

Exploring the Relationship between General and Specific Environmental Attitudes and
Environmentally Responsible Behavioral Intention: A Survey of OHV and
ATV Riders in the Adirondacks

by

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A thesis submitted
in partial fulfillment
of the requirements for the
Master of Science Degree

State University of New York
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May 2010

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Acknowledgements

There are several people and organizations who, without their help this thesis would not have been possible. First of all, thank you to the Department of Environmental Conservation for putting some of the necessary funding toward this project and to the OHV/ATV riders who agreed to participate in this study. Secondly, a special thanks to the members of the North Country ATV Association (NCATVA), who without their assistance, there would never have been enough individuals to even conduct this research, and to the NCATVA club president who was a pleasure to work with.

Another big thank you to my major professor, Chad Dawson, for your help and guidance that made all difference in helping me keep my focus and my sanity over the course of this research. In addition, thank you Rudy Schuster for helping me find the right direction to pursue with my research and getting me involved with this program in the first place.

This thesis would not have been possible without the help of Sarah Barnes, Corey Williams and Jen Baker. To each of you a special thanks for helping me throughout my data collection. Also, thank you Miriam for your help editing and for constructive criticism and support through the last year.

Lastly, I would like to thank my parents, who have provided me with love and encouragement throughout this process and who continue to support me with all of my endeavors. To my sister, Kendra, thank you for your help that one time. To Blake, you have been there to offer encouragement throughout this whole process and I cannot thank you enough. To all my family and friends thank you so much for providing me with comfort, guidance and support.

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Abstract

Barker, Lindsey A. *Exploring the Relationship between General and Specific Environmental Attitudes and Environmentally Responsible Behavioral Intention: A Survey of OHV and ATV Riders in the Adirondacks*. Typed and bound thesis, 150 pages, 49 tables, 14 figures, 2010.

This study examines the relationship between measures of general and specific environmental attitudes and environmentally responsible behavioral intentions. In addition to measuring this relationship the effects of two variables, participation in outdoor recreation activities and community organizations, were also examined to explore their relationship to the study concepts. The purpose of this research is to further examine the relationship between the measures of environmental attitudes and environmentally responsible behavior at both the general and specific levels in a particular recreation group, Off Highway Vehicles (OHV) and All Terrain Vehicles (ATV) recreationists.

Using a mail survey, data was collected in the summer and fall of 2009. Surveys were coded and measures were analyzed using Principle Components Factor Analysis and cross-tabulations to check for relationships between each of the variables. Findings showed that relationships existed between measures of outdoor recreation participation and specific attitudes and behaviors, as well as between general and specific attitudes. Positive relationships were found between participation in environmental community organizations and measures of general environmental attitudes and environmentally responsible behaviors. In addition, the relationship between participation in OHV/ATV organizations was found to have a positive relationship with measures of specific environmental attitudes and environmentally responsible behaviors.

Keywords: ATV, OHV, attitudes, environmentally responsible behavior, intentions, recreation

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Chapter 1

Introduction

This study seeks to add to the existing body of knowledge by examining the relationship between general and specific measures of environmental attitudes and environmentally responsible behavior in addition to selective external factors. To further explore the formation and relationship that environmental attitudes have on individuals and their actions this thesis explores attitude-behavior correspondence in a specific recreation group. While the existence of environmental attitudes has been established in the literature, the formation of these attitudes and external concepts that aid in and affect their formation are still largely unclear.

The relationship between environmental attitudes (EA) and environmentally responsible behavior (ERB) has been the focus of several studies in environmental psychology and recreation research. Early models like those developed by Hines, Hungerford, and Tomera (1986) and Hungerford and Volk (1990) attempted to describe the relationship between these two variables using knowledge of the environment and other psychological variables as main factors affecting an individual's environmental attitudes and how they react to environmental issues. Since these initial models were created several others have been developed that expand on the early relationships and are often utilized to describe the relationship between EA and ERB. Two of the most commonly used models are the norm-activation theory (norm activation model, NAM) (Schwartz 1977) and the theory of planned behavior (TPB) (Ajzen 1985).

Hines, Hungerford, and Tomera (1986) described two types of environmental attitudes that are used to predict ecological behavior: (1) attitudes towards the environment, and (2) attitudes towards ecological behavior. Attitude towards the environment is commonly referred to as environmental concern (Vining & Ebero 1992) and has been defined multiple times as having one or more components that covers either the environment in general or some particular aspect of environment. If attitude toward the environment uses the multiple component approach there is usually a distinction made between cognitive, affective and conative components of attitude. Research of traditional environmental attitudes can be traced back to two studies by Maloney and colleagues (Maloney & Ward 1973; Maloney, Ward & Braucht 1975). These studies used four scales to measure the affective component, factual knowledge about the environment (the cognitive aspect), verbal commitment (behavioral intention) and ecological behavior.

There are several scales used to measure environmental attitudes/environmental concern, one of the more popularly used scales is the new environmental paradigm (NEP). The NEP is a recently developed, single component measure of EA (Dunlap & VanLiere 1978; Dunlap et al. 2000). While some studies use it as a one-dimensional measure, others have used it as a multiple component measure consisting of three dimensions commonly referred to as balance of nature, limits of growth, and humans over nature (Dunlap et al. 2000). In the literature the strength of the relationship between the NEP and ecological behavior ranges from nonexistent (Smith, Haugtvedt & Petty 1994) to weak (Dunlap & VanLiere 1978; Scott & Willits 1994). It is argued that this relatively weak relationship is a reflection of the NEP, as well as other attitude measures, resulting from a shift toward a more evaluative conception of attitude (Dunlap & VanLiere 1978). However, there appears to be at least a moderate relationship between the concepts of EA and ERB.

Previous research concerning environmentally responsible behavior and participation in outdoor recreation is based on the idea that being in direct contact with nature will, in turn, produce positive environmental attitudes and environment awareness which will result in positive environmental behaviors. Dunlap and Heffernan (1975) examined this relationship by hypothesizing that: (1) there is a positive association between outdoor recreation participation and pro-environmental behavior and, (2) there are differences between/among different types of outdoor recreation activities. Since this initial analysis several other researchers (Geisler, Martinson & Wilkening 1977; Pinhey & Grimes 1979; VanLiere & Noe 1981; Jackson 1986 and Nord, Luloff & Bridger 1998) have further examined the association between participation in outdoor recreation and environmental concern, and the results have been far from consistent. More recent studies have examined this relationship by separating outdoor recreation activities by type. For example, Thedori, Luloff and Willits (1998) separated activities into categories based on their extent of resource utilization. However, this separation can result in complicated analysis since while some recreationists fit neatly into one category most participate in multiple activities that incorporate several types of resource use.

While several studies have examined the relationship between outdoor recreation activities and environmentally responsible behavior, none of the previous literature has provided an in depth analysis of a specific activity using multiple measures. Using the concepts of environmentally responsible behavior in conjunction with Ajzen's theory of planned behavior

(Ajzen 1991; Ajzen & Driver 1992) this study examines off-highway vehicle (OHV) and all-terrain vehicle (ATV) users specifically to explore the relationship between general and activity specific EA and intended ERB. The relationship between OHV and ATV use with environmental concern is inconsistent in the literature. For example, some studies have found that motorized activities showed the highest attitude-behavior contingency for ecocentric values (Knopp & Tyger 1973; Jackson & Wong 1982) while it is the general consensus that motorized users do not care about their impact on the environment and lack an awareness of environmental issues. In addition to the negative social and environmental impacts that are associated with OHV and ATV recreationists, ATVs are now being used in combination with other activities (i.e. hunting, fishing) that have traditionally not depended on motorized use.

This study examines the relationship between attitudes and environmentally responsible behaviors in a specific group of recreationists. Other research has examined this relationship in outdoor recreation (Theodori, Luloff & Willits 1998; Thapa & Graefe 2001; Teisl & O'Brien 2003) but none of the studies have conducted such an in depth analysis on a specific activity. The objectives of this thesis are to: (1) examine the relationship of outdoor recreation participation on EA and intended ERB (both general and activity specific); (2) examine the relationship of participation in environmental organizations and OHV/ATV clubs/organizations on EA and intended ERB (both general and activity specific); (3) to investigate the relationship between the variables of EA and ERB; (4) to investigate the relationship between general EA and activity specific EA; and (5) investigate the relationship between general and activity specific measures of ERB. A sixth exploratory question examines the relationship between having children under 18 in the household and an individual's measure of EA and ERB. The overall goal of these six objectives is to further understand the relationship between EA and intended ERB by looking at a specific activity and comparing general measures of EA and intended ERB with activity specific measures.

The proposed relationship between these variables is modeled in Figure 1.1. This model is based on the TPB (Ajzen 1985) and early models developed by Hines, Hungerford and Tomera (1986) and Hungerford and Volk (1990). Using the literature a questionnaire was developed to investigate these relationships. Individual characteristics include relevant socio-demographics and information related to OHV/ATV use (experience use history, riding traits, etc.) as well as community participation in environmental and OHV/ATV organizations.

General EA was measured using the 15-item New Ecological Paradigm (NEP) scale developed by Dunlap et al. (1992), and specific EA was measured using questions developed from the literature and based on a multiple component definition of attitude (cognitive, affective, and conative). Both general and specific intended ERB were measured using questions developed from the literature (including Scott & Willits 1994 and Wakefield et al. 2006). Measures of individual characteristics were based upon variables that have been shown in the literature to have a significant relationship to the formation of environmental attitudes or have an influence on behavior.

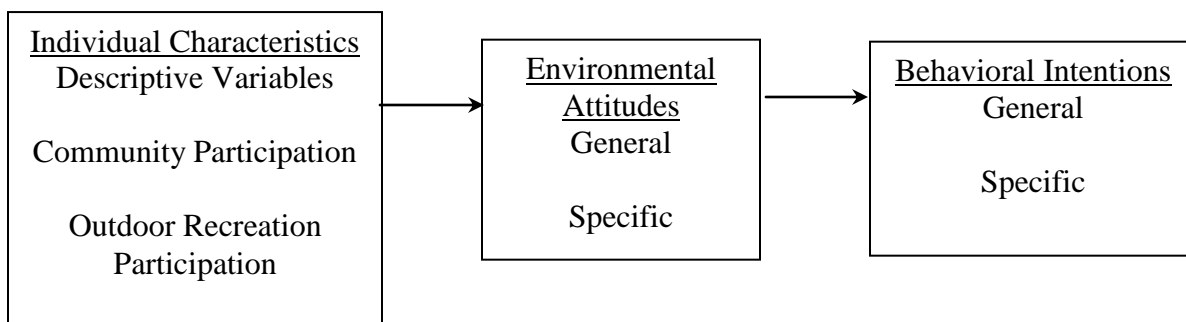


Figure 1.1. Purposed relationship between individual characteristics, environmental attitudes and behavioral intentions.

Problem Statement

While previous studies have examined attitudes toward the environment, behavior, and their relationship at length (including Maloney & Ward 1973; Dunlap & VanLiere 1978; Borden & Schettino 1979; Gamba & Oskamp 1994; Guagnano, Stern & Dietz 1995; Kaiser, Wölfing & Furher 1999; Scott & Willits 1994; Bamberg 2003; and Ewers & Galloway 2004) as well as the role of outdoor recreation participation in this relationship (Dunlap & Heffernan 1975; Geisler, Martinson & Wilkening 1977; VanLiere & Noe 1981; Jackson 1986; Manfreda, Yuan & McGuire 1992; Theodori, Luloff & Willits 1998; Tarrant & Green 1999; Thapa & Graefe 2001 and Teisl & O'Brien 2003) a comparison that examines both EA and ERB at both a general and activity specific levels has not been done. An indepth analysis of this relationship will provide another view at the relationship between EA and ERB and aid in the explanation why or why not individuals who have pro-environmental attitudes do not always have pro-environmental behaviors. This information can be used in the creation and modification of future management

decisions that will have an effect on OHV and ATV recreationists, as well as on other individuals who recreate in the same areas. In addition, this study tests the multidimensionality of the NEP scale when used with a homogeneous population.

OHV and ATV recreationists were used as a sample population for this study for several reasons. First, there are inconsistencies in the literature that relate to the discrepancy between the environmental attitudes and concern by OHV and ATV riders compared to that of the general recreationists. Secondly, OHV and ATV riding is not considered a recreational activity in the management plans for the Adirondacks, but rather as a activity that is used in conjunction with other traditional activities, such as hunting. This designation has lead to several problems with the regulation and management of OHV and ATV riding on state land. OHV/ATV riders also work well as a sample population with the TPB, which will be elaborated on in Chapter 2.

Research Objectives

This study includes the following objectives which will be detailed in Chapter 3:

- 1-** To investigate the relationship between participation in outdoor recreation activities, with respect to their degree of resource utilization, on measures of environmental attitudes and environmentally responsible behavior.
- 2-** To investigate the relationship between active participation in a community organizations or clubs on measures of environmental attitude and pro-environmental intended behavior.
- 3-** To investigate the relationship between environmental attitudes among outdoor recreationists and the relationship to their pro-environmental intended behavior.
- 4-** To investigate the relationship between general and specific measures of environmental attitude.
- 5-** To investigate the relationship between general and specific measures of pro-environmental intended behavior.

- 6- Explore the relationship between individuals who have one or more children under the age of 18 living in their household on measures of environmental attitudes and pro-environmental intended behavior.

Key Definitions

The following terms were used and defined within the context of this study.

All Terrain Vehicle (ATV): A category of OHVs that includes 4 and 6 wheeled vehicles designed primarily for land travel, this does not include off-road motorcycles, 4-wheel drive vehicles or snowmobiles. For the purpose of this study ATVs use is defined as recreational riding only and does not include individuals who only use ATVs for utility and work or racing.

Community Participation: Includes current, active membership environmental/conservation organizations at the local, regional, and international levels as well as ATV and OHV clubs and organizations. For the context of this study community participation does not refer to membership in non-environmental or non-ATV/OHV oriented organizations.

Cooperative Civic Action: Facilitates community empowerment and promotes individual empowerment by linking community members. Activities could include attending public meetings or protests. (Wakefield et al. 2006, p.44)

Environmental Attitudes (EA): Describes the extent to which people evaluate beliefs about the natural resources as desirable (i.e. as good or bad, positive or negative). (Tarrant & Cordell 2002, p.693)

Environmental Concern (EC): A segment of environmental attitudes, refers to the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution (Dunlap & Jones 2002, p.485)

Environmentally Responsible Behavior (ERB): A self-reported measure that asks the individual if they have participated in a variety of environmentally responsible behaviors in the past twelve months. ERB was divided into three broad categories of behaviors including individual civic action, cooperative civic action and personal change.

General Environmental Attitudes: Measured using the NEP scale (Dunlap et al. 2000), describes the environmental orientation of the OHV/ATV rider.

General Intended Environmentally Responsible Behavior: Any individual or group action aimed to do what is right to help protect the environment in general daily practices (Sivek & Hungerford 1989) includes behavioral actions that reflect a sensitivity and advocacy toward protection of the environment.

Individual Civic Action: Refers to individual behaviors that attempt to change social processes (e.g. by donating money to an environmental group or contacting government officials). These activities lead to environmental change and can increase the individuals' sense of empowerment, but they do not result in new linkages to the community (Wakefield et al. 2006, p.44)

Intense Resource-utilization Activities – Refers to motorized activities, ATV/OHV riding, motor boating, and snowmobiling, which have a larger impact on the environment and environmental quality.

Moderate Resource-utilization Activities: Involve activities taking something from the environment and thus represent a 'utilitarian' orientation toward it, or result in a more impacts that slight resource utilization activities. Includes activities classically defined 'consumptive' activities, hunting and fishing, as well as mountain biking, camping and horseback riding.

New Ecological Paradigm (NEP): A revised version of Dunlap & VanLiere's (1978) New Environmental Paradigm scale developed by Dunlap et al. (2000). Includes a 15 items on a Likert-type scale used to measure an individuals' ecological worldview/proenvironmental orientation.

Off-Highway Vehicle (OHV): 'Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain' (EO 11644, Section 2(3)). Includes off-highway motorcycles and dirt bikes as well as 4-wheel drive vehicles (e.g. jeeps) and ATVs intended for recreation activities. For the purposes of this study OHVs does not refer to snowmobiles.

Outdoor Recreation Participation: Involvement in any outdoor recreation activity. Participation in outdoor recreation was measured in two ways, first participants were asked to indicate what activities they participated in within the Adirondack Park in the past twelve months. Second, they were asked to indicate which activity among the ones they checked was their 'most important activity' which was used to delineate which of the activity groups (slight, moderate, or intense resource utilization) they participated with most.

Personal Change: Includes activities in which an individual attempts to personally improve environmental quality (e.g. recycling and green consumerism). These activities may facilitate psychological empowerment and may have direct, yet small environmental results (Stern 2000, p.410), yet they have little to do with community development or control.

Slight Resource-utilization Activities: Includes activities that have minimal impact on the environment that attempt to enjoy nature without altering it (e.g. picnicking, hiking/backpacking, bird watching, etc.)

Specific Environmental Attitudes: Attitudes toward issues relating to OHV/ATVs, their use, and impacts on the environment and other recreation users.

Specific Intended Environmentally Responsible Behavior: Attitudes and behaviors that specifically relate to topics of OHV and ATV use. Irresponsible behavior includes issues such as, riding on unauthorized trails, the creation of new trails in OHV/ATV prohibited areas, environmental impacts and social impacts on other recreationists.

Delimitations

This study was delimited to OHV and ATV recreationists who were 18 years and older using selected areas of the Adirondack Park between June 1st, 2009 and October 31st, 2009. OHV and ATV users who operated solely on private lands, lands outside of the research area, or who were not members of the North Country ATV Association (NCATVA) were not included in this study.

Limitations

One restriction of this research is that the study was based upon a convenience sample, not a random sample, of OHV/ATV recreationists within the Adirondack Park. The purpose of this study was to examine relationships and not to estimate population parameters. Since the amount legal riding space located in the southeastern Adirondacks is minimal, and the amount of recreationists that were sampled during the summer of 2009 as part of a larger visitor study for the DEC was far below the expected number of participants, secondary methods had to be introduced to collect a sufficient sample size for analysis. The list for the mail survey was compiled initially from individuals who participated in the Adirondack Park Visitor Study and answered that they rode an OHV or ATV within the Adirondack Park and, secondly, of

OHV/ATV riders who were active participants of the North Country ATV Association (NCATVA) in September of 2009. Individuals who did not participate in OHV/ATV recreational riding within the park were not included in the study, nor were individuals who did not participate in any form of recreation. Thus, descriptive or inferential conclusions should not be drawn about OHV and ATV recreationists who were not included in the sample for of this study.

Due to space and time concerns on the survey, environmental concern was the only parameter of general attitudes that was included in the study. Other factors of attitude, cognitive and conative, were not measured in a general context. In addition, while the TPB was employed in this study, the aspects of perceived behavioral control and social norms were not included in this study. Situational constraints that may have an effect on intentions or social norms were not included in this study.

Thesis Format

This thesis consists of six chapters. Chapter One serves as an introductory chapter, establishing the goals of the study, outlining the objectives and defining key terms that will be used throughout this research.

Chapter Two consists of a literature review of research and theory on the psychology of environmental attitudes, and their relationship to environmentally responsible behavior. The concepts of attitude and behavioral intentions are reviewed in the context of the Theory of Planned Behavior and the model being applied in this study is introduced. The relationship between outdoor recreation participation and the attitude-behavior relationship is also discussed. Finally, the relationship between general and specific environmental attitudes and behaviors in the context of OHV and ATV recreation is reviewed.

Chapter Three details the methods that were employed in this study and outlines the study hypotheses. Survey design and implementation is discussed and organization and statistical analysis of the data is reviewed.

Chapter Four provides the study's findings from the mail survey. The goals of the study are addressed and hypotheses are reviewed with the results from the statistical analysis. Details of the survey respondents' demographics and experience use history are reviewed and compared to state, regional, and national data.

Chapter Five discusses the results found in Chapter Four, summarizes and discusses the empirical findings. The results from statistical testing on the model created to test the relationship between attitudes and behaviors in this study are reviewed and the results from the hypotheses testing are elaborated upon. The achievements of the objectives of the study are discussed. This chapter concludes by suggesting possible directions for future research based on findings generated by this study.

Chapter 2

Literature Review

This chapter provides an overview of the literature that examines the relationship between environmental attitudes, environmentally responsible behavior and outdoor recreation. This chapter is divided into seven major sections:

- 1- The environmental citizen
- 2- Environmental attitudes
- 3- Environmentally responsible behavior
- 4- The relationship between environmental attitudes and behaviors
- 5- Outdoor recreation and the attitude-behavior relationship
- 6- OHV and ATV use in the Adirondacks
- 7- Summary

It should be noted that this is a selected review of the literature that is directly related to the study objectives and should not be considered a summary of the entire body of literature concerning environmental attitudes and environmentally responsible behavior.

The Environmental Citizen

Citizenship is considered to be a matter of balancing rights and responsibilities. As an environmental citizen an individual makes a commitment to the common good and supports the fact that environmental responsibility follows environmental rights. The concept of environmental citizenship was developed by Hungerford and Volk (1990) who defined an environmental citizen as:

“one who has 1) an awareness and sensitivity to the total environment and its allied problems [and/or issues], 2) a basic understanding of the environment and its allied problems [and/or issues], 3) feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, 4) skills for identifying and solving environmental problems [and/or issues], and 5) active involvement at all levels in working toward resolution of environmental problems [and/or issues].” (pg. 9)

Several studies have examined the concept of environmental citizenship; Furman and Erdur (1999) concluded that a good citizen is expected to perform simple tasks that benefit the community, such as recycling, saving water, and using unleaded gasoline. An environmentalist is expected to support environmental organizations participate in their activities and should have knowledge and skill in the use of environmental action strategies and ecological concepts (Furman & Erdur 1999). An environmental citizen's behavior is influenced by an awareness of what is good for the individual is not necessarily good for a member of the community as a whole. The citizen that sorts her garbage or that prefers ecological goods will often do this because she feels committed to ecological values and ends. The citizen may not, that is, act in sustainable ways solely out of economic or practical incentives: people sometimes choose to do good for other reasons than fear (of punishment or loss) or desire (for economic rewards or social status). An environmental citizen is informed enough about environmental problems to know how to act (i.e. what and why one should recycle, that certain chemical are harmful to the environment). These ideas suggest that there is a relationship between environmental knowledge and activism (Arcury 1990).

There is a close relationship between the idea of an environmental citizen and the concepts of environmental attitude and behavior. Early models of environmentally responsible behavior focused on the assumption that knowledge is linked to attitudes and attitudes to behavior in a linear fashion, and that by being "knowledgeable about the environment and its associated issues... [individuals] will, in turn, become more aware of the environment and its problems and, thus, be more motivated to act toward the environment in more responsible ways" (Hungerford & Volk 1999, p.9). This relationship originated in the field of environmental education and is considered to be the traditional model of the behavior change system (see Figure 2-1).

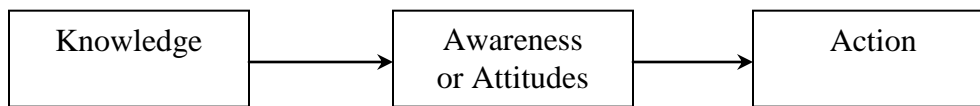


Figure 2.1. The traditional model of the behavior change system utilized in early environmental education models.

The idea of the environmental citizen serves as a backbone for this thesis. The goal of this research is to further explore the relationship between attitudes individuals hold toward the environment and their resulting behaviors, specifically among members of the OHV/ATV community who are considered to be engaging in an activity that is damaging to the environment. Previous research has addressed the relationship between attitudes and behaviors at length; however the association between these concepts is weak to moderate at best. The blame for these weak connections often resides on the lack of specificity between attitude measures and behavior measures. By measuring attitudes and behavior at the specific and general level this study's purpose is to see if a stronger connection can be found to aid in the development of a stronger and more predictive model that can be used for specific activity groups.

