% within WILDER			4.0%		1.5%
		% of Total			1.5%		1.5%
Total		Count	1	1	25	40	67
		% within EDUCAT	1.5%	1.5%	37.3%	59.7%	100.0%
		% within WILDER	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	1.5%	1.5%	37.3%	59.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.738	9	.974
Likelihood Ratio	3.498	9	.941
Linear-by-Linear Association	.065	1	.799
N of Valid Cases	67		

EDUCATION and WILDERNESS 6

Crosstab

		WILDERNESS 6					
		strongly disagree	disagree	neutral	agree	strongly agree	Total
EDUCATIC high school	Count		4	1	6	1	12
	% within EDUCA		33.3%	8.3%	50.0%	8.3%	100.0%
	% within WILDE		40.0%	9.1%	21.4%	6.7%	17.9%
	% of Total		6.0%	1.5%	9.0%	1.5%	17.9%
bachelor's degr	Count	2	6	10	20	12	50
	% within EDUCA	4.0%	12.0%	20.0%	40.0%	24.0%	100.0%
	% within WILDE	66.7%	60.0%	90.9%	71.4%	80.0%	74.6%
	% of Total	3.0%	9.0%	14.9%	29.9%	17.9%	74.6%
master's degre	Count	1			1	2	4
	% within EDUCA	25.0%			25.0%	50.0%	100.0%
	% within WILDE	33.3%			3.6%	13.3%	6.0%
	% of Total	1.5%			1.5%	3.0%	6.0%
doctoral degree	Count				1		1
	% within EDUCA				100.0%		100.0%
	% within WILDE				3.6%		1.5%
	% of Total				1.5%		1.5%
Total	Count	3	10	11	28	15	67
	% within EDUCA	4.5%	14.9%	16.4%	41.8%	22.4%	100.0%
	% within WILDE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	4.5%	14.9%	16.4%	41.8%	22.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.832	12	.312
Likelihood Ratio	13.413	12	.340
Linear-by-Linear Association	.919	1	.338
N of Valid Cases	67		

EDUCATION and WILDERNESS 7

Crosstab

			WILDERNESS 7					
			strongly disagree	disagree	neutral	agree	trongly agre	Total
EDUCATIC	high school	Count	1	7	3	1		12
		% within EDUC	8.3%	58.3%	25.0%	8.3%		100.0%
		% within WILDE	12.5%	22.6%	18.8%	12.5%		17.9%
		% of Total	1.5%	10.4%	4.5%	1.5%		17.9%
	bachelor's deg	Count	6	21	13	7	3	50
		% within EDUC	12.0%	42.0%	26.0%	14.0%	6.0%	100.0%
		% within WILDE	75.0%	67.7%	81.3%	87.5%	75.0%	74.6%
		% of Total	9.0%	31.3%	19.4%	10.4%	4.5%	74.6%
	master's degre	Count	1	2			1	4
		% within EDUC	25.0%	50.0%			25.0%	100.0%
		% within WILDE	12.5%	6.5%			25.0%	6.0%
		% of Total	1.5%	3.0%			1.5%	6.0%
	doctoral degre	Count		1				1
		% within EDUC		100.0%				100.0%
		% within WILDE		3.2%				1.5%
		% of Total		1.5%				1.5%
Total		Count	8	31	16	8	4	67
		% within EDUC	11.9%	46.3%	23.9%	11.9%	6.0%	100.0%
		% within WILDE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	11.9%	46.3%	23.9%	11.9%	6.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.434	12	.828
Likelihood Ratio	8.737	12	.725
Linear-by-Linear Association	.070	1	.791
N of Valid Cases	67		

EDUCATION and WILDERNESS 8

Crosstab

			WILDERNESS 8				
			strongly disagree	disagree	neutral	agree	Total
EDUCATION	high school	Count	5	3	2	2	12
		% within EDUCAT	41.7%	25.0%	16.7%	16.7%	100.0%
		% within WILDER8	17.9%	15.8%	15.4%	28.6%	17.9%
		% of Total	7.5%	4.5%	3.0%	3.0%	17.9%
	bachelor's degree	Count	21	14	10	5	50
		% within EDUCAT	42.0%	28.0%	20.0%	10.0%	100.0%
		% within WILDER8	75.0%	73.7%	76.9%	71.4%	74.6%
		% of Total	31.3%	20.9%	14.9%	7.5%	74.6%
	master's degree	Count	2	1	1		4
		% within EDUCAT	50.0%	25.0%	25.0%		100.0%
		% within WILDER8	7.1%	5.3%	7.7%		6.0%
		% of Total	3.0%	1.5%	1.5%		6.0%
	doctoral degree	Count		1			1
		% within EDUCAT		100.0%			100.0%
		% within WILDER8		5.3%			1.5%
		% of Total		1.5%			1.5%
Total		Count	28	19	13	7	67
		% within EDUCAT	41.8%	28.4%	19.4%	10.4%	100.0%
		% within WILDER8	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	41.8%	28.4%	19.4%	10.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.649	9	.933
Likelihood Ratio	3.988	9	.912
Linear-by-Linear Association	.215	1	.643
N of Valid Cases	67		