Environmental Attitudes

The key to effective management is having an understanding of individual's relationship with the environment, this includes their attitudes, and the basis on which their attitudes are founded (Fulton, Manfredo & Lipscomb 1996; Bright & Manfredo 1995). The majority of research on environmental attitudes includes the concepts of environmental awareness, sensitivity, concern, beliefs, and feelings (Ewers & Galloway 2004). While attitudes toward the environment are commonly used in the literature, many researchers have used this concept to describe other relationships; for example, as a dimension that must be present in consumers who are concerned about ecology (Maloney & Ward 1973), in a triad relationship with feeling and knowledge (Bennet 1974 in Stone et al. 1994), and as a factor paired with behavior to describe environmental concern (Kinnear 1974 in Stone et al. 1994). This section begins by defining attitude and how it relates to environmental concern, how it is influenced by other socio-demographic variables and concepts and finally the methods of measurement that have been used in the literature.

Defining Attitude

The traditional definition of attitude is provided by Allport (1935) who defines attitude as “a mental and neural state of readiness, organized through exerting a directive or dynamic influence upon the individual’s response to all objects and situations with which it is related (pg.810)”. Fishbein and Ajzen (1975) define attitude as ‘a learned predisposition toward some object as either favorable or unfavorable’. In 1993, Eagly and Chaiken (p.1) defined attitude as “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor”, this definition is considered to be the most conventional contemporary definition of attitude (Albarracion, Johnson & Zanna 2005; Milfont 2007). Overall there is a general consensus that attitudes can be viewed as an evaluative summary of judgment of the attributed dimensions of a particular psychological object.

The classical tripartite concept of attitudes as defined by Gray (1985) separated the measurement of attitudes into three components: affective, cognitive, and conative. The affective component is the emotional and evaluative side of attitudes and is generally considered to be synonymous with a more restricted conceptualization of attitude (Fishbein & Ajzen 1975). Descriptions such as good/bad or like/dislike are generally used to measure this component of the attitude model. Vaske (2008) stated that the affective component of attitude refers to general mood and specific emotion and is synonymous with most current definitions of attitude. The cognitive element of attitudes refers to the individual’s professed, self-reported, knowledge of the subject being measured, and in this case environmental issues. Gray (1985) describes this as the beliefs and knowledge an individual has about the nature of an environmental problem, its assumed causes and possible solutions. The final component of attitudes, conative, refers to the verbal commitment associated with the attitude. This can further be described as the readiness to perform or a commitment to support a variety of actions that impact environmental quality on a large scale, such as recycling, or on a smaller, individual scale (e.g. green consumerism); stated support of specific public proposals can also be included in this definition.

Attitudes are formed from beliefs, values and evaluations about an object. According to Ajzen (2001), we can hold multiple attitudes toward any given object but when attitudes change the new attitude overrides, but may not replace, the existing attitude. The evaluation of an object

depends on the context and perspective it is being viewed from; thus attitudes are specific to situations, issues, and objects. Unlike values and beliefs, attitudes can vary in strength and can be very numerous. The research in the field of environmental attitudes has established that evaluative judgments are the result of cognitive processes and the association an individual holds between the attitude and valued attributions. Manfreda, Teel and Bright (2004) further described the evaluative and cognitive dimensions of attitude. The evaluative dimension establishes whether an individual views the object as positive or negative, and the cognitive dimension refers to the beliefs that are associated with the object itself.

Heberlein (1981) described the environment as an object that is consistently present and that has multiple sub-objects which do not, as individual objects, represent the totality. An individual can hold attitudes about specific objects in the environment such as pine trees, a particular lake, the Grand Canyon, etc. He further describes the environment as an experimental object, since no one can experience 'the environment' as a whole; rather individuals experience aspects of the environment that are separate and distinct. For this report a definition of environmental attitudes by Tarrant and Cordell (2002) will be used, this definition describes environmental attitudes as the extent to which people evaluate beliefs about natural resources as desirable; being good or bad, positive or negative. In the context of environmental attitudes Jackson (1986) suggested there were two attitudinal groups, ecocentrics and technocentrics. These groups were based off of the terminology introduced by O'Riordan (1981, p. 1) who stated that "ecocentrism preaches the virtues of reverence, humility, responsibility, and care; it argues for low impact technology (but is not antitechnological); it decries bigness and impersonality in all forms (but especially in the city); and demands a code of behavior that seeks permanence and stability based on ecological principles of diversity and homeostasis. The technocentric ideology, by way of contrast, is almost arrogant in its assumption that man is supremely able to understand and control events to suit his purposes". This dichotomy represents the modern environmental movement where technocentrics are referred to as the dominant social paradigm, relying on technology to fix environmental problems and ecocentrics being on the opposite end of the spectrum. However, not all individuals and environmental groups can be cleanly categorized into belonging to one group or the other. O'Riordan (1981) agreed that the dimensions of each group are often blurred, and that the dichotomy in reality exists as a continuum with ecocentrics on one

end and technocentrics on the other. The area in between includes individuals that are moderately ecocentric or moderately technocentric, Thapa (2000) introduced these individuals as belonging to a third environmental attitude group, dualcentrics.

Environmental Concern

Several researchers have treated environmental concern as an evaluation of, or an attitude toward facts, one's own behavior, or others' behavior with consequences for the environment (Fransson & Garling 1999). Thus environmental concern may refer to both a specific attitude and a general attitude; these possible definitions of environmental concern were referred to by Stern (1992) as value orientations. Stern (1992) classified these value orientations into four categories. In the first definition, environmental concern represents a way of thinking as expressed by the New Environmental Paradigm (NEP) developed in 1978 by Dunlap and VanLiere. The second is related to anthropocentric altruism; which states that people care about the quality of the environment as it affects human health and way of life, placing the value of the environment on its usefulness to humans. For example, both Hopper and Nielsen (1991) and Vining and Ebreo (1992) found that recycling can be predicted by Schwartz's altruism model (Schwartz 1977), a simplified version of Schwartz's altruism model as used in these examples can be seen in Figure 2.4. The third value orientation expresses environmental concern purely as self-interest. Finally, the fourth value orientation was identified by Stern (1992) assuming that environmental concern was the function of a deeper cause, such as religious beliefs or post-materialistic values.

Environmental concern is commonly used in reference to environmental attitudes, and many researchers, including Dunlap and Jones (2002) and VanLiere and Dunlap (1981), use these terms synonymously; other researchers define the two terms separately (Heberlein 1981; Stern & Dietz 1994; Schultz et al. 2005). Environmental concern is now deemed to be one aspect of environmental attitudes that is specifically referring to peoples worry regarding environmental issues. A comparison of definitions of environmental concern and environmental attitudes is given in Table 2.1. For the purposes of this paper environmental concern will be referred to as "a segment of environmental attitudes, that refers to the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution" (Dunlap & Jones 2002, p.485).

The terms environmental concern and environmental attitude can be separated and defined as two parts, the first being environment and the second being either concern or attitude. Environment itself is a term that can have several meanings. Dunlap and Jones (2002) describe three ways that the term environment is commonly divided up into environmental objects that can be measured. The first is by separating the environment into biophysical facets such as air, water, land, etc , secondly by assuring the functions of the biophysical environment in respect to its use to humans (i.e. as a natural resource or a living space). Finally the outcomes of human activities on the environment can be measured, such as attitudes toward resource conservation vs. depletion or development vs. preservation.

Table 2.1. Comparing environmental concern and environmental attitudes: A review of definitions from the literature

Environmental Concern is...	Environmental Attitudes are...
<ul style="list-style-type: none"> • “the totality of ideas on the protection and control of and interference with the natural and artificial environment, as well as the behavioral dispositions connected with them” (Nelissen and Schreurs quoted in Dunlap & Jones, 2002, p.485) • “the degree to which people are aware of problems regarding the environment and support efforts to solve them and/or indicate a willingness to contribute personally to their solution” (Dunlap & Jones, 2002, p.485) • “the affect (i.e., worry) associated with beliefs about environmental problems” (Schultz, Shriver, Tabanico & Khazian 2004, p.31) 	<ul style="list-style-type: none"> • “an organization of beliefs, including an overall evaluation, liking and disliking for some aspects of the environment, the environment as a whole, or some object which has clear and direct effects on the environment” (Heberlein, 1981, p.5) • “the collection of beliefs, affect, and behavioral intentions a person holds regarding environmentally related activities or issues” (Schultz, Shriver, Tabanico & Khazian 2004, p.31) • “concern for environmental quality or environmental concern” (Dunlap and Jones, 2002, p.483)

Influences of Environmental Attitudes

Several studies have examined the effect demographics and individual characteristics have on environmental attitudes. VanLiere and Dunlap (1980) proposed five hypotheses; age, social class, residence, political ideology and gender; which have been used to further explore the concept of environmental attitudes and will be briefly discussed here.

The majority of research agrees that age is negatively correlated with the concept of environmental concern; younger persons are more environmentally concerned than older persons

(VanLiere & Dunlap 1980; Malkis & Grasmick 1977; Hornback 1974 in Dunlap & Jones 1980). This relationship is consistent across longitudinal studies with coefficients ranging from -.2 to -.4, which suggests a moderate negative relationship (Grossman & Potter 1977; Hornback 1974 in Dunlap & Jones 1980). Overall, it has been found that younger individuals tend to be more concerned about environmental quality than older individuals.

Environmental concern is positively associated with education, income and occupational prestige (this combination of factors is also referred to in the literature as 'social class'). This trend has been cited in the literature in numerous studies (VanLiere & Dunlap 1980; Maslow 1970 in Dunlap & Jones 1980; Dunlap & Heffernan 1975; Morrison, 1972). There are two working hypothesis for why this trend exists, Martinson and Wilkening (1975 in VanLiere & Dunlap 1980) propose that upper and middle class individuals are the most politically and socially active segments of American society, and thus are the most concerned about world issues including environmental problems. The other working hypothesis regarding this relationship was published by Buttel and Flinn (1978 in VanLiere & Dunlap 1980), who suggested that lower and working class individuals were as much concerned about environmental problems as members of the upper and middle classes since they typically reside in relatively polluted areas, work in poor physical environments, and have access to poor recreational facilities. Overall the majority of the literature and longitudinal studies agree that individuals with higher education levels have higher levels of environmental concern. The relationship between income level and environmental concern is also positive although it is not as strong as the relationship with education. Martinson and Wilking (1975 in VanLiere & Dunlap 1980) found that upper and middle class were the most politically and socially active members of society. Buttel and Flinn (1978 in VanLiere & Dunlap 1980) hypothesized that lower and working classes are as much or more concerned about environmental problems than the middle and upper classes since they typically reside in relatively polluted areas, work in poor physical environments and have access to poor recreational facilities.

Urban residents are more likely to be concerned than rural residents (VanLiere & Dunlap 1980; Tremblay & Dunlap 1978) and two hypotheses regarding this relationship are commonly observed. The first states that urban residents are more concerned with environmental problems

because they are generally exposed to higher levels of pollution and other types of environmental deterioration, and the second suggests that rural residents are more likely than urbanites to have a utilitarian orientation toward the natural environment because of their involvement with 'extractive' occupations like farming, logging, and mining. However there are many contradictions to this pattern, the coefficients relating the residence of individuals to environmental concern and environmentally responsible behavior vary considerably in magnitude.

While there is only weak observed correlation between the level of environmental concern and Democrats and Republicans (Buttel & Flinn 1978 in Dunlap & VanLiere 1980; Dunlap & Heffernan 1975), there is more support suggesting that political liberals tend to be more supportive of environmental protection than conservatives. Dunlap & Heffernan (1975) suggests that this association may be due to three items: (1) that environmental reforms are generally opposed by businesses and industry because of the costs involved, (2) environmental reforms entail an extension of government activities and regulations, and (3) environmental reforms often require innovative action.

There is no agreement among researchers over the relationship between gender and environmental concern, thus there is little literature that accounts for this demographic variable. Although the research is inconclusive there are two arguments over which gender tends to be more environmentally responsible. McEvoy (1972 in VanLiere & Dunlap 1980) argues that males are more concerned over environmental problems since they are more likely to be politically active, involved in community issues, and have higher levels of education. On the other extreme Passino and Lounsbury (1976 in VanLiere & Dunlap 1980) argue that females will be more concerned with protecting environmental quality since males are more concerned about jobs and economic growth. In addition, Kellert & Berry (1987) found that gender may have an influence on wildlife values, this study sparked several follow up studies including Czech, Devers and Krausman (2001) who found that woman had a greater concern and support for wildlife protection and of the Endangered Species Act.

Measuring Environmental Attitudes

While there are several scales that have been developed to measure environmental attitudes/environmental concern, three scales have been used to measure general environmental attitudes and value orientation by the majority of the literature, the Ecological Attitude scale (Maloney & Ward 1973), the Environmental Concern scale (Weigel & Weigel 1978), and the NEP scale (Dunlap & VanLiere 1978). Each of these scales will be briefly discussed along with its use in the literature; however focus will be on the NEP scale which will be used to measure general environmental attitudes in this thesis.

Maloney and Ward (1973) published one of the best known measures of environmental concern based upon attitude theory. The original version of the Ecological Attitude scale included 128 questions that measured four components of environmental concern, affect (A), verbal commitment (VC), (self-reported) actual commitment (AC), and knowledge (K). The items in the scale were designed to cover a wide range of ecological issues ranging from ecological problems to air pollution and smog. The three scales VC, AC and A were presented in a true/false format while the fourth scale, K, was presented as multiple choice. In 1975 a shortened version of the scale was published, this scale consisting of only 45 questions and increased the practical efficiency of the scale with only a slight decrease in the scale's reliability (Maloney, Ward & Braucht 1975). Both the original and shortened scales were found to have an acceptable level of internal consistency for all scales except for knowledge. The measures of A were correlated with VC and VC was found to be correlated with AC. However, K was not found to have any correlation with the other three measures. The criticism of the Ecological Attitude Scale lays mainly with the fact that Maloney and colleagues did not run a factor analysis on the full scale to determine if the four dimensions representing the facets of environmental concern emerged. Symthe & Brook (1980) performed a factor analysis on the A, VC and AC subscales and found that eight factors emerged; however they did not go into detail regarding which questions loaded together. In addition to this criticism the items used in the scale were also found to be dated and some of the scales were not applicable outside urban areas (Schahn & Holzer 1990). Despite this, the Environmental Attitude scale remains to be the most

comprehensive effort to measure the key facets of environmental concern that are suggested by attitude theory¹ (Dunlap & Jones 2002).

The Environmental Concern Scale developed by Weigel & Weigel (1978) is comprised of 16 items that focus on a wide range of conservation and pollution issues, and is an example of a single scale used to measure environmental concern. This scale uses items that were originally created by Tognacci et al. (1972), 16 of the original 31 questions were selected that had an internal consistency and seemed to be an summated rating scale. Each item was scored 0-4 and a summated score, ranging from 0-64, a higher score indicated a more pronounced concern regarding environmental issues. Weigel and Weigel took a significant amount of time testing the validity and reliability of the scale and found that the scale was useful in predicting pro-environmental behavior (Weigel & Newman 1976). While the Environmental Concern scale does not explicitly tap into the three aspects of attitude theory, the measures of ‘beliefs and feelings’ to reveal predispositions to engage in certain behaviors suggests an interest in the affective, cognitive and conative aspects of attitude. Dunlap and Jones (2002) call this scale a tool that “represents a multiple-topic/multiple-expression measuring instrument, one that appears to provide a valid and reliable means of measuring environmental concern”. While the Environmental Concern scale has been used by several researchers (including Tarrant, Bright & Cordell 1997) it is not beyond criticism. Weigel and Weigel (1978) did not perform a factor analysis to test the unidimensionality of the scale; however another researcher, Gray (1985) did, and questioned whether the scale was truly unidimensional. In addition, similar to the criticism of the Environmental Attitude scale, the questions of the Environmental Concern scale are dated, which may contribute to its limited usefulness as a measurement tool for general environmental concern.

A third measure of environmental concern was created in 1978 by Dunlap and VanLiere, the New Environmental Paradigm (NEP) scale was designed to be a measure that could grasp an ‘environmental worldview’. A set of 12 Likert-type items ranging from 1 (Strongly Agree) to 4 (Strongly Disagree) aimed to measure three facets of environmental concern; beliefs about humans ability to upset the balance of nature, the existence of limits to growth, and beliefs about humans right to rule over the rest of nature. The items deal broadly with the human/environment relations and were considered by the developers to be a single-topic measure; however the three

facets have also been interpreted to be measuring multiple topics. Stern, Dietz and Guagnano (1995, p.725) considered the NEP to be the “most widely used” measure of environmental concern because the items were worded in a manner where they could not be easily dated and NEP scores between the general public and members of environmental groups could be easily distinguished, giving the scale known-group validity and construct validity in that it was shown to have predictive validity for both observed and self-reported behaviors. In addition, Dunlap et al. (2000) noted that the NEP scale worked as expected when it was incorporated into theoretical models that were used to predict specific environmental attitudes and behaviors.

Criticism of the NEP stems from two main areas, conceptual issues and methodological issues. Stern Dietz and Guagnano (1995) described the NEP as having tenuous links to attitude theory, and Reser and Bentrupperbäumer (2000) stated that the NEP did not really measure environmental concern. Fransson and Gärling (1999) agreed, stating that the NEP measures beliefs about the environment, which are a major aspect of EC, but fails to include items that reach the cognitive and behavioral aspects. From a methodological standpoint the NEP has been described as both a single and multi-dimensional scale. Early studies identified three common factors- balance of nature, limits to growth, and anthropocentrism. Dunlap et al. (1992, p.5) note that the “in terms of the multidimensionality, some of the problems may stem from a fundamental flaw of the original NEP scale: Only 4 of the 12 items were worded in anti-NEP direction, and all four focused on anthropocentrism of the belief that nature exists primarily for human use and has no inherent value of its own. It might be that these items have often been found to constitute a distinct dimension at least in part because of response set bias.”

Based on these negative criticisms Dunlap et al. (1992) published a revised NEP scale with 15 items that ranged on a Likert scale of 1 (strongly agree) to 5 (strongly disagree). This ‘New Ecological Paradigm Scale’ was based on “five potential facets of an ecological worldview” including: reality of limits to growth (3 items), antianthropocentrism (3 items), fragility of nature’s balance (3 items), rejection of exemptionalism (3 items) and possibility of an eco-crisis or ecological catastrophe (3 items). The revised NEP scale was designed to be an improvement over the original by increasing the range of the ecological worldview, balancing the pro and anti NEP items and avoiding outdated terminology (Dunlap et al. 2000). Empirical

analysis performed by Dunlap et al. (1992) failed to identify the five conceptual facets of the ecological worldview. This scale still retained its original unidimensionality and had an acceptable internal consistency. Unlike the original NEP scale, where the three factors found had a level of consistency between studies, the revised NEP did not. The revised NEP scale has not been used as widely as the original scale, however several researchers have found three factors (Stern, Dietz & Guagnano 1995; Thapa 1999; Thapa & Graefe 2001), and other studies have four (Floyd & Noe 1996). While there are critics of the NEP (Stern, Dietz & Guagnano 1995) who claim that this instrument is not grounded in social-psychological theories of attitude structure, the NEP remains the most commonly used tool to measure general attitudes toward the environment and will be used in this thesis as the measurement tool for general environmental attitudes.

Environmentally Responsible Behavior

Influencing individuals to participate in environmentally responsible behavior has long been recognized as the ultimate goal of environmental education. While several researchers have studied the influences of ERB at both the general and specific levels, the definition of what exactly ERB is and how its influences change depending on what behavior is specifically being examined. Ostman and Parker (1987) defined ERB as “overt and observable actions taken by a person in response to comprehension of environmental issues to which he/she has had an emotional reaction” (p.7). This definition implies that information needs to be obtained regarding an environmental problem before any action can take place, and is modeled by the traditional behavior change system in environmental education discussed earlier in this chapter (see Figure 2.1). Sia, Hungerford and Tomera (1985) go one step further by describing responsible environmental behavior as a learned response/action, suggesting that knowledge of the issue is not enough, but that an individual needs to know how they can act to aid in the solution of the problem.

The majority of early research about ERB took place in the field of environmental education where several early models of environmental citizenship were proposed. One of the first models that lead to the idea of the environmental citizen was created by Hines, Hungerford and Tomera (1986, see Figure 2.2) who created a diagram that modeled the factors that lead to

responsible environmental behavior. The researchers conducted a meta-analysis of 128 studies that assessed variables that were reported to have an association with pro-environmental behavior. In addition to socio-structural variables, a small portion of the studies also examined the association between attitudes, locus of control/self-efficacy, moral responsibility and behavioral intention with environmentally responsible behavior. They concluded that personality factors, a knowledge of issues and action strategies lead to an intention to act and that responsible environmental behavior was also influenced by situational factors.

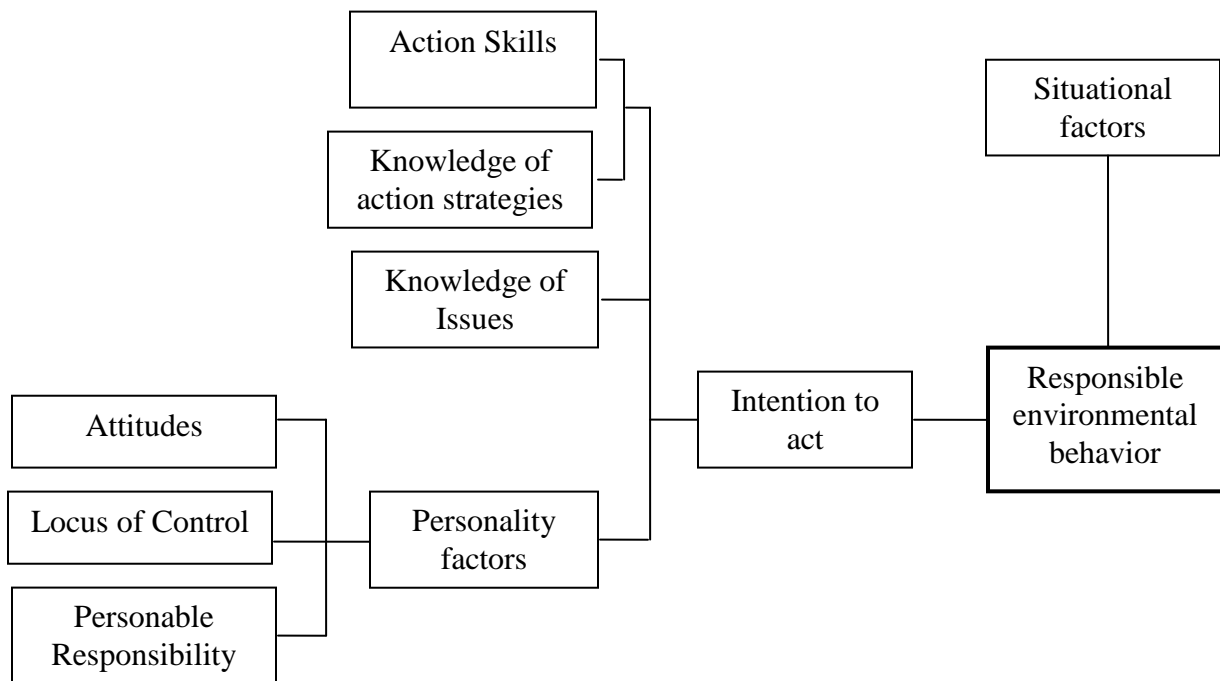


Figure 2.2. The Hines model of responsible environmental behavior (Hines, Hungerford & Tomera 1986).

Hungerford and Volk (1990) utilized the work performed by Hines, Hungerford and Tomera (1986), in addition to several other researchers, by purposing a behavior flow chart that outlined the major and minor variables that contributed to environmental citizenship behavior. These variables were divided into three sections, entry-level variables, ownership variables and empowerment variables (see Figure 2.3). Entry-level variables included sensitivity to environmental problems in addition to having knowledge of ecology, having strong attitudes toward environmental issues and having a neutral general role in society (androgyny). Ownership variables included having an in-depth knowledge of the issues and having a sense of being personally invested in the environment. Other minor variables included knowledge about

the positive and negative consequences of one's behavior and having a personal commitment to the resolution of the issues. Empowerment variables included having the knowledge and skill to employ environmental action strategies, having a strong locus of control (believing that they have control over helping the environment and their actions contribute to the problem/solution) and in-depth knowledge of environmental issues was also considered to be a minor variable.

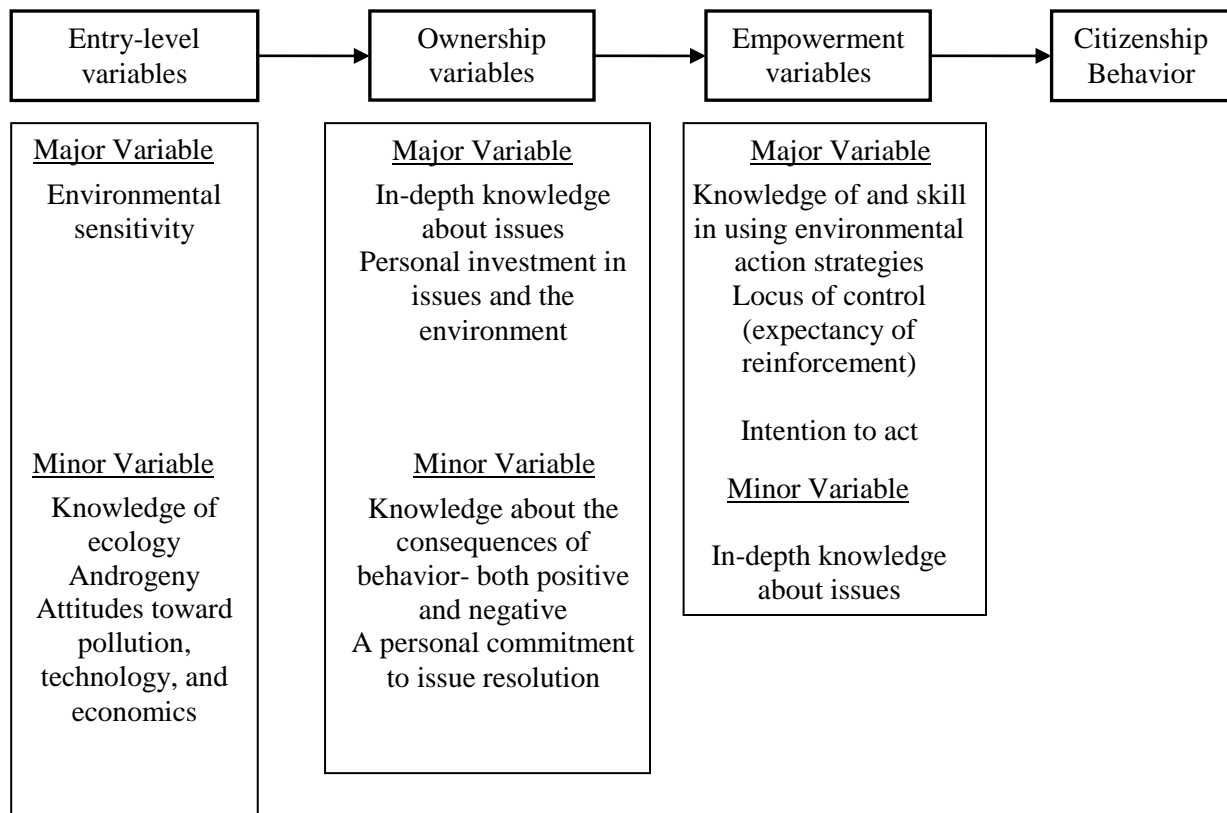


Figure 2.3. Variables associated with environmental citizenship. Behavior flowchart developed by Hungerford and Volk (1990).

In recent literature, ERB has been discussed on a larger and more general scale. Stern (1997 in Stern 2000) defines behavior that is environmentally significant by its impact, the extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself (actions can be indirect or direct). Similarly, Bamberg and Möser (2007 p.15) suggested that “pro-environmental behavior is probably best viewed as a mixture of self-interest and of concern for other people, the next generation, other species, or whole ecosystems”. In this research ERB will be viewed as any

individual or group behavior aimed to do what is right to help protect the environment in general daily practices (Sivek & Hungerford 1989); this definition includes actions that reflect sensitivity to environmental problems and advocacy toward protection of the environment as a whole.

Predictors of ERB

Studies of ERB have received much less scrutiny than research of environmental attitudes. While several researchers have examined predictors of specific pro-environmental behaviors, such as unleaded gas use (Heberlein & Black 1976) and driving frequency (Tanner 1999) there hasn't been an updated model or comprehensive theory of predictors of general environmentally responsible behavior published since the models of Hines, Hungerford and Tomera (1986) and Hungerford and Volk (1990). As shown in the figures above, ERB has several predictors that can be broken down into broad categories: individual characteristics, knowledge about the environment and its problems, knowledge of how to act to aid in the solution of those problems (action strategies), and situational factors.

Individual characteristics have been identified in playing a role in determining who will participate in environmentally responsible behavior. For example Jones and Dunlap (1992) found that young, well-educated, high-income, healthy people are more likely to take environmental actions than those who are older, poorer or ill. However this trend is not consistent across studies. In a continuation of Hines, Hungerford and Tomera's (1986) research Bamberg and Möser (2007) conducted a review of 46 studies (that provided information on 57 independent samples) focusing their search on papers published after 1995 that used the NAM, TPB, or similar theoretical models of pro-environmental behavior. They found that pro-environmental behavioral intention mediated the impact of all of the other psycho-social variables on pro-environmental behavior, and that in addition to attitude and behavioral control, personal moral norm was also a predictor of pro-environmental behavioral intention. Cottrell and Graefe (1997) examined predictors of general ERB and specific ERB in boat owners in Maryland. They found that specific ERB was predicted by education, boat length and years of boating experience (environmental concern was also found to be a moderate predictor); however none of these relationships were significant. General ERB (measured using questions developed from Maloney, Ward and Braucht's (1975) actual commitment scale) was predicted by verbal

commitment and perceived knowledge of ecology, stand on political issues was also found to be a weak predictor.

In summary, a positive relationship has been found between several individuals characteristics (being young, well educated, and having a higher income), proximity characteristics (being close to the problem, having environmental awareness), and community characteristics (having local environmental programs, having access to information and the ability to act). Wakefield et al. (2006) suggest that the research has failed to focus on the relevance of local ecological conditions and local social context to civic participation (i.e. having local environmental programs and knowing where to access information). The development of social networks may be central to the development of local capacity for action (Putnam 1993, 2000).

Self-reported ERB

Wakefield et al. (2006) identified four characteristics that affect an individual's predisposition and capacity to participate in environmental actions. These were classified as individual characteristics (i.e. age, social class, residential status, and health), exposure characteristics (i.e. visibility, duration and intensity of the problem), social network characteristics (i.e. community participation, neighborhood interaction and social support), and community characteristics (i.e. regulations, policies and practices). In addition, Sia, Hungerford and Tomera (1985) found that seven of eight variables tested were found to be statistically significant predictors of environmental behavior: environmental sensitivity, perceived knowledge of environmental action strategies, perceived skill with environmental action strategies, psychological sex role classification, individual locus of control, attitude toward pollution and group locus of control (the eighth predictor, belief in technology, was not found to be a significant predictor).

A wide range of factors and interactions can affect both predisposition and capacity to take action and broke down the actions that are associated with ERB into three categories: personal change, individual civic action, and cooperative civic action (Wakefield et al. 2006). Personal change includes actions that individuals undertake to personally improve environmental

quality, such as green consumerism and recycling. Individual civic action refers to an individual's actions that attempt to change societal processes (i.e. donating to environmental organizations, contacting government officials). Lastly, cooperative civic action refers to actions that promote individual empowerment while facilitating community empowerment, for example attendance at community meetings/clean-up events or protests.

The large majority of the measures that examine pro-environmental behaviors measure self-reported behavior opposed to actual behavior. The use of self-reported behaviors has been debated, since the data collected may not provide an accurate assessment of actual behavior. However, due to the difficulty that researchers encounter measuring actual behaviors, self-reported behavior saves both time and effort. It is suggested that measuring self-reported behaviors is the best option for research (Tarrant & Cordell 1997). Tarrant and Cordell (1997) presented a review of self-reported behaviors collected from several sources (including Cambridge reports/Research International 1990; Gallup & Newport 1990; Roper Organization 1990; Maloney, Ward & Braucht 1975; and Scott & Willits 1994) and offered the following summary:

- 18%-24% of the respondents had contacted a public official about an environmental issue,
- 17%-36% subscribed to environmental publications,
- 26%-32% had attended meetings on environmental issues,
- 40%-49% contributed money to environmental causes,
- 33% of the respondents had voted for a public official (based on environmental reasons),
- over 80% had recycled,
- 70% took into account packaging when purchasing products,
- 58%-64% had switched products for environmental reasons, and
- more than 20% carpooled to work.

In addition, in a study of undergraduates by Thapa (1999) it was found that between 56% and 71% of college students responded that they frequently recycled and sorted their trash. However, of the numerous variables in the study (including participation in the political process, green consumerism, and participation in community clean-up efforts) recycling was found to be the only item that received strong support by students.

Measuring ERB

There have been several scales created to measure ERB; and these scales can be classified into two groups based on whether they are designed to measure intended behavior or actual behavior. For the purpose of this research only scales that were designed to measure intended behavior will be discussed. While there is no real standard measure of ERB, most behavior scales tap into similar themes: recycling, consumerism, political action, and environmental action. Three scales will be briefly discussed that were used, in conjunction with the three categorical definitions of ERB described by Wakefield et al. (2006), to create measures of general and specific intended ERB in this thesis.

The Environmentally Responsible Behavior Index (ERBI) was developed by Smith-Sebasto (1995) to measure the effect of taking an environmental course on student's level of ERB. This self-reported scale consisted of 24 items ranked on a 5-point scale ranging from 1(rarely) to 5(usually). While Smith-Sebasto stated that the scale was designed to be unidimensional, it measured six different action categories: environmental (5 items), civic (3), financial (7), legal (2), persuasion (1) and physical (6). The items used to develop the ERBI scale were taken from Sia, Hungerford and Tomera's (1986) 'Behavioral Inventory of Environmental Action', and the Roper Organization's (1990) 'A guide to the Planet Earth: The American Environmental Test'². While the scale was designed to be unidimensional, results of a factor analysis were never reported in the original study. Thapa (1999) performed a PCA analysis with varimax rotation and clearly identified four factors that explained 62% of the total variance. These factors were labeled as: consumerism (9 items), activism (7 items), educational (5 items) and recycling behavior (3 items).

Kaiser (1998) used three types of ecological behavior measures- a general measure of ecological behavior, three multiple item measures and three single item measures. The general ecological behavior measure consisted of 40 questions to be answered in a yes/no format. There were seven subscales including: pro-social behavior (8 items), ecological garbage removal (5 items), water and power conservation (5 items), ecologically aware consumer behavior (7 items), garbage inhibition (5 items), volunteering in nature protection activities (5 items), and ecological

automobile use (5 items). Three multiple-item measures, which were adopted from Kals (1993 in Kals 1996), attempted to measure three different kinds of readiness: (1) readiness to adopt behaviors that are easy to perform, (2) readiness to adopt behaviors that are difficult to perform and (3) willingness to accept government prohibitions. These measures focused on determining ecological behavior in the realm of pollution and pollution management, using a 6 question Likert-type scale ranging from 1 (completely willing to do) to 6 (under no circumstances willing to do). Three single-item measures, adapted from Fuhrer and Wölfling (1997 in Kaiser, Wölfling & Fuhrer 1999), were found to be empirically independent from one another. These included environmental knowledge (10 items), environmental values (7 items), and ecological behavioral intention (11 items). Kaiser's scale aimed to estimate the probability of an individual behaving ecologically as well as the probability of being able to carry out a certain behavior (how easy it was to carry out the behavior). The major criticism of this scale stemmed from its focus on auto use/driving behavior, and that it did not measure multiple aspects of environmental behaviors.

A third scale that should be mentioned has been used by several researchers as an instrument to measure general ERB and was briefly discussed earlier in this chapter is the actual commitment scale developed by Maloney, Ward and Braucht (1975). The actual commitment scale was used in combination with the measures of knowledge, verbal commitment and affect to create the EAS. In 1994, Scott and Willits used the actual commitment scale in a statewide survey of Pennsylvania citizens to measure behavioral intention in relation to the original NEP scale. Instead of a unidimensional scale, they found two subscales within the measure; consumer behavior (3 items) and political behavior (7 items). In addition, Cottrell (2003) used the scale to measure general ERB among recreational boaters in Chesapeake Bay. While the full scale had a reliability alpha of .68, after a PCA analysis with varimax rotation three factors were identified. The first included 4 items and had a reliability alpha of .67, the second factor consisted of 3 items related to consumer behavior and had a reliability alpha of .63 and the third factor consisted of 3 items and had a reliability index of .47.

Problems with the measurement of ecological behaviors stems from two features of ecological behavior: (1) that some ecological behaviors are more difficult to carry out than others and (2) ecological behavior is susceptible to numerous influences (Kaiser 1998). Frey (1989 in

Tanner, 1999) proposed the ipsative theory of behavior which states that an individual's behavior may be hindered by a lack of opportunity and that this constraint can be imposed by both internal and external conditions. There are several factors that affect the difficulty in carrying out actions and can include community constraints (lack of opportunity, environmental information and programs), monetary constraints and time constraints among several others. Guagnano, Stern and Dietz (1995) suggested that sociocultural constraints also play a part in determining to some extent which ecological behaviors are harder and easier. Kaiser, Wölfling and Fuhrer (1999) suggested a possible solution to this problem may lie in rating ERBs by difficulty of performance. Environmentally significant behavior has also been found to depend on a wide range of causal factors, both general and behavior specific (Stern 2000). Thus a general theory of environmentalism may not be useful for changing specific behaviors since different types of behaviors have different motivational factors and different constraints. Since causal factors can vary greatly across behaviors and individuals, Stern (2000) suggests that each target behavior should be theorized separately to account for this variation.

The Relationship between EA and ERB

Kaiser, Wölfling and Fuhrer (1999) established environmental attitudes as a powerful predictor of environmentally responsible behavior. However, while previous studies have an overall consensus that individuals with a higher level of concern toward the environment are more likely to participate in ERB the results are weak to moderate at best (Borden & Schettino 1979; Dunlap & VanLiere 1978; Gigliotti 1992; Guagnano, Stern & Dietz 1995; Hines, Hungerford & Tomera 1986; Maloney & Ward 1973; Scott & Willits 1994; Tarrant, Bright & Cordell 1997; Thapa 1999, VanLiere & Dunlap 1981; and Vogel 1996). The question that keeps resurfacing in the literature is why do people fail to practice ERB while their attitudes support environmental protection? Tarrant & Green (1999) indicated that "contemporary researchers are no longer questioning if attitudes predict behavior, but rather under what conditions attitudes possess predicative validity" (p.19).

Tarrant & Cordell (1997) provided a review of the literature examining why in many cases attitudes do not predict behavior, they concluded that the weak relationship was based of three factors: (1) attitude specificity, (2) the difference in attitude measurements used by

researchers and (3) external factors (including normative behavior, situational conditions and lack of congruity between specific attitudes and/or variables and actual behaviors). Ewers and Galloway (2004) agreed and expanded on the problems associated with measurement, stating that the problems lie in the statistical analysis techniques used, and that they may be underestimating the actual relationship and that the measurement of EA and ERB may be imprecise, or be measured at different specificity levels.

The specificity of measures has been noted as being of great importance in the correlation of EA and ERB. Ajzen and Fishbein (1980) comment that specific attitudes correlate to specific behaviors and general attitudes correlate to general behaviors, thus most studies try to find a correspondence between the measures being used. Ajzen and Fishbein (1980) also identified four specificity variables (target, context, action, and time) that researchers should be sure to correspond measurement tools they use to relate attitudes and behaviors. In agreement, Fishbein and Manfredo (2002) and Whittaker, Vaske and Manfredo (2006) both found that beliefs, attitudes and behaviors were most strongly related when measured at corresponding levels of specificity. However, specific measures appear to be more strongly affected by situational influences than general measures, which make findings from different domains hard to compare (Kaiser, Wölfling & Fuhrer, 1999). While this is the general consensus there is a lack of agreement about how much measurement specificity really accounts for the overall moderate/weak relationships that have been found. For example, Hines, Hungerford and Volk (1986) found in their meta-analysis that there was only a very small correlation between using a specific and a general attitude-behavior measure. In addition several researchers have used general attitude measures to predict multiple behaviors with moderate success (Dunlap & VanLiere 1978; Weigel & Newman 1976; and Weigel & Weigel 1978). Schwartz and Tessler (1972) argue that being able to predict behavior at the general level has the greatest utility to managers since it allows for the prediction of behaviors across a range of situations. While general attitude measures are good predictors of general environmental behaviors they do not hold the same weight as specific measures.

With the abundant number of instruments that have been used to measure EA and ERB it can be difficult to find comparable studies. For example, environmental concern is a broad concept with several different meanings. Tarrant and Cordell (1997) reviewed five scales

(Environmental Concern scale, Awareness of Consequences scale, Forest Values scale, Roper scale, and the NEP) and found that all of the scales had predictive validity when correlated with a general environmental behavior index although they did vary in strength (in order from strongest: EC, AC, NEP, FV, and ROPER). They concluded that the varying results could be due to different approaches to measurement and statistical analysis and that an effort needs be made to investigate how different methods affect the EA/ERB correspondence.

External factors, such as normative behavior, situational factors, socio-demographic and personality factors have also been shown to have an affect on the relationship between attitudes and behaviors. Predictors such as having direct experience with the attitudinal object were found to enhance the attitude-behavior contingency (Fazio & Zanna, 1978). Being in direct contact with the attitudinal object has been proposed by several researchers to create sensitivity to relevant issues and a predisposition to act. For example, Peterson (1982 in Chawla 1998) researched the relationship between environmental sensitivity and ERB and concluded that “individuals sensitive to environmental processes have a basic appreciation and concern for the natural environment, yet this appreciation and concern is not of enough intensity to motivate them to alter their behavior in behalf of environmental quality (p.5)”. Sensitivity to the environment is an important variable in environmental awareness and individuals who are sensitive to problems concerning the environment have a predisposition to engage in ERB (Chawla 1998). Sia, Hungerford and Tomera (1985) found that participation in outdoor recreation on a continued basis and time spent in pristine environments, in addition to the influence of role models, all have a positive impact on environmental sensitivity. Hungerford and Volk (1990, p.9) defined environmental sensitivity in the context of environmental education as a way “to help social groups and individuals gain a variety of experiences in, and acquire a basic understanding of, the environment and its associated problems [and/or issues]”. Thus, as described by Hungerford and Volk (1990), environmental sensitivity is a prerequisite that would enhance a person’s decision making toward environmentally responsible behavior.

Parenthood

In this research there are two other factors that are proposed to have a relationship with environmental attitudes and environmentally responsible behavior, having children who are

under 18 years of age in the household and participation in community organizations. While both of these predictors have been found to have some relationship with EA and ERB there are not many studies that have included them as variables. Hawthorne and Alabaster (1999) found that a having children present in the household could be linked to a sense of social responsibility and that “individuals with a strong sense of social responsibility are likely to be the most prepared to make sacrifices for the sake of others (individuals, nations, and [future] generations)” (p.27). Thus individuals who have children are more likely to be interested in protecting the environment for future generations. They found that having children had a significant positive correlation with measurements of the affective component of attitude, a sense of social responsibility, and economic orientation. Social responsibility was described by Weigel and Weigel (1978) as an attitude that is commonly used as an indicator of environmental concern. In addition, Uzzell (1994 in Hawthorne & Alabaster 1999) found that children of school age are likely to have a greater influence over their parents. This suggests that teaching children about the importance of protecting the environment may be an effective way of educating adults. Maloney, Ward and Braucht (1975) found that parenthood was a predictor of measures of environmental concern and environmentally responsible behavior. This relates to the definition of ERB as being an action that is motivated by self-interest, a concern for others and the next generation (Bamberg & Möser 2007), thus parents are concerned about the environment and motivated to protect it due to the fact that they want to preserve resources for future generations, namely their children.

Community Participation

A second factor that is suggested in this research to be a predictor of EA and ERB is participation in community organizations. Hawthorne and Alabaster (1999) suggested that “the environmental citizen is likely to be a member of an environmental group” (pg.41) after finding that environmental education and training were the most important predictors of ERB. Members of environmental organizations are also more likely to be involved in political processes that relate to the designation of recreation areas and protection of the environment as it relates to their recreational activity. This is suggested to be because, due to competition and scarcity of resources, members of organizations are concerned about their ‘right to recreate’; especially when new recreation areas are being introduced or when areas are closed to the public (Schutt &

Ostergren 1999). Ewert and Baker (2001) suggests that involvement with the planning process is necessary to support the interests of users of specific natural resource areas. In agreement; Fielding, McDonald and Louis (2008) found that being a member of an environmental group contributed to a stronger behavioral intention to engage in environmental activism. Schuett & Ostergren (1999) sampled active members of the International Mountain Biking Association (IMBA) and the National Off-Highway Vehicle Conservation Council (NOHVCC); examining the relationship between demographics, EUH, riding behavior, environmental concern and involvement in riding organizations. They found that IMBA members were more actively involved in environmental organizations than NOHVCC members and, that IMBA members had a higher correlation with the scale used to measure environmental attitudes (12-item NEP scale). This observation is in agreement with other researchers who have also found diverging attitudes between non-motorized and motorized users (Jackson 1986; Nord, Luloff & Bridger 1998).

Models of the EA/ERB relationship

Several models have been developed to explain the relationship between environmental attitudes and actual behavior, among these are the norm activation theory (Schwartz 1977) and the theories of reasoned action and planned behavior (Ajzen & Fishbein 1980). For the purposes of this research the theory of planned behavior was chosen as the model that would best fit with the hypotheses being tested. After a brief description of Schwartz's norm activation theory, the theory of reasoned action and the theory of planned behavior are both described in depth. While these two models are not the only ones that exist to aid in the explanation of the relationship between EA and ERB, they are among the most commonly used and discussed in the literature. Depending on which of these aspects, pro-social motives or self-interest, a researcher feels has the largest overall affect on the specific pro-environmental behavior being examined the theoretical model applied can be changed. Bamberg & Möser (2007) suggest that researchers who feel environmental behavior is pro-socially motivated tend to use the norm-activation model (NAM, Schwartz 1977) and those who feel self-interest is more important often utilize the theory of planned behavior (TPB, Ajzen 1991).

Schwartz's Norm Activation Theory

The norm-activation theory (Schwartz 1977) and the theory of human values (Schwartz 1994) emphasize pro-social motives and are based off Schwartz's model of altruistic behavior (see Figure 2.4). Schwartz (1977) argued that altruistic behavior would occur when individuals hold personal norms with regard to a specific behavior. Norms are the result of both awareness of the consequences of engaging or not engaging in the behavior and the ascription of personal responsibility for carrying out the altruistic behavior. According to Schwartz norms represent values and attitudes of significant others; we expect others to act in the morally proper way and they expect the same of us. As can be seen in the figure below social norms shape our adoption of personal norms, which are based on strongly internalized moral attitudes (Schwartz & Howard 1980). In this model the transition from attitudes to behaviors is influenced by 2 variables, awareness of consequences (that the action/behavior will have) and ascription of responsibility (for those consequences).

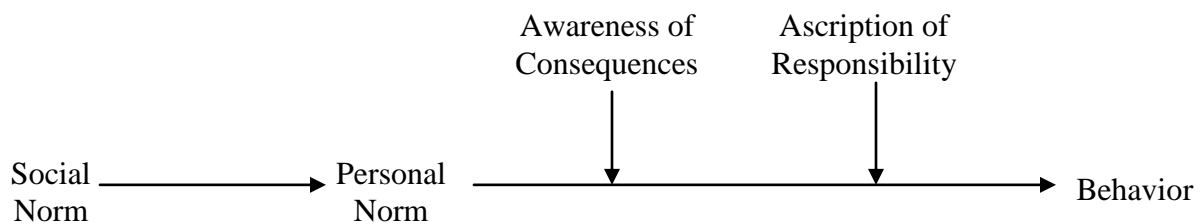


Figure 2.4. Model of Altruistic Behavior. Published originally by Schwartz's (1977)

Several other researchers base their models and assumptions on theories of altruism, claiming that altruism is needed or at least supports pro-environmental behavior. Heberlein (1972) presumed that environmental quality is a public good, and that altruistic motives are necessary for an individual to significantly contribute. The norm activation model assumes that people tend to feel obligated for the welfare of others beyond the prudential interest in favor of one's own well being (Stern, Dietz & Karlof 1993). In the literature results from research that utilizes the norm-activation theory are mixed and there is disagreement among which it variables is the most relevant in the model. Some data suggests the ascription of responsibility if the most relevant concept (Guagnano, Stern & Dietz 1995; Kaiser & Shimoda 1999; VanLiere & Dunlap 1978) others found a personal sense of obligation to be more crucial (Hopper & Nielsen 1991; Vining & Ebreo 1992).