EDUCATION and WILDERNESS 9

Crosstab

			WILDERNESS 9			
			strongly disagree	disagree	agree	Total
EDUCATION	high school	Count	8	4		12
		% within EDUCATIO	66.7%	33.3%		100.0%
		% within WILDER9	20.5%	20.0%		17.9%
		% of Total	11.9%	6.0%		17.9%
	bachelor's degree	Count	30	13	7	50
		% within EDUCATIO	60.0%	26.0%	14.0%	100.0%
		% within WILDER9	76.9%	65.0%	87.5%	74.6%
		% of Total	44.8%	19.4%	10.4%	74.6%
	master's degree	Count	1	3		4
		% within EDUCATIO	25.0%	75.0%		100.0%
		% within WILDER9	2.6%	15.0%		6.0%
		% of Total	1.5%	4.5%		6.0%
	doctoral degree	Count			1	1
		% within EDUCATIO			100.0%	100.0%
		% within WILDER9			12.5%	1.5%
		% of Total			1.5%	1.5%
Total		Count	39	20	8	67
		% within EDUCATIO	58.2%	29.9%	11.9%	100.0%
		% within WILDER9	100.0%	100.0%	100.0%	100.0%
		% of Total	58.2%	29.9%	11.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.425	6	.037
Likelihood Ratio	11.597	6	.072
Linear-by-Linear Association	4.295	1	.038
N of Valid Cases	67		

EDUCATION and WILDERNESS 10

Crosstab

			WILDERNESS 10				
			strongly disagree	disagree	neutral	agree	Total
EDUCATION	high school	Count	11	1			12
		% within EDUCATIO	91.7%	8.3%			100.0%
		% within WILDER10	20.4%	10.0%			17.9%
		% of Total	16.4%	1.5%			17.9%
	bachelor's degree	Count	41	7	1	1	50
		% within EDUCATIO	82.0%	14.0%	2.0%	2.0%	100.0%
		% within WILDER10	75.9%	70.0%	100.0%	50.0%	74.6%
		% of Total	61.2%	10.4%	1.5%	1.5%	74.6%
	master's degree	Count	2	1		1	4
		% within EDUCATIO	50.0%	25.0%		25.0%	100.0%
		% within WILDER10	3.7%	10.0%		50.0%	6.0%
		% of Total	3.0%	1.5%		1.5%	6.0%
	doctoral degree	Count		1			1
		% within EDUCATIO		100.0%			100.0%
		% within WILDER10		10.0%			1.5%
		% of Total		1.5%			1.5%
Total		Count	54	10	1	2	67
		% within EDUCATIO	80.6%	14.9%	1.5%	3.0%	100.0%
		% within WILDER10	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	80.6%	14.9%	1.5%	3.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.350	9	.110
Likelihood Ratio	9.146	9	.424
Linear-by-Linear Association	5.458	1	.019
N of Valid Cases	67		

Appendix G Basic Ecology and Minimal Impact Correlated with Wilderness Issues

		Basic Ecology	Minimal Impact
Wilderness 1	Pearson Correlation	-.303*	-.016
	Sig. (2-tailed)	.013	.899
	N	67	67
Wilderness 2	Pearson Correlation	.010	-.112
	Sig. (2-tailed)	.937	.366
	N	67	67
Wilderness 3	Pearson Correlation	-.010	-.094
	Sig. (2-tailed)	.934	.448
	N	67	67
Wilderness 4	Pearson Correlation	.207	.103
	Sig. (2-tailed)	.093	.406
	N	67	67
Wilderness 5	Pearson Correlation	.030	-.005
	Sig. (2-tailed)	.812	.970
	N	67	67
Wilderness 6	Pearson Correlation	.044	.006
	Sig. (2-tailed)	.723	.962
	N	67	67
Wilderness 7	Pearson Correlation	.019	-.223
	Sig. (2-tailed)	.878	.070
	N	67	67
Wilderness 8	Pearson Correlation	.075	-.159
	Sig. (2-tailed)	.545	.199
	N	67	67
Wilderness 9	Pearson Correlation	-.166	-.050
	Sig. (2-tailed)	.179	.685
	N	67	67
W10	Pearson Correlation	-.199	-.065
	Sig. (2-tailed)	.107	.600
	N	67	67

*. Correlation is significant at the 0.05 level (2-tailed).

VITA

Michael R. Daniel

Candidate for the Degree of

Masters of Science

Thesis: OUTWARD BOUND INSTRUCTOR'S KNOWLEDGE OF BASIC ECOLOGY, MINIMAL IMPACT, AND WILDERNESS ISSUES

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