The Theory of Reasoned Action and the Theory of Planned Behavior

Both the theory of reasoned action, TRA, (Ajzen & Fishbein 1980) and the theory of planned behavior, TPB, (Ajzen 1985, 1987) are models that emphasize self interest motives. The theory of planned behavior has been used to measure several topics including environmental activism (Fielding, McDonald & Louis 2008), prediction of leisure behavior (Ajzen & Driver 1992; Ajzen, Nicholas & Driver 1995), and hunting behavior (Hrubes, Ajzen & Daigle 2001; Rossi & Armstrong 1999). Both the TRA and the TPB are “user-friendly” models. They can be modified to sufficiently explain different behaviors, and each of the variables can be broken down and rearranged to fit the researcher’s specific needs (Ajzen 1991). The TPB is an extension of the TRA made necessary by the original model’s limitations in dealing with behaviors over which people have incomplete volitional control. Volitional control refers to whether a person can decide to perform or not perform the behavior (e.g. non-motivational factors such as the availability of requisite opportunities, time, money etc). In Figure 2.5, the theory of planned behavior is represented graphically.

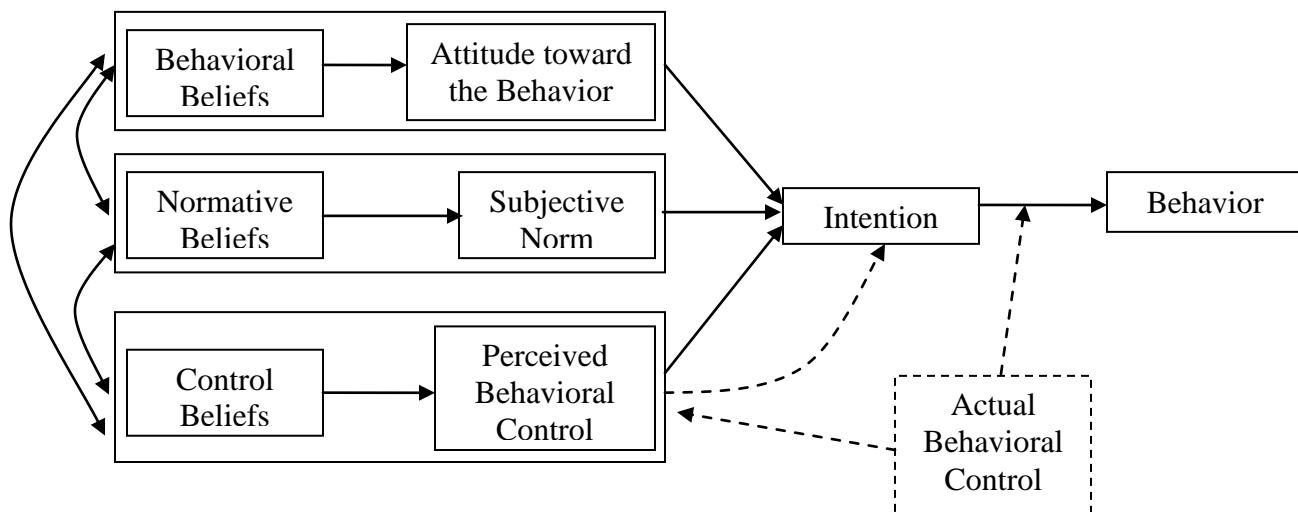


Figure 2.5. The Theory of Planned Behavior (Ajzen 2006)

According to the theory of planned behavior an individual’s actions are guided by three types of considerations- beliefs about the likely consequences of behavior (behavioral beliefs), beliefs

about the normative expectations of others (normative beliefs), and beliefs about the existence and presence of constraints that may affect performance of the behavior (control beliefs). Behavioral beliefs lead to the development of a positive or negative attitude toward the behavior, normative beliefs result in perceived social pressure or subjective norm and control beliefs lead to perceived behavioral control (the ease of performing the behavior). In combination these three variables lead to behavioral intention and, as a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance. Perceived behavioral control is different from Rotter's (1966 in Moseley & Utley 2008) locus of control (LOC) which is a generalized expectancy that remains stable across situations and forms of action. In this context a person may believe that, in general, their outcomes are determined by their own behavior (internal LOC), yet at the same time may also believe that their chances of becoming a commercial airplane pilot, for example, are very slim (low perceived behavioral control). Intention is affected by not only perceived behavioral control but also actual behavioral control.

For this thesis the theory of planned behavior was used as the basis for the construction of a model to explain the relationship between attitudes and behavioral intention. One of the strengths of the TPB is that it allows for the inclusion of additional variables that are relevant to a specific behavioral context (Manstead & Parker 1995). Several other researchers have used TPB for studies on environmentally responsible behavior including recycling, composting, energy use, water conservation, use of sustainable agriculture practices, and general activism. Reviews and meta-analyses have shown support for the TPB for general behaviors, and it has been shown that the inclusion of other variables may help to increase the predictive validity of the model (Armitage & Conner 2001).

Outdoor Recreation and the correlation of EA and ERB

It is the general consensus that being in direct contact with nature creates an appreciation of its existence and support for environmental protection, and that in addition individuals who are active in outdoor recreation activities should have not only a desire to preserve the resources for their specific activity but access to information about environmental problems. In 1975, Dunlap and Heffernan proposed four possible reasons for this trend: (1) involvement in outdoor recreation activities creates an awareness of environmental problems, (2) it creates commitment

to the protection of valued recreation sites, (3) it cultivates an esthetic taste for a “natural” environment fostering generalized opposition to environmental degradation, and (4) it exposes outdoor recreationists to informal and educational campaigns which stress the importance of environmental quality. With these ideas in mind they proposed three hypotheses that sparked the research on the EA/ERB relationship with outdoor recreation participation (Dunlap & Heffernan 1975, p.20):

- There is a positive association between outdoor recreation participation and pro-environmental behavior.
- The association is stronger between appreciative activities and environmental concern than between consumptive activities and environmental concern.
- There is a stronger association between outdoor recreation and concern with protecting aspects of the environment necessary for pursuing such activities than between outdoor recreation and other environmental issues such as air and water pollution.

Outdoor recreation was presented in this study with an appreciative-consumptive dichotomy. According to Dunlap and Heffernan (1975, p.19-20), appreciative activities “involve attempts to enjoy the natural environment without altering it”, these activities are more likely to be associated with a preservationist orientation toward the environment. Some examples of appreciative activities include hiking/backpacking, camping, photography, and canoeing/kayaking. Consumptive activities “involve taking something from the environment and thus reflect a ‘utilitarian’ orientation toward it” (Dunlap and Heffernan, 1975, p. 19). Activities such as hunting and fishing are most often related with this category. In their review of Washington state residents, Dunlap and Heffernan (1975) found that there was mixed, yet generally weak support for the first hypothesis, modest support for the second hypothesis, and somewhat stronger support for the third hypothesis. To check their results for spurious relationships they controlled for five demographic variables: age, gender, residence, education, and income. Although the relationships were weakened slightly there was no loss of significance reported. Their study sparked several other researchers to test the hypotheses proposed, however the overall results have been far from consistent. Table 2.2 offers a summary of the findings from research that has examined the first two hypotheses proposed by Dunlap and Heffernan (1975).

Table 2.2. Overview of papers that have examined the Dunlap and Heffernan (1975) Thesis.
Note: ‘--’, indicates that the hypothesis was not tested in the study.

Study	Hypothesis 1	Hypothesis 2	Hypothesis 3
Dunlap & Heffernan, 1975	mixed	weak support	moderate support
Geisler, Martinson & Wilkening, 1977	mixed	moderate support	--
Jewell, 1978	--	moderate support	mixed
Pinhey & Grimes, 1979	weak support	no support	--
VanLiere & Noe, 1981	no support	weak support	--
Jackson, 1986	--	moderate support	moderate support
Nord, Luloff & Bridger, 1998	mixed	mixed	--
Theodori, Luloff & Willits 1998	strong	none	--

Geisler, Martinson & Wilkening (1977) replicated and expanded Dunlap and Heffernan’s research using data from the 1975 quality of life survey in northwest Wisconsin. Geisler, Martinson & Wilkening examined the first two hypotheses suggested by Dunlap and Heffernan (1975) and found considerable support for the first hypothesis and mixed support for the second. Upon controlling for the five demographic variables Geisler, Martinson & Wilkening found that a number of the associations between measures of outdoor recreation and environmental concern greatly declined, concluding that individual characteristics account for most of the variation in environmental concern. The researchers also included a third category of outdoor recreation categories, ‘abusive’, that included activities such as ATV riding, snowmobiling and mountain biking. Although they were not included in the original study this type of recreation activity was defined by Dunlap and Heffernan (1975) as activities that produce “severe environmental degradation” (p.27). Geisler, Martinson & Wilkening (1977) also observed that “recreationists frequently engage in several outdoor activities at once or in the course of a typical ‘visitor day’” (p.248), and concluded that this factor may also contribute to the generally weak findings.

Jewell (1978 in Theodori, Luloff & Willits 1998) explored Dunlap and Heffernan’s (1975) second and third hypotheses, with slight modifications, among a sample of college students. The results found support for the second hypothesis and mixed support for the third hypothesis.

Pinhey and Grimes (1979) also re-examined the Dunlap and Heffernan thesis (1975) using different measures of environmental concern and involvement in outdoor recreation activities. They found very little support for the first hypothesis and none for the second. When controlling for age, income, occupation, and residence they found involvement in recreation activities to be one of the least efficient predictors of environmental concern. Pinhey and Grimes, in agreement with Geisler, Martinson & Wilkening (1977), concluded that individual characteristics were more important than recreational activity participation in influencing environmental concern.

In 1981, VanLiere and Noe further examined the first two hypotheses proposed by Dunlap and Heffernan (1975), but used “stronger measures of outdoor recreation and environmental attitudes” (p.506). Using Dunlap and VanLiere’s 12-item NEP scale (1978) to measure environmental orientation the researchers predicted that using a different measure of attitudes would produce coefficients that would vary systematically from previous studies. Outdoor recreation was operationalized by determining intensity of participation, by measuring the number of hours each day was spent doing the activity, frequency of participation and number of days spent doing the activity. However the results found no support for the first hypothesis and only somewhat supported the second hypothesis.

VanLiere and Noe (1981) emphasized a “need to identify the influences which might cause individuals to interpret their outdoor experiences in a manner that creates awareness and concern about the environment and causes them to manifest that concern in their actual behavior” (p.512). In their review of the first two hypotheses outdoor recreation was examined using 2 measures, the average number of hours spent per day in each of several activities and number of days during the visit they engage in this activity. A control sample that measured outdoor recreation participation similar to the method used by Dunlap and Heffernan (1975), number of times the individual engaged in activity in the preceding year (never, 1-10, 11-20, 21-more), was also conducted. Environmental orientation was measured using the NEP. The results of the study found that there was no support for the first hypothesis and only weak support for the second., VanLiere and Noe concluded that EA and outdoor recreation were linked in ways important to understanding the development of pro-environmental orientations, but the linkage is

more complex than the existing research proposed (where outdoor recreation is considered an independent variable).

Jackson (1986) examined hypotheses two and three among residents of Edmonton and Calgary, Canada. Outdoor recreation was measured using frequency of participation and environmental attitudes were measured using the NEP scale and the Environmental Attitude Scale (EAS). In addition to the appreciative/consumptive dichotomy used by Dunlap and VanLiere; Jackson included a third category, 'mechanized', which included snowmobiling and mountain biking. The results supported both hypotheses and when the effects of age, education, gender, and income were controlled, the significance levels did not vary considerably.

Recent studies have also continued to examine the hypotheses proposed by Dunlap and Heffernan. Theodori, Luloff and Willits (1998) preformed a more comprehensive test of the second Dunlap /Heffernan (1975) hypothesis by comparing the pro-environmental behaviors of respondents who participated solely in one or more of the appreciative to slight resource utilization activities with pro-environmental behaviors of those who participated in one or more moderate to intensive resource utilization activities. This excluded respondents who participated in at least one outdoor recreation activity from each category. However, this test may not be feasible, but may have some use in procedure as in Jackson (1986). Theodori, Luloff and Willits (1998) found that recreationists who engaged in appreciative to slight resource utilization activities but not in moderate to intensive activities did not differ significantly in regards to pro-environmental behavior from those who engage in moderate/intensive but not appreciative/slight activities. The study found considerable support for the first hypothesis and mixed support for the second.

Finally, Nord, Luloff and Bridger (1998) found considerable support for the first hypothesis using a multivariate regression approach with respect to environmental behavior but no support in terms of environmental concern. Additionally they obtained mixed results for the second hypothesis. Nord, Luloff and Bridger (1998) concluded that the difference between associations is not between appreciative, consumptive, and abusive but whether the activities are motorized.

In summary, the large majority of studies that examine the relationship between environmental attitudes (or environmental concern) and environmentally responsible behavior find that there is (1) a consistent positive association between outdoor recreation and EA and (2) the strength of the relationship varies across different types of outdoor recreation (Teisl & O'Brien 2003). This relationship has been found to be inconsistent, but extremely important. If there is in fact an identifiable relationship between EA/ERB and outdoor recreation participation it demonstrates that there is a possible benefit of recreation involvement that is critical for outdoor recreation management. In addition it creates a commitment to protection of special places and resources for outdoor recreation (Jackson, 1986), specific outdoor recreation activities provide potential constituency for environmental organizations (Dunlap & Heffernan, 1975) and it generates an aesthetic appreciation for a natural vs. a developed environment, promoting an opposition to further environmental degradation (Jackson, 1986). The research on the association between EA and ERB in the context of outdoor recreation may also have important policy dimensions. For example, if participation in outdoor recreation significantly impacts this relationship, then policies and programs that promote these activities could possibly be effective in furthering the environmental agenda.

OHV and ATV use in the Adirondacks

In the context of this research OHV and ATV recreationists will be used as the sample to further study the relationship between EA and ERB at a general and specific level. Motorized recreationists, specifically OHV/ATV riders, were chosen in this study for 2 primary reasons. First, there is a disagreement in the literature regarding the level of environmental concern that individuals who are involved in a recreational activity that is considered to be 'abusive' have toward the environment. Thapa & Graefe (2001) found that individuals who participated in motorized activities (including ATV/OHV riders) showed the highest attitude-behavior contingency for ecocentric and lowest for technocentric attitudes. Knopp & Tyger (1973) found the same relationship with snowmobilers in comparison with cross-country skiers. It has been suggested that this is because the desire for dominance with machine oriented recreationists is very strong and that activities take first priority over environmental protection (Bury, Holland & McEwen 1983). Even though the individuals do not hold negative attitudes to the environment, their drive for dominance supersedes their actions.

Secondly, the model proposed in Chapter 3 is based on the TPB. This study focuses on the relationship between EA and behavioral intention and does not examine other factors included in the study such as norms and behavioral control. Several researchers have found only low correlations between measures of norms and behavioral intentions, and while OHV/ATV riders are subject to constraints to recreation as are all other recreationists, the levels of perceived behavioral control was deemed to be low for this sample group. This is due to high levels of initial investment (cost of equipment, membership to riding areas) and that the large majority of the sample population are members of an OHV/ATV riding club, giving them access to riding areas, training, riding partners. A review of ATV/OHV riding laws and regulations in New York State and the Adirondack Park is provided in Appendix B.

Summary

Even though the 1990s witnessed the highest levels of environmentalism in regard to public attitudes, environmentally responsible behaviors have not simultaneously increased (Tarrant & Cordell 1997). With information regarding global environmental issues only becoming an increasing concern for the public a better understanding of how attitudes about the environment are influenced and their relationship to behaviors is becoming increasingly more important. The question of why people who hold positive attitudes toward environmental protection fail to practice environmental behaviors is still unanswered in many contexts. To further investigate the formation of attitudes and their relationship to measures of behavioral intention at both the general and activity specific level a better understanding of the fundamental concepts is needed. This thesis serves as a test for a model that relates several individual characteristics, such as socio-demographics, participation in community organizations and outdoor recreation activities with measures of environmental attitudes and behaviors at both a general and specific level.

¹ Other researchers have used attitude theory in the construction of measures; refer to the following sources for more information: Schahn & Holzer 1990 and Kaiser, Wölfig & Fuhrer 1999.

² The Roper Organization's (1990) A Guide to Planet Earth: The American Environmental Test was designed by Rush/Winston Productions in conjunction with the United States Environmental Protection Agency (US-EPA) and broadcast by the American Broadcasting Company on April 16, 1991 (in Smith-Sebasto 1995).

Chapter 3 Methodology

This chapter outlines the procedures used to examine the relationship between participation in OHV/ATV recreation, environmental attitudes and environmentally responsible behavior. The chapter is divided into the following sections:

- 1- Study objectives and null hypotheses,
- 2- Description of the study area,
- 3- Sampling and data collection,
- 4- Instrumentation,
- 5- Data analysis, and
- 6- Summary

Study Objectives and Null Hypotheses

This study includes the following objectives and null hypotheses:

Objective 1- To investigate the relationship between participation in outdoor recreation activities, with respect to their degree of resource utilization, on measures of environmental attitudes and environmentally responsible behavior.

Null Hypothesis 1.1 There will be no difference in the relationships between different activity orientation groups (slight, moderate, and intensive) and their measure of environmental attitudes.

Null Hypothesis 1.2 There will be no difference in the relationships between different activity orientation groups (slight, moderate, and intensive) and their measures of pro-environmental intended behaviors.

Objective 2- To investigate the relationship between active participation in a community organization or club on measures of environmental attitude and pro-environmental intended behavior.

Null Hypothesis 2.1 There will be no difference in the relationship of environmental attitude measures between individuals who actively participate in environmentally oriented community organizations and those who do not.

Null Hypothesis 2.2 There will be no difference in the relationship of pro-environmental intended behavior measures between individuals who actively

participate in environmentally oriented community organizations and those who do not.

Null Hypothesis 2.3 There will be no difference in the relationship of environmental attitude measures between individuals who actively participate in OHV/ATV oriented community organizations and those who do not.

Null Hypothesis 2.4 There will be no difference in the relationship of pro-environmental intended behavior measures between individuals who actively participate in OHV/ATV oriented community organizations and those who do not.

Objective 3- To investigate the relationship between environmental attitudes among outdoor recreationists and the relationship to their measure pro-environmental intended behavior.

Null Hypothesis 3.1 There will be no relationship between the measure of general environmental attitude and general pro-environmental intended behavior.

Null Hypothesis 3.2 There will be no relationship between the measure of general environmental attitude and specific pro-environmental intended behavior.

Null Hypothesis 3.3 There will be no relationship between the measure of specific environmental attitude and general pro-environmental intended behavior.

Null Hypothesis 3.4 There will be no relationship between the measure of specific environmental attitude and specific pro-environmental intended behavior.

Objective 4- To investigate the relationship between general and specific measures of environmental attitude.

Objective 5- To investigate the relationship between general and specific measures of pro-environmental intended behavior.

Objective 6- Explore the relationship between individuals who have one or more children under the age of 18 living in their household and environmental attitudes and pro-environmental intended behavior.

Null Hypothesis 6.1 There will be no differences in the relationship of environmental attitudes for individuals who have children under 18 living in their household and those who do not.

Null Hypothesis 6.2 There will be no differences in the relationship of pro-environmental intended behavior for individuals who have children under 18 living in their household and those who do not.

Description of the Study Area

The Adirondack Park is located in upstate New York and encompasses six million acres, of which 2.6 million are classified as New York State Forest Preserve lands and subject to park wide state land classifications and specific unit management plans. The Forest Preserve in the Adirondack Park offers over 1,800 miles of marked trails and several other recreation opportunities including camping, canoeing, hunting, fishing, and snowmobiling. There are nine land classifications within the Forest Preserve based on the capacity the area has to withstand use, these classifications include; wilderness, wild forest, canoe, primitive, intensive use, wild, scenic & recreational rivers, travel corridors, historic and state administration areas. For the purposes of this report only the classifications of areas included in the study will be described in detail. The Adirondack Park State Land Master Plan, APSLMP (NYSDEC 2001), is the document that defines land use guidelines for state land in the forest preserve and therefore it establishes the framework for designation of roads for motor vehicle use in different state land designations. The primary designations of state land in the Forest Preserve are wilderness, primitive and wild forest; the six other state land designations occupy a smaller overall area and serve more specific functions.

Wilderness: The existence of roads and the use of motor vehicles are seen as fundamentally inconsistent with the wilderness classification, and therefore public use of motor vehicles and the creation of new roads are prohibited in wilderness. Existing roads in newly classified wilderness areas need to be closed, and administrative use of motor vehicles in all Wilderness areas is restricted to emergency circumstances.

Primitive Areas: There are approximately 30 primitive areas in the Park, many of which are relatively small parcels that would be part of larger adjacent wilderness areas, but contain nonconforming structures or improvements, such as roads. The goal of the APSLMP is to manage primitive areas in a condition “as close to wilderness as possible;” (NYSDEC 2001, p.27) therefore the guidelines for motor vehicle use and for roads are comparable to the Wilderness guidelines, therefore, except for the existence of some roads, as described above.

Wild Forest: For the purposes of this report, perhaps the most important state land classification is wild forest. This classification applies to units in which “the resources permit a somewhat higher degree of human use than in wilderness, primitive or canoe areas, while retaining an essentially wild character” (NYSDEC 2001, p.32). It should be noted that, although wild

forest areas are guided by a less stringent test of conformity than wilderness, they are still part of the forest preserve and thus are still subject to the “forever wild” clause of the Constitution, Article IVX (US Congress 1964).

There are 52 unit management areas within the Forest Preserve lands of the Adirondack Park. For many of these areas a Unit Management Plan (UMP) has been created by the Department of Environmental Conservation (DEC) under the policies of the Adirondack Park Agency (APA). The main objective for a UMP is to manage public use of the area in a way that is consistent with the land classification and the guidelines for the wild character of those lands in conjunction with the APSLMP.

This study focused on the southeastern area of the Adirondack Park (see Figure 3.1) which includes a total of 648,741 acres (approximately 25% of the total park area) in Essex, Hamilton, Warren, Fulton, Washington and Saratoga counties. In the southeastern quadrant of the Adirondack Park there are ten unit management areas of Forest Preserve Lands, all with their own regulations (see Table 3.1). Of the ten units; eight have UMPs, or draft UMPs written by the NYSDEC. Hoffman Notch and Hudson Gorge do not have working plans; however each area designation (primitive, wilderness or wild forest) has its own regulations regarding motorized use.

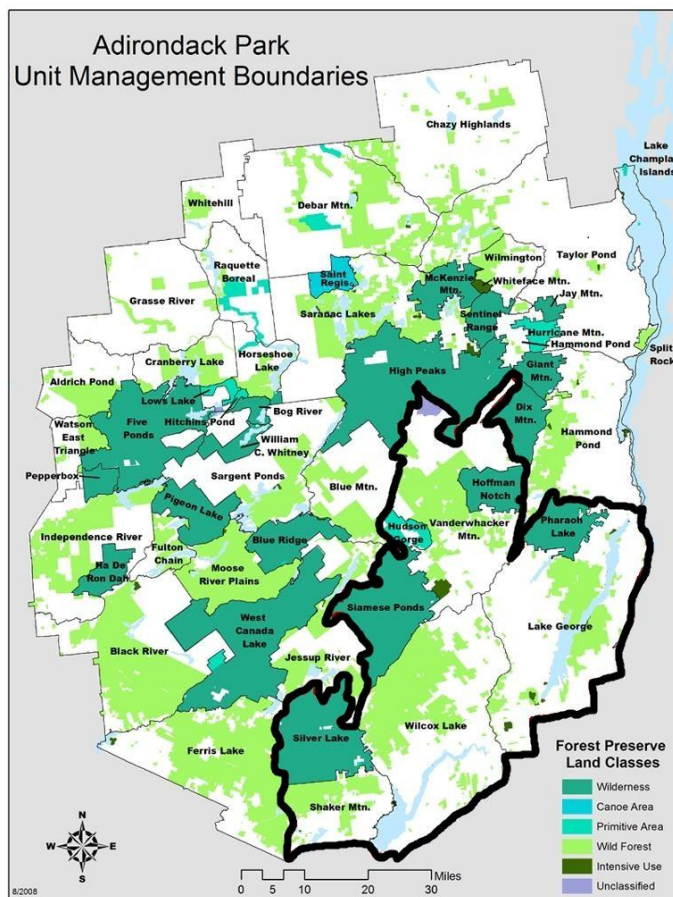


Figure 3.1. Adirondack Park State Unit Management Boundaries Map. Survey area outlined in bold (NYSDEC 2009).

Table 3.1. Description of the unit management areas included in the study (Approximate acreage from New York State Department of Environmental Conservation website (NYSDEC 2009).

Unit Management Area	Abbreviation	Acres	Counties
Hoffman Notch Wilderness Area	HNWA	36,000	Essex
Hudson Gorge Primitive Area	HGPA	17,000	Essex, Hamilton
Hudson River Special Management Area (within LGWF)	HRSMA	5,500	Warren
Lake George Wild Forest	LGWF	71,333	Warren, Washington
Pharaoh Lake Wilderness Area	PLWA	46,283	Essex, Warren
Shaker Mountain Wild Forest	SMWF	40,500	Fulton, Hamilton
Siamese Ponds Wilderness Area	SPWA	114,010	Hamilton, Warren
Silver Lake Wilderness Area	SLWA	106,770	Hamilton
Vanderwhacker Mountain Wild Forest	VMWF	92,000	Essex, Hamilton, Warren
Wilcox Lake Wild Forest	WLWF	140,000	Warren, Hamilton, Saratoga, Fulton
Total Acreage		678,741	

Since there is no motorized use allowed in wilderness or primitive areas; the only opportunities for OHV or ATV riding areas would be in the units with a wild forest land classification. While the UMPs of these areas describe several roads and trails that are subject to illegal use by ATVs, none of the wild forest areas have trails or roads that allow legal ATV access. While opportunities to ride OHVs and ATVs on state land in the southeastern quadrant are nonexistent, there are town roads within the quadrant boundary that are marked for legal seasonal (March 31 through October 1) use by ATVs within the towns of Stony Creek and Thurman, which are located adjacent to the Wilcox Lake Wild Forest. In addition to these roads there are several ATV trails owned and maintained by OHV/ATV clubs and other organizations (e.g. campgrounds) that allow access to members and visitors for a fee. For a more detailed review of New York state law and Adirondack Park rules and regulations regarding OHV and ATV use refer to Appendix B.

Sampling and Data Collection

The Adirondack Visitor Study

This study was part of a larger project aimed at collecting data about visitors and their recreation use on Forest Preserve Lands in the southeastern Adirondack Park. The Adirondack Visitor Study was a cooperative effort by the SUNY College of Environmental Science and Forestry and the New York State Department of Environmental Conservation. The on-site survey consisted of an eight-page questionnaire with a total of twenty questions. The intent of the on-site questionnaire was to collect information regarding where visitors were coming from, the activities in which they were participating, information about their recreation group, and basic demographic information. The last question on the survey asked visitors to participate in a mail survey. Individuals who decided to participate in the mail survey were mailed an additional questionnaire that focused on where information was obtained for their trip, activities they participated in and overall satisfaction with the area.

Data Collection Methods

Two methods were employed for collecting data for this study. The first method utilized the Adirondack Visitor Study to collect names and addresses of individuals who used ATVs or OHVs within the Adirondack Park. If these individuals agreed to participate in a mail survey they were mailed a copy of the OHV and ATV Recreation Survey (see Appendix A) in place of the regular mail survey. Originally it was estimated that by using this method, enough ATV and OHV riders would be collected to form a reasonable sample. However, due to the lack of legal riding areas in the southeastern Adirondacks, the number of visitor survey participants who also rode OHVs or ATVs within the park was far lower than originally anticipated and a second method of data collection was employed. This method involved contacting OHV/ATV clubs that were active in the southeastern area of the Adirondacks to participate in the mail survey.

Surveys using the Adirondack Visitor Study were collected during the summer (June 1- August 31) and the fall (September 1- October 31) of 2009. The Adirondack Visitor Survey was administered at trail heads throughout the southeastern quadrant; a trail head was sampled for three and a half hours either in the morning or afternoon. From these trail heads; OHV/ATV

riders were only encountered in five areas (see Table 3.2) and a total survey number of 17 was obtained. Each of these individuals was mailed a survey packed within two weeks of taking the visitor survey. Each survey pack included a cover letter (see Appendix A), a copy of the survey, and a reply envelope that was pre-posted and addressed. Using a modified Dillman Total Design Method (Dillman 1978), there were three total mailings included in the study. If after two weeks the survey was not returned; a reminder letter was sent to the participant. If after an additional two weeks the survey was still not returned; a second packet was sent that included a cover letter, a second copy of the survey and a reply envelope.

Table 3.2. Location of surveys collected during Adirondack Visitor Survey sampling (June 1-October 31, 2009).

Unit	Trail head	# of OHV/ATV surveys from site
Lake George Wild Forest	Jabe Pond	7
	Hewitt Pond	1
Pharaoh Lakes Wilderness Area	Sucker Brook	1
	Crane Pond	1
	Long Swing	1
	Woods Lake	1
Silver Lake Wilderness Area	Thirteenth Lake	1
Siamese Ponds Wilderness Area	John Pond	1
	Murphy Middle	1
Wilcox Lake Wild Forest	Bennett	2
	Round/Lizard Pond	2
Total		17

Due to the extremely low numbers of OHV/ATV riders encountered during the visitor survey sampling; an effort was made to contact OHV/ATV clubs who were active in the southeastern area of the park. Using the club/organization list provided by the New York State Off-Highway Recreational Vehicle Association (NYSORVA); clubs who were based in towns within the southeastern Adirondacks were contacted. Due to poor contact information for several of the clubs; only one club responded and agreed to participate in the survey (the North Country ATV Association). The North Country ATV Association (NCATVA) is based out of Greenfield Center, NY. To protect the privacy of the members, the president of NCATVA agreed to mail survey packets to all current members. A package of 140 pre-sealed survey packets, containing a cover letter, survey and return envelope, was sent to the club president to be addressed and mailed out to the 140 current members.

Instrumentation

The 2009 OHV and ATV Recreation Survey consisted of six pages and had a total of 21 questions, several of which had multiple parts. The questionnaire was divided into six sections for ease of answering which covered outdoor recreation activities in the Adirondacks, involvement with environmental and OHV/ATV organizations, OHV and ATV ownership and use history, opinions toward the environment and OHVs/ATVs, background information and environmental behavior (see Table 3.3). A copy of the final survey is located in Appendix A.

Table 3.3. Outline of sections included in the OHV and ATV Recreation Survey

Section	Measuring	Questions
A	Outdoor recreation participation	1-2
B	Community participation	3-4
C	OHV and ATV ownership and use	5-12
D	Attitudes toward the environment and OHV/ATV use	13-14
E	Individual characteristics	15-19
F	Environmentally responsible behavior	20-21

Outdoor Recreation Participation

Outdoor recreation activities were measured using two questions. The first asked “During the last 12 months, did you participate in any of the following activities in the Adirondack Park?” and asked respondents to check the box next to any activities in which they had participated. The list consisted of 21 activities with a space for individuals to write in another activity if it was not included on the list. A second question asked participants to write in which of the activities listed was, in general, their most important recreation activity. This designation was used by Thapa and Graefe (2001) to separate respondents into categories for analysis based on the amount of resource utilization for each recreational activity. In their research Thapa and Graefe (2001) used the labels of appreciative, consumptive, and motorized for classification of recreation activities. The original labels for consumptive and appreciative typology were developed by Dunlap & Heffernan (1975). Other researchers including Thedori, Luloff and Willits (1998) and Cottrell (2003) used a similar method for organizing activities but employed different labels on activities, separating them by the degree of resource utilization: slight, moderate or intense. Using this classification the recreation activities were labeled using these three categories and respondents were separated into three groups for analysis (see Table

3.4). A slight modification of the classification scheme used by Theodori, Luloff and Willits (1998) was made, moving Camping and Mountain Biking from the moderate category to the slight resource utilization category.

Table 3.4. Classification of outdoor recreation activities on the 2009 OHV and ATV Recreation Survey (based on Theodori, Luloff & Willits 1998).

Classification	Outdoor recreation activity
Slight Resource Utilization	Hiking/backpacking Skiing (cross-county or downhill) Snowshoeing Picnicking Birdwatching/Wildlife watching Viewing Scenery Swimming Canoeing/kayaking Photography Jogging/trail running Mountain Biking Camping
Moderate Resource Utilization	Hunting Fishing Insect collection Mushroom hunting Horseback riding
Intense Resource Utilization	Snowmobiling Off-road vehicles (ORVs) All terrain vehicles (ATVs) Motorboating

Community Participation

Section B was designed to assess the respondent's involvement in environmental and OHV/ATV organizations. An individual was asked to check if they actively participate in environmental or conservation organizations and, if they answered yes, to list the organizations they were involved in at the local, regional, national or international level. A similar second question asked the individual about their active participation in OHV and/or ATV riding clubs or organizations, and to list any they were involved with. The purpose of this section was to investigate whether individuals who were actively involved with an organization that focused on environmental or OHV/ATV riding issues had a different measures of attitude toward the

environment and environmentally responsible behavior than those who were not a member of a club or organization.

OHV/ATV Ownership and Use

Section C consisted of eight questions to gather additional information regarding OHV/ATV riders experience and use characteristics. The questions were derived from the literature to compare the sample group to others used in similar studies (see Table 3.5). There was a total of four fill in the blank questions and four check-box questions which instructed the respondent to ‘check all that apply’ with the exception of ‘riding ability level’ which the individual classified themselves as being a novice, intermediate, advanced, or expert rider.

Table 3.5. Survey questions on OHV and ATV ownership and use history for the 2009 OHV and ATV Recreation Survey.

Rider Characteristics	Variable	Type of Question	Source
General	What types of OHVs or ATVs do you ride?	Check-box	Baker 2008; D’Luhosch 2008
OHV/ATV Use	What activities do you use OHVs or ATVs for?	Check-box	Lord 2006
	What is your OHV or ATV riding ability level?	Check-box	Baker 2008; Schutt & Ostergren 1999
	For how many years have you been riding OHVs or ATVs?	Fill in the blank	Baker 2008; Lord 2006
	How many days per year do you ride your OHV or ATV?	Fill in the blank	Baker 2008; Lord 2006
	What areas in the Adirondacks do you ride your OHV or ATV	Check-box	D’Luhosch 2008
OHV/ATV Ownership	How many OHVs or ATVs do you own in your household?	Fill in the blank	Lord 2006
	How many OHV or ATV riders live in your household?	Fill in the blank	Lord 2006

Environment Attitudes

To assess opinions toward the environment and OHVs/ATVs, Section D was split into 2 questions. The first question used the revised New Ecological Paradigm scale (Dunlap et al. 1992) which consisted of 15 items tied to a 5-point Likert Scale format, ranging from Strongly

disagree (1) to Strongly agree (5). Even though the scale was based on five facets of environmental attitudes: (1) reality of limits to growth, (2) anti-anthropocentrism, (3) fragility of nature's balance, (4) rejection of exemptionalism and (5) possibility of an eco-crisis, the authors maintain that the NEP scale is unidimensional with a high degree of internal consistency. Despite this the NEP scale has been identified in several studies as having multiple factors. Thapa (1999) identified three factors when using the NEP to measure college student's environmental attitudes, and Floyd & Noe (1996) identified three samples in Moores Creek National Battlefield Sample and three factors in another sample at the Cape Lookout National Seashore. Unlike the original version of the NEP scale, where three factors were consistently identified by researchers, the revised scale lacks the same level of cohesiveness considering the multiple factors that have been identified. In addition, the authors failed to identify the five conceptual facets that were involved in the development of the measure. With this in mind the revised NEP scale will be used to further test the dimensionality of the scale and to serve as a measure of general environmental attitudes (see Table 3.6). Eight of the 15 items were reverse coded to maintain the directionality of the scale. A higher score indicates a greater agreement with the dominant environmental paradigm, suggesting a greater concern for the environment.

Table 3.6. Items used to measure general environmental attitudes: The revised NEP scale.

Revised NEP Scale Item
Humans have the right to modify the natural environment to suit their needs.
Human ingenuity will ensure that we do not make the earth unlivable.
The earth has plenty of natural resources if we just learn how to develop them.
The balance of nature is strong enough to cope with the impacts of modern industrial nations.
The so called "ecological crisis" facing human-kind has been greatly exaggerated.
Humans will eventually learn enough about how nature works to be able to control it.
Humans were meant to rule over the rest of nature.
Reverse coded items
We are approaching the limit of the number of people that the earth can support.
When we interfere with nature, it often produces disastrous consequences.
Plants and animals have as much right as humans to exist.
Humans are severely abusing the environment.
Despite our special abilities humans are still subject to the laws of nature.
If things continue on their present course, we will soon experience a major ecological catastrophe.
The balance of nature is very delicate and easily upset.
The earth is like a spaceship with very limited room and resources.

The second question in Section D was designed to assess respondent's specific environmental attitudes toward OHV/ATV riding issues. These questions were based upon a scale developed by D'Luchosh (2008) and had a foundation in attitude theory. D'Luchosh (2008) purposed two main issues in response to OHV/ATV use and the environment; creation of new trails and riding where OHV/ATV use is prohibited. For this study a third issue was added, environmental/social impacts. Overall there were 17 total items that aimed to measure the cognitive, affective, and conative dimensions of attitude (see Table 3.7). There were five questions that measured the cognitive component of attitude, three of the questions measured professed knowledge, and the other two focused on environmental/social impacts of OHV/ATV use. Another six questions addressed the affective component using terminology such as good/bad, like/dislike, and positive/negative. For this component four questions referred to the emotional aspect of the component, and the other two measured the evaluative aspect. Lastly, the final 6 questions addressed the conative component of attitudes focusing on the individual's verbal commitment to close trails if needed (three questions) and regarding permitting use on trails and roads (three questions). Specific attitudes were measured on a 5-point Likert scale from (1) strongly disagree to (5) strongly agree. To maintain a consistent directionality six of the 17 items were reverse coded, a low overall score on the scale indicated an individual's attitudes were more OHV/ATV-centric than individuals with a higher score.

Table 3.7. Items used to assess respondents specific environmental attitudes toward OHV/ATV riding.

Specific Attitude Scale Item
I dislike OHV and ATV riders who create new trails in areas where riding is prohibited.
I have a negative opinion about people who ride OHVs/ATVs on prohibited trails.
It is more acceptable to ride OHVs/ATVs on prohibited roads than on prohibited trails.
The creation of new trails in an area where OHV/ATV use is prohibited is unacceptable, even if there are not many other riding opportunities in the area.
In general, I know a great deal about OHVs and ATVs.
I know a lot about the negative impacts associated with OHV and ATV use.
I get annoyed when other OHV/ATV riders ride on trails that are prohibited.
I care that my development and/or use if unauthorized OHV and ATV trails could result in harm to the environment and/or the disturbance of other users.
I support the closing of trails where OHV and ATV has a negative impact on the environment.
I know that using my OHV/ATV in areas where use is prohibited can result in me getting ticketed.
I care that my development or use of unauthorized OHV and ATV trails, where use is prohibited, could disturb other users.
Reverse coded items
In general, I have a positive opinion about OHVs and ATVs.*
In my opinion OHVs/ATVs generally do not have a large impact on the environment or other park users.*
I believe that use of ATVs and OHVs on public trails where OHV/ATV use is prohibited is okay.*
It's important to permit OHV and ATV use in public natural areas in the Adirondack park.*
OHV and ATV riding experiences should be permitted on public lands in general.*
I believe that OHV/ATV use should be permitted on public roads.*

Respondent Characteristics

Section E contained five total questions to collect demographic information from respondents. These questions included factors that were previously mentioned in the literature to consistently have an effect on environmental attitudes or environmentally responsible behavior. The five questions included gender, age, highest education level achieved, number of children under 18 living in the household and political orientation.

Environmentally Responsible Behavior

Similar to EA, ERB was separated into two sections; general ERB and specific ERB (see Table 3.8). Using the classification designated by Wakefield et al. (2006) the seven general ERB questions were divided into three groups: personal change (two questions), individual civic

action (two questions), and cooperative civic action (three questions). The questions were worded in a yes/no format, asking if in the previous year they had participated in a list of activities. This scale was created by Wakefield et al. (2006) to measure environmental actions of citizens of Hamilton, Ontario.

To measure specific ERB, questions were modeled using the same organization as the general ERB measures. Of the seven questions, three were designed to measure personal change, two questions were designed to measure individual civic action and the remaining two questions addressed cooperative civic action. An eighth question was included with this measure asking respondents to give details regarding their participation in trail maintenance if they checked yes to the previous question, and to indicate the number of times per year and on what type of lands they assist with maintenance (derived from D'Luchosh 2008).

Table 3.8. Items used to measure general and specific ERB

Scale	Question	Classification
General ERB	Regularly sort materials for recycling?	Personal Change
	Refused to buy a product for environmental reasons?	
	Contacted government /industry /media about environmental issue?	Individual Civic Action
	Donated money to a local environmental group?	
	Attended public meeting about a local environmental issue?	Cooperative Civic Action
	Attended public protest about a local environmental issue?	
Specific ERB	Joined a local clean-up effort	
	Educate yourself on how to reduce impacts created by ATVs?	Personal Change
	Performed maintenance on your ATV to help reduce emissions?	
	Taken a class, online or in person, regarding ATV safety?	
	Donated money to an ATV club/organization (excluding fees)?	Individual Civic Action
	Contacted your local government/agency regarding an ATV related issue?	
	Attended a public/club/organization meeting regarding ATV issues?	Cooperative Civic Action
	Assisted in trail maintenance programs?	

Purposed Model

Using the TPB as a foundation a model that represented the purposed relationship between individual characteristics, environmental attitudes and behavioral intentions was created (see Figure 3.2). Individual characteristics include descriptive variables, community participation and outdoor recreation participation. Descriptive variables include socio-demographic variables that have been shown in the literature to have an affect on EA and ERB; age, political orientation, education, and parenthood (having a child less than 18 years of age living in the household). In addition descriptive variables include items focusing on OHV and ATV ownership and use history such as riding ability level, time spent riding, types of vehicles owned. Community participation was defined as *active* membership in an environmental and/or OHV/ATV club or organization at the local, regional, or international level. Outdoor recreation participation was measured in terms of degree of resource utilization depending on the respondents' 'most important' recreation activity and classified as slight, moderate or intensive. EA was measured at the general level using the revised NEP scale and at the specific level. Similarly ERB was measured at the general and specific level as well, and included three categories of behaviors; personal change, individual civic action and cooperative civic action.

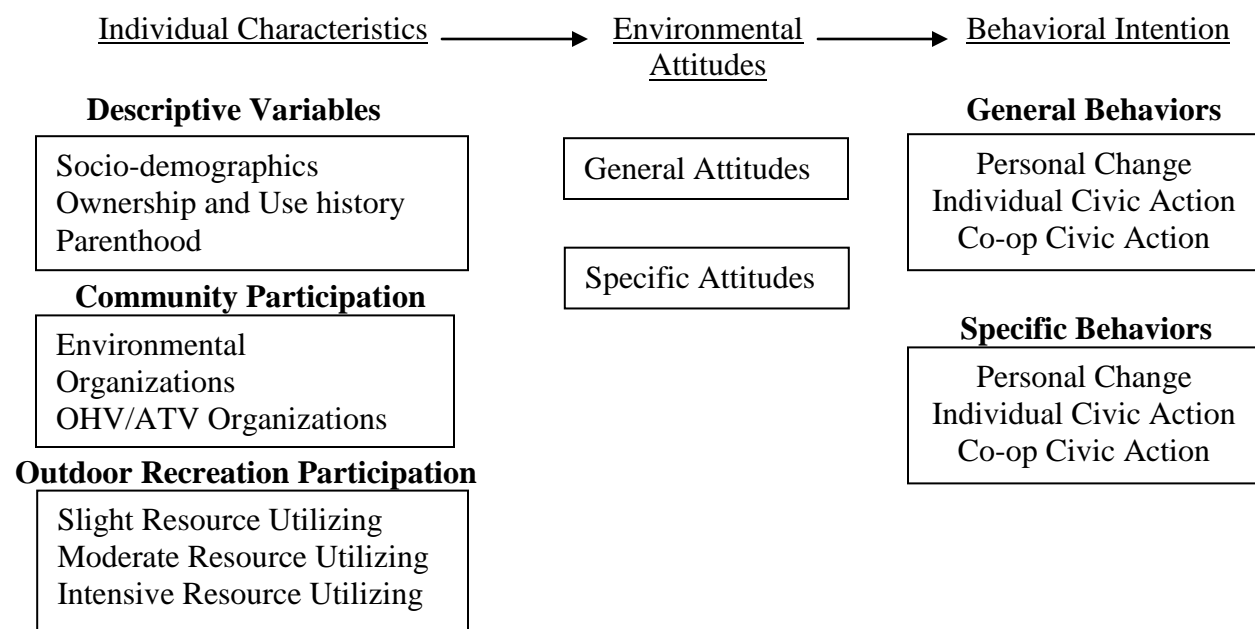


Figure 3.2. Purposed model between study concepts individual characteristic, environmental attitudes and behavioral intention.

Data Analysis

Upon return, each survey was dated and coded as being follows: (1) received and completed, (2) received and not completed and (3) undeliverable (0-not received).

Data Entry and Analysis

The data from each survey was entered into an excel spreadsheet and transferred to SPSS, the Statistical Package for the Social Sciences, version 13.0, for analysis. All open-ended questions were coded as response patterns emerged. Descriptive statistics were calculated and all variables were checked for normality. Descriptive statistics for outdoor recreation participation were calculated for all of the variables as well as by activity group (slight, moderate, intensive, see p. 51 for a review). Both of the attitude scales (general and specific) were coded using a 5-point Likert scale (e.g. 1=strongly disagree to 5=strongly agree). Both of the attitude scales were subjected to Principle Component Factor Analysis (PCA) as were environmentally responsible behaviors.

A factor analysis using principle component analysis and varimax rotation was performed on both of the attitude scales. Prior to factor analysis several items on both the NEP scale and the specific attitude scale were reverse coded to maintain a consistent directionality of items. Evaluation criteria included checking scree plots, eigenvalues greater than 1, percent variance greater than 5% for any factor and factor loadings greater than 0.4 for any variable. A Cronbach's reliability coefficient (alpha) of 0.7 was required for a scale to be considered reliable (Tabachnick & Fidell 1996). Both of the scales that measured environmentally responsible behavior (general and specific) were subjected to principle component analysis as well, using the same set of evaluation criteria as used with environmental attitudes.

Hypothesis Testing

The analysis plan to test the six hypotheses detailed in the beginning of this chapter and are summarized in Table 3.9. Hypothesis plans were formed using recommendations from Vaske (2008) after classification of variables according to their level measurement. Prior to hypothesis testing a Crosstabs analysis focusing on the nonparametric correlations between the variables was performed. This initial test served as an indicator for relationships between the test variables. Bivariate correlations were used to examine relationships between the variables proposed in the

initial model; depending on the level of measurement a different procedure was utilized to measure the association.

Table 3.9. Hypothesis testing plan for data collected in the 2009 OHV and ATV Recreation Survey. Brackets indicate the measurement level of the variable being tested.

Objective	Independent Variable	Dependent Variable	Analysis
1	Outdoor Recreation Participation (Categorical)	General EA (Ranked Ordinal) Specific EA (Ranked Ordinal) General ERB (Ranked Ordinal) Specific ERB (Ranked Ordinal)	Contingency C
2	Community Participation: Environmental (Dichotomous) Community Participation: OHV/ATV (Dichotomous)	General EA (Ranked Ordinal) Specific EA (Ranked Ordinal) General ERB (Ranked Ordinal) Specific ERB (Ranked Ordinal) General EA (Ranked Ordinal) Specific EA (Ranked Ordinal) General ERB (Ranked Ordinal) Specific ERB (Ranked Ordinal)	Cramer's V
3	General EA (Ranked Ordinal) Specific ERB (Ranked Ordinal)	General ERB (Ranked Ordinal) Specific ERB (Ranked Ordinal) General ERB (Ranked Ordinal) Specific ERB (Ranked Ordinal)	Kendall's tau
4	General EA (Ranked Ordinal)	Specific EA (Ranked Ordinal)	Kendall's tau
5	General ERB (Ranked Ordinal)	Specific ERB (Ranked Ordinal)	Kendall's tau
6	Children U18 (Dichotomous)	General EA (Ranked Ordinal) Specific EA (Ranked Ordinal) General ERB (Ranked Ordinal) Specific ERB (Ranked Ordinal)	Cramer's V

Objective 1:

To investigate the relationship between participation in outdoor recreation activities, with respect to their degree of resource utilization, on measures of environmental attitudes and environmentally responsible behavior.

This hypothesis was tested using Contingency C to determine if there was a difference between activity orientation groups (slight, moderate and intensive) with respect to measures of EA and ERB. Outdoor recreation participation was separated into three categories (slight, moderate and intensive) by respondents indicating “most important activity” (Thapa & Graefe

2001). Prior to the Contingency C test; a factor analysis was completed for the measures of general and specific EA as well as for general and specific ERB.

Objective 2:

To investigate the relationship between active participation in a community organization or club on measures of environmental attitude and pro-environmental intended behavior.

Hypothesis 2 was tested by classifying participation in environmental organizations and OHV/ATV organizations in a Yes/No format. Cramer's V was used to test the relationship between participation in a community organization and measures of EA and ERB.

Objective 3:

To investigate the relationship between environmental attitudes among outdoor recreationists and the relationship to their measure of pro-environmental intended behavior.

To examine the relationship between EA and ERB among respondents Kendall's tau was used to examine the relationship between both general and specific measures of each variable.

Objective 4:

To investigate the relationship between general and specific measures of environmental attitude.

The relationship between general and specific measures of attitude will be measured using Kendall's tau.

Objective 5:

To investigate the relationship between general and specific measures of pro-environmental intended behavior.

Hypothesis 5 measures the correlation between general and specific measures of ERB, to test this relationship Kendall's tau was used.

Exploratory Question (Objective 6):

Explore the relationship between individuals who have one or more children under the age of 18 living in their household and environmental attitudes and pro-environmental intended behavior.

Cramer's V was used to examine the relationship between respondents who have with those who do not have a child under the age of 18 living in the household. The number of children under 18 was not taken into account; the variable was limited to a yes/no dichotomy.

Summary

This study aimed to examine how participation in outdoor recreation activities and community organizations affected measures of general and specific EA and intended ERB. The study focused on a very select group of individuals, OHV/ATV riders who were active in the south-eastern quadrant of the Adirondack Park. Outdoor recreation participation separated respondents by their 'most important' activity into groups based on the amount of resource utilization that particular activity had (slight, moderate, or intense). General environmental attitudes were measured using the 15-item revised NEP scale (Dunlap et al. 2000), and specific environmental attitudes were measured using a 17-item measure based on the tripartite definition of attitudes and questions developed by D'Luhosch (2008). To measure intended ERB two scales were developed (a 7-item measure for general ERB and a 7-item measure for specific ERB) from the literature based on the classification of actions by Wakefield et al. (2006): personal change, individual civic action and cooperative civic action.

Chapter 4

Results

Chapter 4 presents the result obtained from the OHV/ATV survey processes, and is divided into the following seven sections:

- 1- Profile of respondents,
- 2- OHV/ATV ownership and use history,
- 3- Outdoor recreation and community participation,
- 4- Environmental attitudes,
- 5- Environmentally responsible behavior,
- 6- Hypothesis testing, and
- 7- Summary

Profile of Respondents

Response Rates

From the 17 surveys that were originally mailed out in conjunction with the Adirondack visitor study, only eight were returned giving a response rate of 47%. Of the eight surveys, five were returned completed and the other three returned were not completed. The club sample consisted of a package of 140 surveys for all known members which was sent to the NCATVA president. From this sample, a total of 70 surveys were returned, giving a 50% response rate. Of these 70 surveys, 44 were returned completed (63%) and the remaining 26 were returned but not complete (37%). For the combined sample there were 78 returned surveys, giving an overall response rate of 50%.

Merging the OHV/ATV Samples

Due to the unexpectedly small sample size collected during the Adirondack visitor study (n=8), an effort was made to combine the data from the Adirondack visitor survey with the OHV/ATV club survey to create a total sample population of 78 respondents. Descriptive statistics for 8 variables (riding ability, years riding, days/year riding, age, education, children under 18, political orientations and gender) were checked to see if there were similar values for the mean and standard deviations between the two different sets of survey respondents (see Table 4.1). The means for all of the variables were similar with the exception of days/year spent riding,

for the OHV/ATV club sample the mean days per year spent riding was 63.6 days/year and for the Adirondack visitor sample the mean was 43.8 days/year. The number of years riding was also higher for the club population (mean=16.4) compared to the visitor population (mean=13.1). Using the Levene's test for equality of variances between the samples there were three significant findings for the questions of riding ability ($F=8.11$, $p<0.05$), education ($F=6.06$, $p<0.05$), and gender ($F=11.19$, $p<0.05$). For these variables, with the exception of gender, a cross tabulation and chi-square test was performed. For each of the variables the small number of surveys had a large impact on the outcome of the statistical testing. Even though there were some significant differences found between the two data sets, they were combined to create a sample size of 78 for further analysis due to the fact that small sample size comparisons were not conclusive and the absolute mean differences were large only for days/year riding.

Table 4.1. Comparison of the OHV/ATV club and Adirondack visitor survey statistics.

Question	Survey type	N	Mean	Std. Deviation	Std. Error Mean
Riding ability*	Club Survey	69	2.7	0.66	0.08
	Visitor Survey	8	2.6	1.18	0.42
Years riding*	Club Survey	70	16.4	11.58	1.38
	Visitor Survey	8	13.1	9.37	3.31
Days/year ride*	Club Survey	68	63.6	62.57	7.58
	Visitor Survey	8	43.8	46.89	16.58
Age	Club Survey	68	46.6	12.11	1.46
	Visitor Survey	8	45.8	16.25	5.74
Education*	Club Survey	68	3.5	1.55	0.18
	Visitor Survey	8	4.0	1.06	0.37
Children under 18	Club Survey	68	0.7	0.94	0.11
	Visitor Survey	8	0.6	0.91	0.32
Political orientation	Club Survey	60	3.3	0.99	0.12
	Visitor Survey	6	2.8	0.75	0.30
Gender*	Club Survey	68	1.0	0.23	0.02
	Visitor Survey	8	1.2	0.46	0.16

*- Significant differences between survey respondents in each survey type.

Respondent Characteristics

Collectively, there were a total of 78 usable surveys from the Adirondack visitor and OHV/ATV club survey samples. Males accounted for approximately 92% of the total sample, while females accounted for the remaining 8%. The age group that had the largest proportion of respondents was 35-54 years, which accounted for about 55% of the total sample, followed by the 55 and older age group with approximately 26%, and lastly the 34 year old and under category which described the remaining 18% of the respondents (see Table 4.2). The distribution of highest education level was evenly divided between individuals with a high school education or less (32%), individuals with some college or an associate's degree (35%), and individuals with a bachelor's or graduate degree (31%). Compared to the population of the US the sample population had a higher percentage of individuals who had earned a graduate or advanced college degree (17% compared to 9% of the US population).

Table 4.2. Profile of respondents obtained from the combined survey compared to New York state and US populations. Data for NY and US populations obtained from 2000 census (U.S. Census Bureau 2010)

Characteristics	Frequency	Percentage (%)	Percentage NY population (%)	Percentage US population (%)
Gender (n=76)				
Male	70	92.1	48.2	49.1
Female	6	7.9	51.8	50.9
Age (n=76)				
Under 24	3	3.9	34.0	35.3
25-34	11	14.5	14.5	14.2
35-44	19	25.0	16.2	16.0
45-54	23	30.3	13.5	13.4
55-64	13	17.1	8.9	8.6
65 +	7	9.2	12.8	12.4
Highest Education Level (n=76)				
High School or less	25	32.9	48.6	48.2
Some college	18	23.7	16.8	21.1
Associates degree	9	11.8	7.2	6.3
Bachelors degree	11	14.5	15.6	15.5
Graduate/Advanced college degree	13	17.1	11.8	8.9

The majority of the respondents did not have any children under the age of 18 living in their household (54%); 22% of the respondents had one child under the age of 18 living in the household, and the remaining 24% had 2 or 3 children living in the household (see Table 4.3). The majority of the respondents defined themselves as having a conservative political orientation (41%), while 15% of the population defined themselves as being liberal, and the remaining 44% defined themselves as being slightly liberal/conservative.

Characteristics	Frequency	Percentage (%)
Children Under 18 (n=76)		
0	41	53.9
1	17	22.4
2	14	18.4
3	4	5.3
Political Orientation (n=66)		
Very liberal	3	4.5
Moderately liberal	7	10.6
Slightly liberal/conservative	29	43.9
Moderately conservative	19	28.8
Very conservative	8	12.1

Table 4.3. Profile of respondents obtained from the survey questions for parenthood and political orientation.

OHV/ATV Ownership and Use History

The large majority of the sample population used ATVs (92%), with 17% using off-highway motorcycles or dirtbikes, another 17% used off-highway 4WD Jeeps, automobiles, or sport utility vehicles (see Table 4.4). Trial and leisure riding was by far the main activity ATVs/OHVs were used for (99%), followed by hunting (53%), utility and work (51%), fishing (36%) and sport riding (28%).

Table 4.4. OHV and ATV ownership and use history profile of respondents.

Question	Frequency	Percentage
Type of vehicle used (n=78)		
ATVs (4 and 6-wheelers)	72	92.3
Off-highway motorcycle or dirtbike	13	16.7
Off-highway 4WD Jeep, automobile, or sport utility vehicle	13	16.7
Other	4	5.1
Activities OHV/ATV used for (n=78)		
Trail/leisure riding	77	98.7
Hunting	41	52.6
Utility and work	40	51.3
Fishing	28	35.9
Sport riding	22	28.2
Transportation	14	17.9
Racing/competition	6	7.7
Other	4	5.1

Approximately 55% of the respondents defined themselves as being advanced riders and another 13% consider themselves to be experts (see Table 4.5). Almost a quarter (24%) of respondents had been riding for 5 years or less, while 33% of the sample population had been riding OHV/ATVs for 20 or more years. In response to where they ride their OHV/ATVs the large majority of survey respondents stated they ride on club lands (70%) and another 44% ride on private land.

Table 4.5. Ability level and riding frequency and percentage.

Question	Frequency	Percentage
Riding ability level (n=77)		
Novice	3	3.9
Intermediate	22	28.6
Advanced	42	54.5
Expert	10	13.0
Number of year riding (n=78)		
0-5 years	19	24.4
6-10	14	17.9
11-20	19	24.4
21-30	18	23.0
31-40	5	6.5
40 +	3	3.8
Days per year ride (n=76)		
0-30	28	36.8
31-60	28	36.9
61-90	3	3.9
91-180	12	15.8
181 +	5	6.6
What lands used for OHV/ATV riding (n=77)		
Club land	70	89.7
Private land	44	56.4
County land	15	19.2
State land	6	7.7
Other	5	6.4

Over 50% of the respondents own one or two OHV/ATVs (see Table 4.6) and a small portion own five or more OHV/ATVs; the number of OHV/ATVs owned was comparable to the number of riders per household. Almost half (44%) of the households included in the study have one rider, another 40% have 2 or 3 riders. The majority of respondents own 1 or 2 OHV/ATVs (58%) and the remaining 29% own 3 or more OHV/ATVs.

Table 4.6. Household OHV/ATV statistics

Question	Frequency	Percentage
Number of OHV/ATV owned (n=78)		
0	2	2.6
1	27	24.6
2	26	33.3
3	12	15.4
4	5	6.4
5+	6	7.6
Number of riders per household (n=78)		
0	2	2.6
1	34	43.6
2	19	24.4
3	12	15.4
4	7	9.0
5+	4	5.2

Recreation and Community Participation

Outdoor Recreation Participation

Individuals were asked to select which activities they participated in within the Adirondack Park in the past year and then select from the list of activities which was the ‘most important activity’ to them. A summary of what activities respondents participated in can be seen in Figure 4.1. The activities participated by respondents was ATV riding (80%), followed by fishing (53%) and hunting (46%), hiking/backpacking (45%) and camping (43%). The activities were separated into three categories for analysis by their amount of resource utilization of the environment (see Chapter 3 for a more detailed explanation of the separation of the activities). There were ten (excluding the ‘other’ category) activities that were selected as ‘most important activity’ by respondents (see Table 4.7). Activities were separated by their degree of resource utilization; see Chapter 3 for more details. Activities that were classified as having slight resource utilization accounted for 16% of the respondent choices and another 18% for activities considered to have moderate resource utilization. The majority of respondents, 61%, choose intense resource utilization activities to be their ‘most important activity’, with 47% of this category being ATV riding

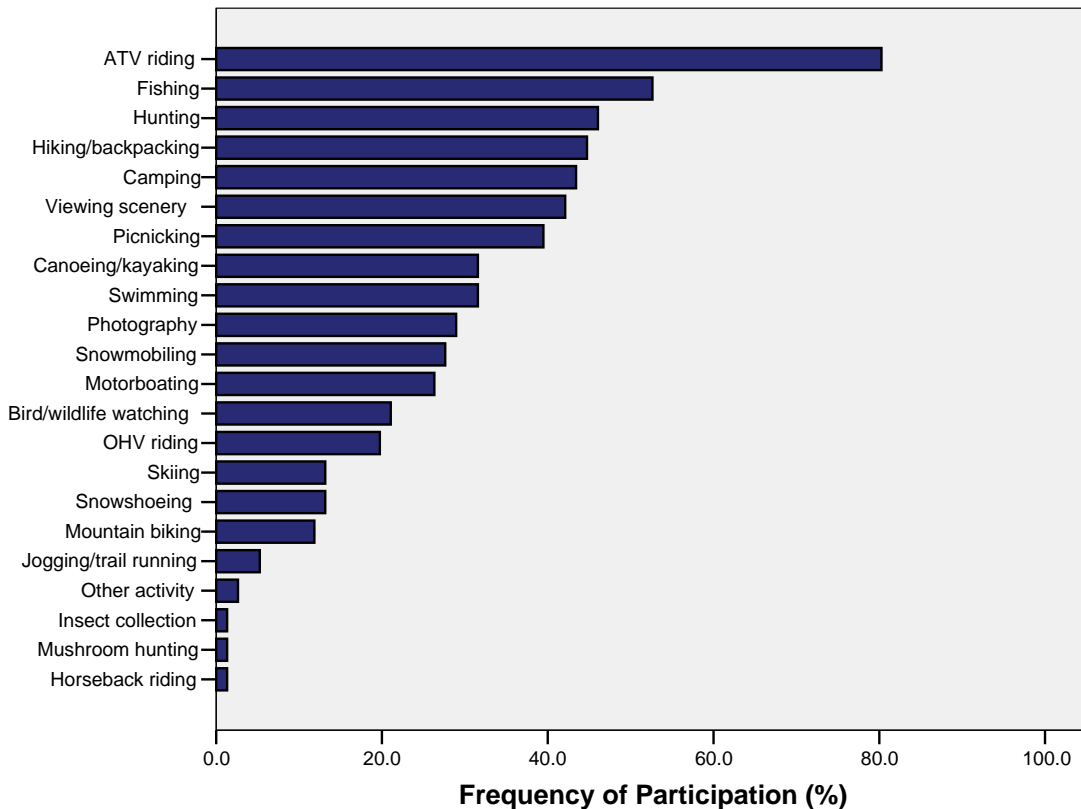


Figure 4.1. Frequency of activity participation in the Adirondack Park by respondents (n=78)

Table 4.7. Activity orientation and frequency of participation of most important activity by respondents

Most Important Activity (n=76)	Frequency	Percentage
Slight resource utilization	12	15.7
Camping	5	6.6
Hiking/backpacking	3	3.9
Canoeing/kayaking	2	2.6
Photography	2	2.6
Moderate resource utilization	14	18.4
Hunting	11	14.5
Fishing	3	3.9
Intense resource utilization	46	60.5
ATV riding	36	47.4
Snowmobiling	6	7.9
OHV riding	3	3.9
Motorboating	1	1.3
Other	4	5.3

Involvement in Environmental Organizations

The majority of respondents (88%) did not actively participate in any environmental clubs or organizations (see Table 4.8). Of the 12% who were active members; 44% were members of local organizations which included the Saratoga County Council, Friends of Kade, and the Cossayuna Lake Improvement Association. Almost a quarter (22%) of the respondents were involved in recreation organizations such as Americans for Responsible Recreational Access (ARRA) and the Blue Ribbon Coalition (BRC); another 22% were multiple organizations that fit into several categories.

Involvement in OHV/ATV Organizations

Since the large majority of survey respondents were from the North Country ATV Association (NCATVA), it was expected to see high membership in OHV/ATV organizations. Seventy three percent of the survey respondents classified themselves as an active member of one or more OHV/ATV clubs/organizations; of these individuals; 53% were members of NCATVA and its affiliates the New York Trail Riders Association (NYTRO) and the New York State Off-Highway Vehicle Association only (see Table 4.8). The remaining individuals were members of other organizations in addition to being a member of NCATVA, 11% were members of other New York OHV/ATV clubs and organizations and 4% were also members of out of state OHV/ATV clubs and organizations. Other OHV/ATV clubs in New York State included, but were not limited to, the Adirondack Jeeps Club (ADKJ), the Hilltown Riders ATV Club, and Rivergate Wheelers ATV Club. Membership in multiple organizational groups was limited to 3.8% of the respondents.

There were eight respondents who were active members in both environmental organizations and OHV/ATV organizations. All of these individuals were members of the NCATVA and its related organizations, and no other OHV/ATV clubs and organizations. Some of the environmental organizations that these individuals were members of were the Surfrider Foundation, the North American Fishing Club (NAFC) and the National Rifle Association (NRA).

Table 4.8. Active involvement in community clubs and organizations by respondents

Membership	Frequency	Percentage
Environmental organizations (n=75)		
No	66	88.0
Yes	9	12.0
Local organizations	4	44.4
Recreation organizations	2	22.2
Nature organizations	1	11.1
Multiple organizations	2	22.2
OHV/ATV organizations (n=78)		
No	5	6.4
Yes	73	93.6
NCATVA and related organizations	53	67.9
New York OHV/ATV organizations	11	41.1
Out of state OHV/ATV organizations	4	5.1
Mountain bike organizations	1	1.3
Snowmobile organizations	1	1.3
Multiple organizations	3	3.8

Environmental Attitudes

General Environmental Attitudes

To assess general environmental attitudes the 15 item NEP scale was used (New Ecological Paradigm) with each item tied to a 5-point Likert Scale format ranging from Strongly Disagree (1) to Strongly Agree (5) (Dunlap et al. 1992). This scale was chosen for three reasons: (1) to use a widely accepted scale for measuring general environmental attitude/environmental concern, (2) to further test the dimensionality argument of the scale and (3) to investigate if the NEP worked well with unidimensional samples. As discussed in Chapter 2, the revised NEP scale has been found to have an inconsistent number of dimensions therefore further testing is needed among various types of samples to investigate its usefulness in several situations.

An overview of the responses can be viewed in Table 4.9. Several of the questions had a skewed frequency distribution. For example the question “When we interfere with nature, it often produced disastrous consequences” had no individuals who responded that they strongly disagreed, and 50% of the respondents stated they agree with the statement. Additionally, for the question “Despite our special abilities humans are still subject to the laws of nature” had no respondents who selected that they strongly disagreed or disagreed with the statement, 72% of the respondents stated that they agreed with the statement. For example the question “When we

Table 4.9. Frequency Distributions (in percentages) of the combined data set for general environmental attitudes (revised New Ecological Paradigm).

Statement	SD	D	N	A	SA	Number of Cases
Humans have the right to modify the natural environment to suit their needs.	1.3	27.3	33.8	29.9	7.8	77
Human ingenuity will ensure that we do not make the earth unlivable.	6.7	33.3	30.7	26.7	2.7	75
The earth has plenty of natural resources if we just learn how to develop them.	18.2	46.8	15.6	15.6	3.9	77
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1.3	7.9	28.9	51.3	10.5	76
The so called “ecological crisis” facing human-kind has been greatly exaggerated.	4.0	18.7	33.3	38.7	5.3	75
Humans will eventually learn enough about how nature works to be able to control it.	2.6	7.9	25.0	50.0	14.5	76
Humans were meant to rule over the rest of nature.	5.3	13.2	18.4	40.8	22.4	76
Reverse Coded						
We are approaching the limit of the number of people that the earth can support.	10.4	23.4	31.2	27.3	7.8	77
When we interfere with nature, it often produces disastrous consequences.	0	21.1	21.1	50.0	7.9	76
Plants and animals have as much right as humans to exist.	1.3	7.8	9.1	53.2	28.6	77
Humans are severely abusing the environment.	0	18.7	21.3	48.0	12.0	75
Despite our special abilities humans are still subject to the laws of nature.	0	0	5.3	72.0	22.7	75
If things continue on their present course, we will soon experience a major ecological catastrophe.	4.0	24.0	30.7	36.0	5.3	75
The balance of nature is very delicate and easily upset.	0	19.7	23.7	46.1	10.5	76
The earth is like a spaceship with very limited room and resources.	6.7	24.0	28.0	36.0	5.3	75

Note: Responses were coded on a 5-point Likert-type scale. SA= strongly agree, A=agree, N= neutral, D= disagree, SD= strongly disagree.

interfere with nature, it often produces disastrous consequences” had no individuals who responded that they strongly disagreed, and half of the respondents stated they agreed with this statement. Additionally, for the question “Despite our special abilities humans are still subject to the laws of nature”, no respondents selected that they strongly disagreed or disagreed with the statement, 72% of the respondents stated they agreed with the item. For the statements “Humans are severely abusing the environment” and “The balance of nature is delicate and very easily upset” there were no respondents who strongly agreed with the statement, for both over 40% of those surveyed agreed. While the majority of NEP items had frequencies that tended to be more ecocentric, a few questions showed the opposite trend. For the items “The balance of nature is strong enough to cope with the impacts of modern industrial nations”, “The ‘so-called’ ecological crisis facing human-kind has been greatly exaggerated”, “Humans will eventually learn enough about how nature works to eventually control it”, and “Humans were meant to rule over the rest of nature” there was a slight tendency for the respondents to agree with the statements, which is viewed as having a more technocentric attitude.

The NEP scale was subjected to a principle component analysis using varimax rotation. Prior to analysis 8 of the 15 factors were reverse coded to maintain consistent directionality of the items (as in Dunlap et al. 2000). Results of the factor analysis can be seen in Table 4.10. While there were four factors extracted by PCA, several of the NEP items did not load neatly on to one factor. In addition; factors obtained by this analysis were not in accordance with factors obtained by previous researchers (Thapa & Graefe 2001). Forcing the scale to three factors using PCA analysis with varimax rotation was also attempted but this method did not produce clear loading for the scale.

Overall the full scale had a Cronbach’s alpha of .84 and explained 66% of the total variance. For further analysis, it was decided that the scale could be broken up by score as seen in Floyd, Jang and Noe (1997). Using measures of quartiles, low, medium and high NEP groups were created. The maximum highest score for the NEP scale is 75, respondents of the 2009 OHV/ATV Recreation Survey (n=71) had scores ranging from 31 to 64 (see Figure 4.2). The low group included scores of the 25th percentile and below (31-45, n=19), the medium group had scores ranging from the 25th to the 75th percentile (46-56, n=35), and the high group had scores ranging in the 75th percentile and above (57-64, n=17).

Table 4.10. Principle component analysis of NEP items with varimax rotation

Factor and Questionnaire Items	Factor Loadings	Mean Ratings	Factor Mean	Factor Alpha Value (Cronbach's)
<i>Factor 1:</i>			3.40	0.82
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	0.61	3.63		
Humans were meant to rule over the rest of nature.	0.60	3.62		
Humans are severely abusing the environment.	0.59	3.52		
The balance of nature is very delicate and easily upset.	0.47	3.47		
The so called "ecological crisis" facing human-kind has been greatly exaggerated.	0.59	3.26		
If things continue on their present course, we will soon experience a major ecological catastrophe.	0.52	3.19		
Humans have the right to modify the natural environment to suit their needs.	0.80	3.14		
<i>Factor 2:</i>			2.98	0.66
The earth is like a spaceship with very limited room and resources.	0.75	3.08		
We are approaching the limit of the number of people that the earth can support.	0.87	3.03		
Human ingenuity will ensure that we do not make the earth unlivable.	0.52	2.85		
<i>Factor 3:</i>			3.87	0.56
Despite our special abilities humans are still subject to the laws of nature.	0.65	4.18		
Plants and animals have as much right as humans to exist.	0.75	4.00		
When we interfere with nature, it often produces disastrous consequences.	0.48	3.45		
<i>Factor 4:</i>			3.02	0.48
Humans will eventually learn enough about how nature works to be able to control it.	0.76	3.66		
The earth has plenty of natural resources if we just learn how to develop them.	0.55	2.39		

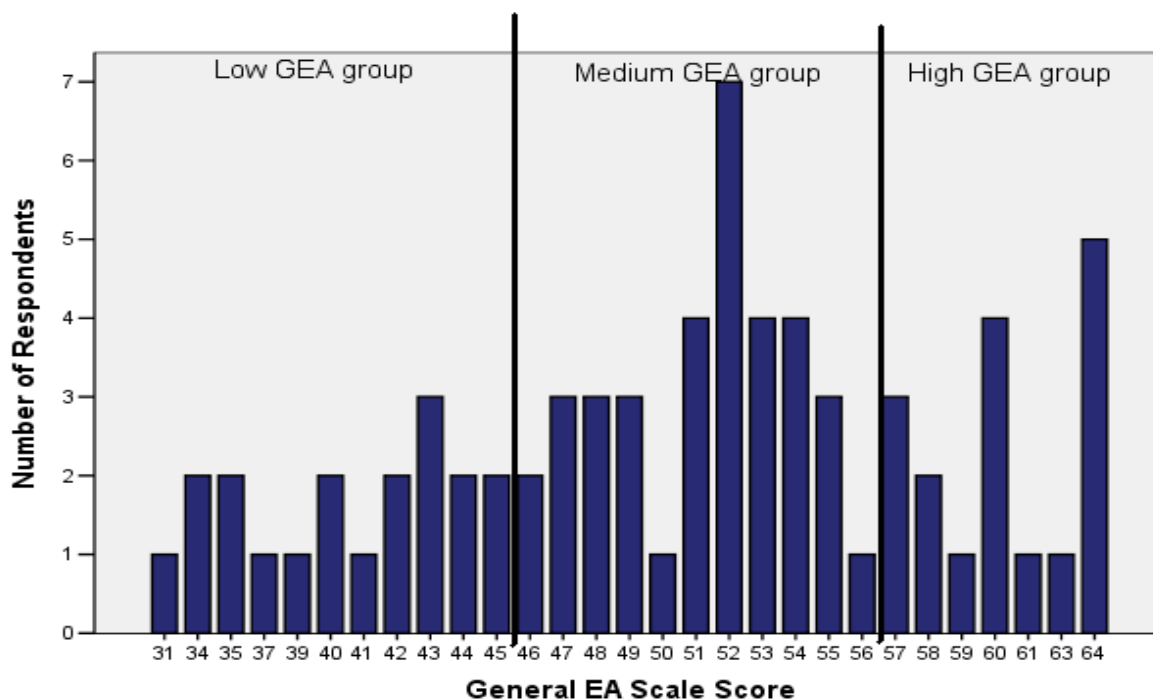


Figure 4.2. Distribution of NEP scores for the combined data set.

Specific Environmental Attitudes

To assess individuals' attitudes toward OHV/ATV use in the Adirondacks the 17 item specific attitude scale was developed. The scale was scored on a 5-point Likert scale ranging from (1) Strongly Disagree to (5) Strongly Agree. The scale itself was designed to measure three concepts relating to OHV/ATV use: (1) creation of new OHV/ATV trails, (2) riding where OHV/ATV use is prohibited, and (3) environmental/social impacts of OHV/ATV recreation. A frequency distribution of the responses obtained can be seen in Table 4.11. The large majority of the questions had a skewed distribution that reflected an increased support for OHV/ATV use. For example, over 95% of the respondents agreed or strongly agreed with the statement "In general, I have a positive opinion about OHVs and ATVs". One of the questions did not follow the hypothesized directionality, 75% of the respondents disagreed/strongly disagreed with the statement "I believe that use of ATVs and OHVs on public trails where OHV/ATV use is prohibited is okay". A person who was more OHV/ATV-centric was expected to agree with this

item. This statement was incongruent with several other questions that addressed use of OHV/ATVs on prohibited trails and the large majority of respondents felt that OHV/ATV riding should be allowed everywhere, and that the activity did not have a large environmental or social impact. Over 80% of the respondents disagreed/strongly disagreed with the statement “I care that my development or use of unauthorized trails, where use is prohibited, could harm the environment”. In addition, over 50% disagreed/strongly disagreed with the statement “I support the closing of trails where OHV and ATV use has a negative impact on the environment”. Overall the tendency of respondents was shifted toward keeping trails open and allowing access regardless of impacts on the environment or other recreationists.

Of the 17 questions, 6 were reverse coded to maintain a consistent directionality of the items. After conducting a PCA analysis with varimax rotation, there was no clear separation of factors (see Table 4.12). While a few items loaded clearly on one factor, several did not, nor did the factors match up to the components that were included in the development of the scale. It was decided that the scale should be treated as being one-dimensional. The full scale had an acceptable alpha reliability of .62 and accounted for approximately 29% of the total variance. For this scale a lower score indicated an individual who was more OHV/ATV-centric. Scores ranged from 34 to 60, with 85 being the highest possible score obtainable. Respondents were separated into three groups by quartiles (see Figure 4.3). The low specific EA group included individuals with scores ranging from 34-42 (n=16), this division accounted for 24% of the respondents. The medium group had scores of 43-48 (52%, n=36), and the high specific EA group had scores of 49-60 (25%, n=17).

Table 4.11. Frequency Distributions (in percentages) of the combined data set for specific environmental attitudes.

Statement	SD	D	N	A	SA	N
I dislike OHV and ATV riders who create new trails in areas where riding is prohibited.	48.0	42.7	5.3	1.3	2.7	75
I have a negative opinion about people who ride OHVs/ATVs on prohibited trails.	32.9	42.1	9.2	13.2	2.6	76
It is more acceptable to ride OHVs/ATVs on prohibited roads than on prohibited trails.	4.0	14.7	28.0	30.7	22.7	75
The creation of new trails in an area where OHV/ATV use is prohibited is unacceptable, even if there are not many other riding opportunities in the area.	35.5	50.0	6.6	5.3	2.6	76
In general, I know a great deal about OHVs and ATVs.	35.5	48.7	11.8	3.9	0	76
I know a lot about the negative impacts associated with OHV and ATV use.	23.7	56.6	11.8	5.3	2.6	76
I get annoyed when other OHV/ATV riders ride on trails that are prohibited.	32.0	57.3	10.7	0	0	75
I care that my development or use of unauthorized OHV and ATV trails, where use is prohibited, could disturb other users.	23.0	63.5	10.8	0	2.7	74
I support the closing of trails where OHV and ATV has a negative impact on the environment.	9.2	48.7	21.1	10.5	10.5	76
I know that using my OHV/ATV in areas where use is prohibited can result in me getting ticketed.	40.0	53.5	6.7	0	0	75
I care that my development and/or use if unauthorized OHV and ATV trails could result in harm to the environment and/or the disturbance of other users.	21.6	62.2	10.8	5.4	0	74
Reverse Coded						
In general, I have a positive opinion about OHVs and ATVs.	1.3	1.3	1.3	51.3	44.7	76
In my opinion OHVs/ATVs generally do not have a large impact on the environment or other park users.	1.3	10.5	23.7	51.3	13.2	76
I believe that use of ATVs and OHVs on public trails where OHV/ATV use is prohibited is okay.	21.6	48.6	9.5	8.1	12.2	74
It's important to permit OHV and ATV use in public natural areas in the Adirondack park.	0	0	1.3	25.0	73.7	76
OHV and ATV riding experiences should be permitted on public lands in general.	0	11.8	17.1	32.9	38.2	76
I believe that OHV/ATV use should be permitted on public roads.	4.1	14.9	23.0	35.1	23.0	74

Note: Responses were coded on a 5-point Likert-type scale. SA= strongly agree, A=agree, N= neutral, D= disagree, SD= strongly disagree.

Table 4.12. Principle component analysis of specific attitude items with varimax rotation.

Factor and Questionnaire Items	Factor Loadings	Mean Ratings	Factor Mean	Factor Alpha Value (Cronbach's)
<i>Factor 1:</i>			1.86	0.69
I have a negative opinion about people who ride OHVs/ATVs on prohibited trails.	0.72	2.09		
The creation of new trails in an area where OHV/ATV use is prohibited is unacceptable, even if there are not many other riding opportunities in the area.	0.72	1.89		
I get annoyed when other OHV/ATV riders ride on trails that are prohibited.	0.62	1.78		
I dislike OHV and ATV riders who create new trails in areas where riding is prohibited.	0.67	1.68		
<i>Factor 2:</i>			1.94	0.73
I know a lot about the negative impacts associated with OHV and ATV use.	.84	2.07		
In general, I know a great deal about OHVs and ATVs.	.84	1.84		
<i>Factor 3:</i>			2.74	0.57
In general, I have a positive opinion about OHVs and ATVs.	0.39	4.36		
I support the closing of trails where OHV and ATV has a negative impact on the environment.	0.74	2.64		
I care that my development and/or use of unauthorized OHV and ATV trails could result in harm to the environment and/or the disturbance of other users.	0.59	2.00		
I care that my development or use of unauthorized OHV and ATV trails, where use is prohibited, could disturb other users.	0.61	1.96		
<i>Factor 4:</i>			4.11	0.58
It's important to permit OHV and ATV use in public natural areas in the Adirondack park.	0.79	4.72		
OHV and ATV riding experiences should be permitted on public lands in general.	0.51	3.97		
In my opinion OHVs/ATVs generally do not have a large impact on the environment or other park users.	0.78	3.64		
<i>Factor 5:</i>			2.92	-0.32
I believe that OHV/ATV use should be permitted on public roads.	0.52	3.58		
It is more acceptable to ride OHVs/ATVs on prohibited roads than on prohibited trails.	-0.73	3.53		
I know that using my OHV/ATV in areas where use is prohibited can result in me getting ticketed.	0.52	1.67		
<i>Factor 6:</i>			NA	NA
I believe that use of ATVs and OHVs on public trails where OHV/ATV use is prohibited is okay.	0.88	2.46		

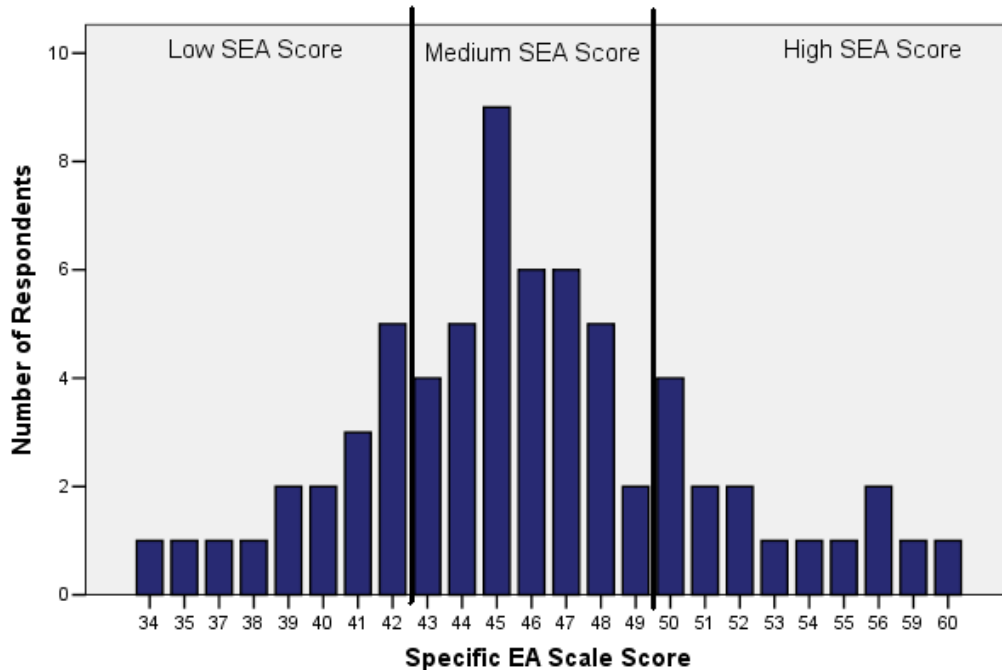


Figure 4.3. Distribution of specific EA scores from the combined data set.

Environmentally Responsible Behavior

General Environmental Behavior

The seven item scale for general ERB was developed to be separated into three sections: personal change, individual civic action and cooperative civic action. An overview of the frequencies and percentages can be seen in Table 4.13. The item that received the most support from the survey respondents was participation in recycling (98.7%). Another 54.7% refused to buy a product for environmental reasons, and 31.6% donated money to an environmental group. The actions that received the lowest participation were contacting governmental agencies regarding environmental issues (25%) and attending public meetings regarding environmental issues (26%). The lowest participation was regarding attendance to public protests about local environmental issues and was only participated in by 5.3% of the respondents.

Table 4.13. Frequency of respondents who answered yes to general environmental behaviors items

Questionnaire statements	Frequency	Percentage
Regularly sort materials for recycling (n=76)	75	98.7
Refused to buy a product for environmental reasons (n=75)	41	54.7
Joined a local clean-up effort (n=76)	37	48.7
Donated money to an local environmental group (n=76)	24	31.6
Attended a public meeting about a local environmental issue (n=76)	20	26.3
Contacted government/industry/media about environmental issues (n=76)	19	25.0
Attended a public protest about a local environmental issue (n=76)	4	5.3

While the scale was designed to measure three aspects of environmental behavior, PCA analysis with varimax rotation revealed that the measure worked better when treated as a full scale (see Table 4.14). PCA analysis found three factors, the first of which included three items: contacted a government agency, attended a meeting and joined a clean-up effort ($\alpha = .553$). The second factor had two items: refused to buy a product and attended a protest ($\alpha = -.486$). The third factor had two items: sorted materials for recycling and donated money to an environmental group ($\alpha = .070$). These factors did not match up with the original aspects of environmental behavior the scale intended to measure so it was decided to treat the scale as being a single dimension.

The reliability alpha was .46 for the full scale; however, with the deletion of the ‘protest’ item; the alpha for the scale increased to .49. Similar to the treatment of the attitude scales the ERB scales were divided into three groups using quartiles. The scale was divided into three groups: low, medium and high (with respect to how many items the respondents answered yes). The scores ranged from 0 (1.3% of the respondents); to 6 (1.3% of respondents), no survey respondents answered yes to participation in all 7 ERB activities. Individuals with a score of 0-1 were considered to have a low general ERB score; 2-4 was the medium general ERB group, and 5-6 was considered to be the high general NEP group (see Figure 4.4). Distribution of the scores aimed to mirror the use of quartiles for the attitude scales. Approximately 19% of the respondents had scores in the low category, 65% had scores in the medium category, and the remaining 16% scored in the high general ERB category.

Table 4.14. Reliability analysis for respondents' general environmentally responsible behaviors.

Questionnaire statements	Mean	Var*	Corrected Item Total Correlation	Alpha if Item Deleted
Full Scale ($\alpha = 0.46$)	2.92			
Regularly sort materials for recycling	1.93	1.90	0.16	0.46
Refused to buy a product for environmental reasons	2.37	1.45	0.21	0.43
Contacted government/industry/media about environmental issues	2.67	1.38	0.37	0.34
Donated money to an local environmental group	2.60	1.54	0.17	0.45
Attended a public meeting about a local environmental issue	2.65	1.44	0.30	0.36
Attended a public protest about a local environmental issue	2.87	1.92	-0.02	0.49
Joined a local clean-up effort	2.43	1.35	0.30	0.38

(*Scale variance if item deleted).

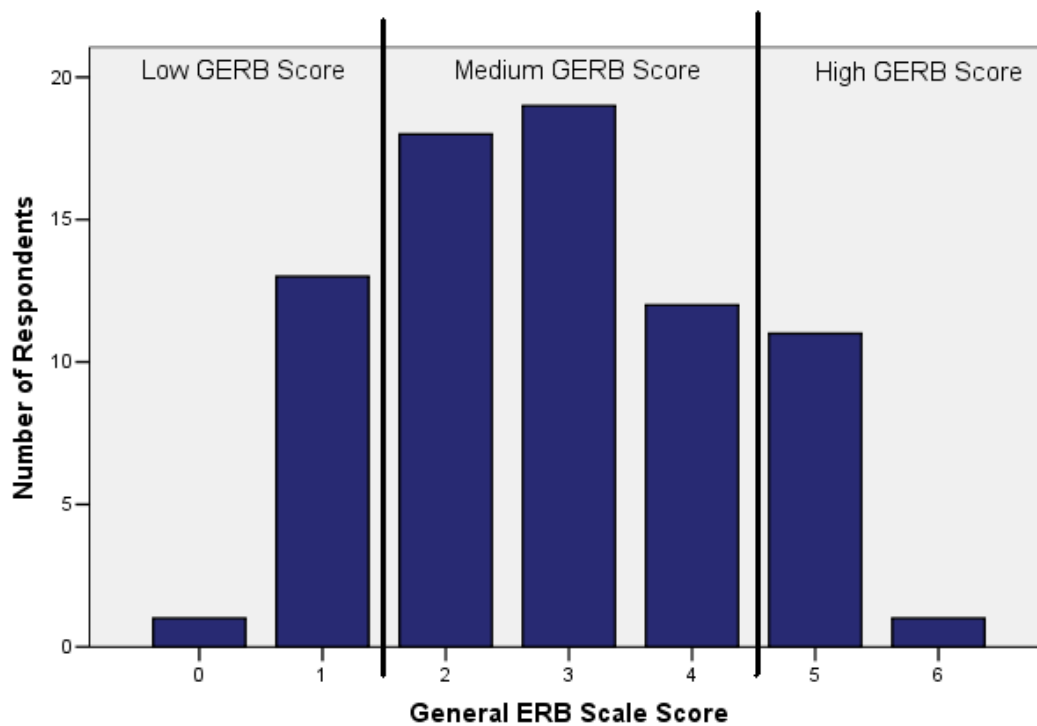


Figure 4.4. Distribution of general ERB scores for the combined data set.

Specific Environmental Behavior

The specific ERB scale had relatively high participation for all of the 7 items (ranging from 41.6% to 77.9%); see Table 4.15 for a review. Over two thirds of the respondents participated in trail maintenance programs, the majority of which participated 1-5 times per year on OHV/ATV club lands (40%), and several individuals participated with trail maintenance six times or more. After club lands; the next highest trail maintenance participation was seen on private lands, with 24% participating 1-5 times per year and an additional 24% participating over six times per year. The next highest activity participated in by respondents was performing maintenance on their vehicle to help reduce emissions (71%). Approximately 60% of respondents educated themselves on how they could reduce impacts created by OHV/ATVs and another 58% attended meetings regarding ATV issues. Additionally 53% of the individuals in the survey group donated money to an ATV club/organization (excluding club fees). The items that had the least amount of participation by survey participants involved contacting local agencies regarding ATV related issues (47%) and taking a class regarding ATV safety (42%).

Table 4.15. Frequency of respondents who answered yes to specific environmental behaviors items.

Questionnaire statements	Frequency	Percentage
Assisted in trail maintenance programs (n=77)	60	77.9
Performed maintenance on ATV to help reduce emissions (n=76)	54	71.1
Educated yourself regarding ways to reduce impacts from ATVs (n=77)	46	59.7
Attended a public/club/organization meeting for ATV issues (n=77)	44	57.1
Donated money to an ATV club/organization (n=76)	40	52.6
Contacted your local government regarding ATV related issues (n=75)	35	46.7
Taken a class regarding ATV safety (n=77)	32	41.6

A PCA analysis with varimax rotation split the specific ERB scale into three factors; however these three factors did not match up to the original elements that were designed to be measured (see Table 4.16). In addition; the reliability alpha for the full scale ($\alpha = .678$) was higher than for any of the three factors. The first factor included three items: educating to reduce impacts, taking an ATV safety class, and contacting local government regarding ATV issues ($\alpha =$

.58). The second factor also included three items: donated money to an organization, attended meetings on ATV issues and assisted with trail maintenance ($\alpha = .54$). The third factor had single item (performed maintenance to reduce emissions). As with the other measures of EA and ERB, the specific ERB scale was split into three categories. The scores ranged from 0 to 7, with 13% of the respondents answering yes to all of the 7 items. Separation of the groups aimed to stick as close to the quartiles as possible (see Figure 4.5). The low specific ERB group included individuals who scored 0-2 (23% of the respondents), the medium group included scores of 3-5 (47% of the respondents), and the high group consisted of individuals who scored a 6-7 (with approximately 30% of the individuals).

Table 4.16. Reliability analysis for respondents' specific environmentally responsible behaviors.

Questionnaire statements	Mean	Var*	Corrected Item Total Correlation	Alpha if Item Deleted
Full Scale: ($\alpha = .67$)	4.14			
Educated yourself regarding ways to reduce impacts from ATVs	3.53	2.828	.46	.62
Performed maintenance on ATV to help reduce emissions	3.42	3.288	.21	.68
Taken a class regarding ATV safety	3.72	2.973	.36	.65
Donated money to an ATV club/organization	3.59	2.820	.45	.62
Contacted your local government regarding ATV related issues	3.66	2.720	.52	.60
Attended a public/club/organization meeting for ATV issues	3.55	2.935	.38	.64
Assisted in trail maintenance programs	3.34	3.268	.28	.66

(*Scale variance if item deleted).

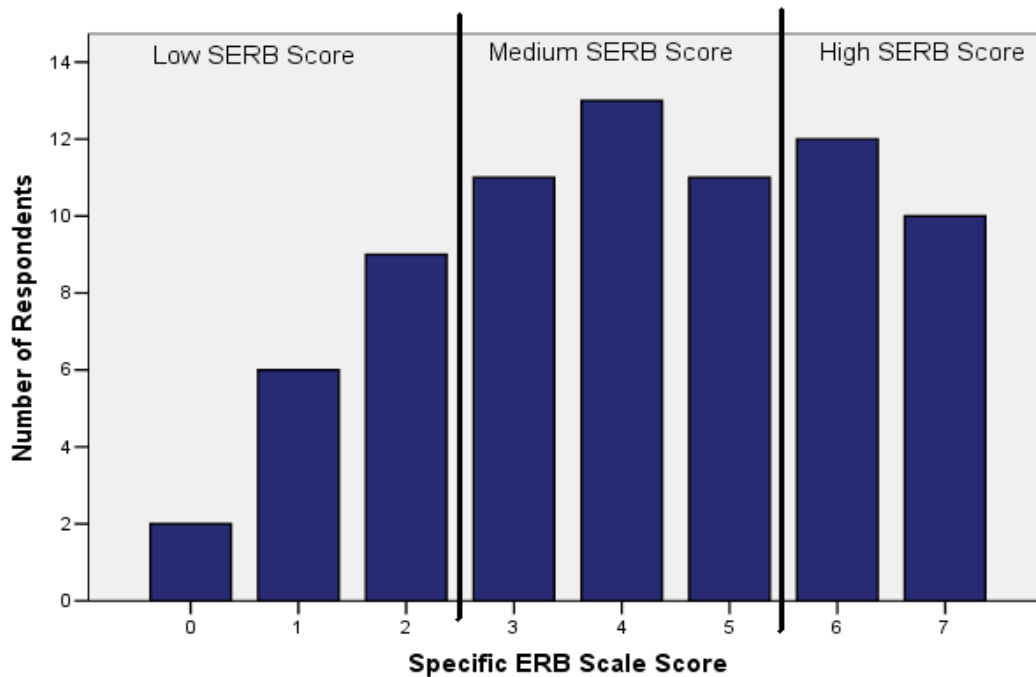


Figure 4.5. Distribution of specific ERB scores for the combined data set.

Results of Hypothesis Testing

Five hypotheses were tested using statistical procedures that were appropriate for the data type to address the research goals and objectives. All data was coded into SPSS for analysis and each variable was treated as stated in the analysis plan in Table 3.9. The results of the testing procedures will be presented here and further discussion regarding the research findings can be found in Chapter 5.

Objective 1

To investigate the relationship between participation in outdoor recreation activities, with respect to their degree of resource utilization, on measures of environmental attitudes and environmentally responsible behavior

1.1.1 There will be no difference in the relationship between different activity orientation groups (slight, moderate, and intensive) and their measure of general environmental attitudes (Not Rejected)

Outdoor recreation participation was separated by ‘most important’ activity group (a categorical variable) and compared to scores of general environmental attitudes (a ranked ordinal variable) measured using the revised NEP scale (Dunlap et al. 1992). Groups were split into three attitude score groups using quartile measures: low, medium, and high. There was no strong pattern between measures of most important activity group and general environmental attitudes (see Table 4.17). However 16.7% of the overall cases were missing from this analysis due to missing items. The chi square coefficient was .275 and was not found to be significant ($p=.257$).

Table 4.17. Test of the relationship between outdoor recreation participation and general environmental attitudes for the 2009 OHV/ATV Recreation Survey statistics (chi sq=0.275; $p=.257$).

			General Environmental Attitude Group			Total
			Low	Med	High	
Most Important Activity Group	Slight	Count	2	4	6	12
		% within Impclass	16.7%	33.3%	50.0%	100.0%
		% within NEPclass	11.8%	12.5%	37.5%	18.5%
	Mod	Count	3	7	2	12
		% within Impclass	25.0%	58.3%	16.7%	100.0%
		% within NEPclass	17.6%	21.9%	12.5%	18.5%
	Int	Count	12	21	8	41
		% within Impclass	29.3%	51.2%	19.5%	100.0%
		% within NEPclass	70.6%	65.6%	50.0%	63.1%
Total	Count	17	32	16	65	
	% within Impclass	26.2%	49.2%	24.6%	100.0%	
	% within NEPclass	100.0%	100.0%	100.0%	100.0%	

1.1.2. *There will be no difference in the relationship between different activity orientation groups (slight, moderate, and intensive) and their measure of specific environmental attitudes* (**Rejected**)

Outdoor recreation participation was found to have a significant, positive relationship with specific environmental attitudes. As can be seen in Table 4.18, as measures of ‘most important’ activity increase (from slight to intensive) the measure of specific EA also increases. This relationship had a chi square coefficient of .425 ($p=.008$). It should be noted however, that 19.2% of the cases were excluded from this analysis due to missing data ($n=15$). This

relationship suggests that individuals whose most important activity was in the slight resource utilization classification would have a high score for the specific EA scale (indicating they were not OHV/ATV-centric), while individuals whose most important activity was an intense resource utilization activity would tend to be more OHV/ATV-centric and have a lower score on the specific EA scale.

Table 4.18. Test of the relationship between outdoor recreation participation and specific environmental attitudes for the 2009 OHV/ATV Recreation Survey statistics (chi sq=0.425; p=.008).

			Specific Environmental Attitude Group			Total
			Low	Med	High	
Most Important Activity Group	Slight	Count	7	3	1	11
		% within Impclass	63.6%	27.3%	9.1%	100.0%
		% within SAclass	43.8%	9.1%	7.1%	17.5%
	Mod	Count	2	10	1	13
		% within Impclass	15.4%	76.9%	7.7%	100.0%
		% within SAclass	12.5%	30.3%	7.1%	20.6%
	Int	Count	7	20	12	39
		% within Impclass	17.9%	51.3%	30.8%	100.0%
		% within SAclass	43.8%	60.6%	85.7%	61.9%
Total	Count	16	33	14	63	
	% within Impclass	25.4%	52.4%	22.2%	100.0%	
	% within SAclass	100.0%	100.0%	100.0%	100.0%	

1.2.1 There will be no difference between different activity orientation groups (slight, moderate, and intensive) and their measures of general pro-environmental intended behaviors (Not Rejected)

There was no relationship found between measures of outdoor recreation participation and general ERB. The chi square coefficient for the measure was .048 (p=.997) and 11.5% of the cases were excluded from the analysis. Table 4.19 provides a review found from the cross tabulation. The measures of 'most important' activity had similar measurements for all general ERB classes (low, medium and high), with approximately 20% of the individuals in the low

category, 60% in the medium category and the remaining 15% in the high category for each outdoor recreation participation class (slight, moderate and intensive).

Table 4.19. Test of the relationship between outdoor recreation participation and general environmental behavior for the 2009 OHV/ATV Recreation Survey statistics (chi sq=.048; p=.997).

			General ERB Group			Total
			Low	Med	High	
Most Important Activity Group	Slight	Count	2	8	2	12
		% within Impclass	16.7%	66.7%	16.7%	100.0%
		% within GERBclass	14.3%	18.2%	18.2%	17.4%
	Mod	Count	3	8	2	13
		% within Impclass	23.1%	61.5%	15.4%	100.0%
		% within GERBclass	21.4%	18.2%	18.2%	18.8%
	Int	Count	9	28	7	44
		% within Impclass	20.5%	63.6%	15.9%	100.0%
		% within GERBclass	64.3%	63.6%	63.6%	63.8%
Total	Count	14	44	11	69	
	% within Impclass	20.3%	63.8%	15.9%	100.0%	
	% within GERBclass	100.0%	100.0%	100.0%	100.0%	

1.2.2 There will be no difference between different activity orientation groups (slight, moderate, and intensive) and their measures of specific pro-environmental intended behaviors (Rejected)

A significant relationship was found between measures of outdoor recreation participation and specific ERB (see Table 4.20). For ‘most important’ activity the measure of slight was skewed to the left (toward a low score for specific ERB), the measure of moderate was bell shaped and the measure of intense was skewed to the right (toward a high score for specific ERB). This relationship had a chi square coefficient of .356 and was significant (p=.043). For this measure; 12.8% of the cases were excluded from the analysis (n=10). This pattern was expected since individuals who had a slight resource utilization activity selected as their “most important” activity would most likely not be active OHV/ATV riders and thus would likely perform less OHV/ATV specific behaviors.

Table 4.20. Test of the relationship between outdoor recreation participation and specific environmental behavior for the 2009 OHV/ATV Recreation Survey statistics (chi sq=0.356; p=.043).

			Specific ERB Group			Total
			Low	Med	High	
Most Important Activity Group	Slight	Count	6	2	2	10
		% within Impclass	60.0%	20.0%	20.0%	100.0%
		% within SERBclass	37.5%	6.5%	9.5%	14.7%
	Mod	Count	3	8	3	14
		% within Impclass	21.4%	57.1%	21.4%	100.0%
		% within SERBclass	18.8%	25.8%	14.3%	20.6%
	Int	Count	7	21	16	44
		% within Impclass	15.9%	47.7%	36.4%	100.0%
		% within SERBclass	43.8%	67.7%	76.2%	64.7%
Total	Count	16	31	21	68	
	% within Impclass	23.5%	45.6%	30.9%	100.0%	
	% within SERBclass	100.0%	100.0%	100.0%	100.0%	

Objective 2

To investigate the relationship between active participation in a community organization or club on measures of environmental attitude and pro-environmental intended behavior

2.1.1 There will be no difference in the relationship between individuals who actively participate in environmentally oriented community organizations and those who do not and their measure of general environmental attitudes (Rejected)

An association was found between individuals who actively participated in environmental organizations and an increased measure of general EA. Community participation, both environmental and ATV/OHV related, were classified as being dichotomous variables and measures of EA and ERB were classified as being ranked ordinal; thus Cramer's V was used as a test statistic for these variables. For the relationship of general ERB and participation in environmental organizations; the value of Cramer's V was .316 and found to be significant ($p \leq .05$). A review of the findings is provided in Table 4.21, and shows that individuals who are actively involved in environmental organizations tend to have higher scores of general EA than those who are not active. However; there is some concern regarding this relationship in terms of the small sample size of individuals obtained that participate in environmental organizations.

Table 4.21. Test of the relationship between participation in environmental organizations and specific environmental attitudes for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=0.316$; $p=.033$)

			General Environmental Attitude Group			Total
			Low	Med	High	
Environmental Organization	No	Count	17	31	12	60
		% within Environmental Org	28.3%	51.7%	20.0%	100.0%
		% within NEPclass	94.4%	93.9%	70.6%	88.2%
	Yes	Count	1	2	5	8
		% within Environmental Org	12.5%	25.0%	62.5%	100.0%
		% within NEPclass	5.6%	6.1%	29.4%	11.8%
Total	Count	18	33	17	68	
	% within Environmental Org	26.5%	48.5%	25.0%	100.0%	
	% within NEPclass	100.0%	100.0%	100.0%	100.0%	

2.1.2 There will be no difference in the relationship between individuals who actively participate in environmentally oriented community organizations and those who do not and their measure of specific environmental attitudes (Not Rejected)

There was no observed relationship found between measures of participation in environmental organizations and the measure of general EA (see Figure 4.22). For this analysis the value of Cramer's V was .027 and was not found to be significant ($p=.976$).

Table 4.22. Test of the relationship between participation in environmental organizations and specific environmental attitudes for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=.027$; $p=.976$).

			Specific Environmental Attitude Group			Total
			Low	Med	High	
Environmental Organization	No	Count	14	29	13	56
		% within Environmental Org	25.0%	51.8%	23.2%	100.0%
		% within SAclass	87.5%	85.3%	86.7%	86.2%
	Yes	Count	2	5	2	9
		% within Environmental Org	22.2%	55.6%	22.2%	100.0%
		% within SAclass	12.5%	14.7%	13.3%	13.8%
Total	Count	16	34	15	65	
	% within Environmental Org	24.6%	52.3%	23.1%	100.0%	
	% within SAclass	100.0%	100.0%	100.0%	100.0%	

2.2.1 *There will be no difference in the relationship between individuals who actively participate in environmentally oriented community organizations and those who do not and their measure of general pro-environmental intended behavior (Rejected)*

There was a significant relationship found between measures of participation in environmental organizations and the measure of general ERB. Individuals who were not involved in environmental organizations tended to have a lower general ERB score than those who did (see Table 4.23). Cramer's V was equal to .334 and was significant ($p=.018$). This suggests that a person who is active in environmental organizations generally tends to perform more environmentally responsible behaviors than individuals who are not members of environmental organizations.

Table 4.23. Test of the relationship between participation in environmental organizations and general environmentally responsible behavior for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=.334$; $p=.018$).

			General ERB group			Total
			Low	Med	High	
Environmal Organization	No	Count	14	42	6	62
		% within Environmal Org	22.6%	67.7%	9.7%	100.0%
		% within GERBclass	100.0%	87.5%	60.0%	86.1%
	Yes	Count	0	6	4	10
		% within Environmal Org	.0%	60.0%	40.0%	100.0%
		% within GERBclass	.0%	12.5%	40.0%	13.9%
Total		Count	14	48	10	72
		% within Environmal Org	19.4%	66.7%	13.9%	100.0%
		% within GERBclass	100.0%	100.0%	100.0%	100.0%

2.2.2 *There will be no difference in the relationship between individuals who actively participate in environmentally oriented community organizations and those who do not and their measure of specific pro-environmental intended behavior (Not Rejected)*

The measures specific ERB between individuals who were active in environmental organizations and those who were not were almost equal (see Table 4.24). This relationship had a Cramer's V of 0.70 and was not significant ($p=.842$).

Table 4.24. Test of the relationship between participation in environmental organizations and specific environmentally responsible behavior for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=0.70$; $p=.842$).

			Specific ERB group			Total
			Low	Med	High	
Environmal Organization	No	Count	14	30	17	61
		% within Environmal Org	23.0%	49.2%	27.9%	100.0%
		% within SERBclass	82.4%	88.2%	85.0%	85.9%
	Yes	Count	3	4	3	10
		% within Environmal Org	30.0%	40.0%	30.0%	100.0%
		% within SERBclass	17.6%	11.8%	15.0%	14.1%
Total		Count	17	34	20	71
		% within Environmal Org	23.9%	47.9%	28.2%	100.0%
		% within SERBclass	100.0%	100.0%	100.0%	100.0%

2.3.1 *There will be no difference in the relationship between individuals who actively participate in OHV/ATV oriented community organizations and those who do not and their measure of general environmental attitudes (Not Rejected)*

Individuals who participated in OHV/ATV organizations and those who did not had no measureable difference in general EA (see Table 4.25). This relationship had a Cramer's V of .376 and was not significant ($p=.005$).

Table 4.25. Test of the relationship between participation in OHV/ATV organizations and general environmental attitudes for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=.376$; $p=.005$).

		General Environmental Attitude Group			Total	
		Low	Med	High		
ATV Organizator	No	Count	1	2	2	5
		% within ATV Org	20.0%	40.0%	40.0%	100.0%
		% within NEPclass	5.3%	5.7%	11.8%	7.0%
	Yes	Count	18	33	15	66
		% within ATV Org	27.3%	50.0%	22.7%	100.0%
		% within NEPclass	94.7%	94.3%	88.2%	93.0%
Total		Count	19	35	17	71
		% within ATV Org	26.8%	49.3%	23.9%	100.0%
		% within NEPclass	100.0%	100.0%	100.0%	100.0%

2.3.2 *There will be no difference in the relationship between individuals who actively participate in OHV/ATV oriented community organizations and those who do not and their measure of specific environmental attitudes (Rejected)*

There was a significant relationship found between individuals who actively participated in OHV/ATV organizations and specific environmental attitudes (see Table 4.26). Individuals who did not actively participate in OHV/ATV organizations tended to have specific EA scores that were lower than those who did participate in an OHV/ATV organization. It should be noted that there was a very low number of respondents who were not members of an OHV/ATV organization (n=4). The value of Cramer's V for this relationship was .307 and was significant (p=.040).

Table 4.26. Test of the relationship between participation in OHV/ATV organizations and specific environmental attitudes for the 2009 OHV/ATV Recreation Survey statistics (Cramer's V=.307; p=.040).

		Specific Environmental Attitude Group			Total
		Low	Med	High	
ATV Organization No	Count	3	1	0	4
	% within ATV Org	75.0%	25.0%	.0%	100.0%
	% within SAclass	18.8%	2.9%	.0%	5.9%
Yes	Count	13	34	17	64
	% within ATV Org	20.3%	53.1%	26.6%	100.0%
	% within SAclass	81.3%	97.1%	100.0%	94.1%
Total	Count	16	35	17	68
	% within ATV Org	23.5%	51.5%	25.0%	100.0%
	% within SAclass	100.0%	100.0%	100.0%	100.0%

2.4.1 There will be no difference in the relationship between individuals who actively participate in OHV/ATV oriented community organizations and those who do not and their measure of general pro-environmental intended behavior (Not Rejected)

There was no relationship found between measures of OHV/ATV organization participation and general ERB (see Table 4.27). Cramer's V was equal to .033 and was not found to be significant (p=.960).

Table 4.27. Test of the relationship between participation in OHV/ATV organizations and general environmentally responsible behavior for the 2009 OHV/ATV Recreation Survey statistics (Cramer's V=.033; p=.960).

		General ERB group			Total
		Low	Med	High	
ATV Organization No	Count	1	3	1	5
	% within ATV Org	20.0%	60.0%	20.0%	100.0%
	% within GERBclass	7.1%	6.1%	8.3%	6.7%
	Yes	Count	13	46	11
	% within ATV Org	18.6%	65.7%	15.7%	100.0%
	% within GERBclass	92.9%	93.9%	91.7%	93.3%
Total	Count	14	49	12	75
	% within ATV Org	18.7%	65.3%	16.0%	100.0%
	% within GERBclass	100.0%	100.0%	100.0%	100.0%

2.4.2 *There will be no difference in the average scores (x) between individuals who actively participate in OHV/ATV oriented community organizations and those who do not and their measure of specific pro-environmental intended behavior (**Rejected**)*

Similarly to the relationship found between OHV/ATV organization participation and general ERB, there was also a relationship found with specific ERB (see Table 4.27). Respondents who were not active members of an OHV/ATV organization had lower scores for specific ERB, although the low sample number of individuals in this category should be noted ($n=3$). Cramer's V was equal to .376 and was significant ($p \geq .05$).

Table 4.27. Test of the relationship between participation in OHV/ATV organizations and specific environmentally responsible behavior for the 2009 OHV/ATV Recreation Survey statistics (Cramer's V= .376; $p \geq .05$).

		Specific ERB group			Total
		Low	Med	High	
ATV Organizaion No	Count	3	0	0	3
	% within ATV Org	100.0%	.0%	.0%	100.0%
	% within SERBclass	17.6%	.0%	.0%	4.1%
	Yes	Count	14	35	22
	% within ATV Org	19.7%	49.3%	31.0%	100.0%
	% within SERBclass	82.4%	100.0%	100.0%	95.9%
Total	Count	17	35	22	74
	% within ATV Org	23.0%	47.3%	29.7%	100.0%
	% within SERBclass	100.0%	100.0%	100.0%	100.0%

Objective 3

To investigate the relationship between environmental attitudes among outdoor recreationists and the relationship to their measure of pro-environmental intended behavior

3.1 *There will be no relationship between the measure of general environmental attitude and general pro-environmental intended behavior (Not Rejected)*

Since the variables of EA and ERB were all classified as being ranked ordinal Kendall's tau was used to assess the significance of the relationships. There was no relationship found between general EA and general ERB (see Table 4.28). However there was a slight tendency found between the variables that was not significant (Kendall's tau-b = .150, p=.161). Individuals who scored in the medium group on the general EA scale tended to score in the low or medium general ERB groups. In addition, individuals who scored in the high group for general EA tended to have medium to high scores on the general ERB scale.

Table 4.28. Test of the relationship between general EA and general ERB for the 2009 OHV/ATV Recreation Survey statistics (Kendall's tau=.150; p=.161).

			General Environmental Attitude Group			Total
			Low	Med	High	
General ERB group	Low	Count	2	11	0	13
		% within GERBclass	15.4%	84.6%	.0%	100.0%
		% within NEPclass	11.1%	32.4%	.0%	18.8%
	Med	Count	13	21	11	45
		% within GERBclass	28.9%	46.7%	24.4%	100.0%
		% within NEPclass	72.2%	61.8%	64.7%	65.2%
	High	Count	3	2	6	11
		% within GERBclass	27.3%	18.2%	54.5%	100.0%
		% within NEPclass	16.7%	5.9%	35.3%	15.9%
Total	Count	18	34	17	69	
	% within GERBclass	26.1%	49.3%	24.6%	100.0%	
	% within NEPclass	100.0%	100.0%	100.0%	100.0%	

3.2 *There will be no relationship between the measure of general environmental attitude and specific pro-environmental intended behavior (Not Rejected)*

There was no relationship found between measures of general EA and specific ERB (see Table 4.29). This hypothesis had a Kendall's tau-b value of .001 and was not significant ($p=.990$).

Table 4.29. Test of the relationship between general EA and specific ERB for the 2009 OHV/ATV Recreation Survey statistics (Kendall's tau=.001; $p=.990$).

			General Environmental Attitude Group			Total
			Low	Med	High	
Specific ERB group	Low	Count	4	9	4	17
		% within SERBclass	23.5%	52.9%	23.5%	100.0%
		% within NEPclass	22.2%	25.7%	25.0%	24.6%
	Med	Count	9	17	7	33
		% within SERBclass	27.3%	51.5%	21.2%	100.0%
		% within NEPclass	50.0%	48.6%	43.8%	47.8%
	High	Count	5	9	5	19
		% within SERBclass	26.3%	47.4%	26.3%	100.0%
		% within NEPclass	27.8%	25.7%	31.3%	27.5%
Total	Count	18	35	16	69	
	% within SERBclass	26.1%	50.7%	23.2%	100.0%	
	% within NEPclass	100.0%	100.0%	100.0%	100.0%	

3.3 *There will be no relationship between the measure of specific environmental attitude and general pro-environmental intended behavior (Not Rejected)*

While there was no significant relationship found between measures of specific EA and general ERB, there was a tendency found across the relationship. Individuals who scored in the medium group for specific EA tended to score higher on the general ERB scale and those who score in the high group for specific EA tended to score lower on the general ERB scale (see Table 4.30). Kendall's tau-b had a value of -.199 and was not significant ($p=.120$).

Table 4.30. Test of the relationship between specific EA and general ERB for the 2009 OHV/ATV Recreation Survey statistics (Kendall's tau= -.199; $p=.120$).

			Specific Environmental Attitude Group			Total
			Low	Med	High	
Genral ERB group	Low	Count	3	3	7	13
		% within GERBclass	23.1%	23.1%	53.8%	100.0%
		% within SAclass	18.8%	9.1%	41.2%	19.7%
	Med	Count	9	25	8	42
		% within GERBclass	21.4%	59.5%	19.0%	100.0%
		% within SAclass	56.3%	75.8%	47.1%	63.6%
	High	Count	4	5	2	11
		% within GERBclass	36.4%	45.5%	18.2%	100.0%
		% within SAclass	25.0%	15.2%	11.8%	16.7%
Total	Count	16	33	17	66	
	% within GERBclass	24.2%	50.0%	25.8%	100.0%	
	% within SAclass	100.0%	100.0%	100.0%	100.0%	

3.4 *There will be no relationship between the measure of specific environmental attitude and specific pro-environmental intended behavior (Not Rejected)*

The measures of specific EA and specific ERB were found to have no significant relationships. While the medium and high groups for specific EA had similar measures of specific ERB, the low specific EA group was different. Individuals who had a lower score for the specific EA scale tended to have either low or high measures of specific ERB (see Table 4.31). However this relationship was not significant (Kendall's tau-b = -.032, p=.796).

Table 4.31. Test of the relationship between specific EA and specific ERB for the 2009 OHV/ATV Recreation Survey statistics (Kendall's tau= -.032; p=.796).

			Specific Environmental Attitude Group			Total
			Low	Med	High	
Specific ERB group	Low	Count	5	7	4	16
		% within SERBclass	31.3%	43.8%	25.0%	100.0%
		% within SAclass	33.3%	20.0%	23.5%	23.9%
	Med	Count	4	20	9	33
		% within SERBclass	12.1%	60.6%	27.3%	100.0%
		% within SAclass	26.7%	57.1%	52.9%	49.3%
	High	Count	6	8	4	18
		% within SERBclass	33.3%	44.4%	22.2%	100.0%
		% within SAclass	40.0%	22.9%	23.5%	26.9%
Total	Count	15	35	17	67	
	% within SERBclass	22.4%	52.2%	25.4%	100.0%	
	% within SAclass	100.0%	100.0%	100.0%	100.0%	

Objective 4

To investigate the relationship between general and specific measures of environmental attitude

- 4 *There will be no relationship between the measure of general environmental attitudes and specific environmental attitudes (Rejected)*

There was a significant negative relationship found between the variables of general and specific EA. For this relationship, respondents who had a high general EA score tended to have a low specific EA score. In addition, individuals who were in the low to medium general EA groups tended to have medium to high measures of specific EA. This relationship had a Kendall's tau-b of -.336 and was significant ($p=.001$).

Table 4.32. Test of the relationship between general EA and specific EA for the 2009 OHV/ATV Recreation Survey statistics (Kendall's tau= -.336; $p=.001$).

			Specific Environmental Attitude Group			Total
			Low	Med	High	
General Environmental Attitude Group	Low	Count	1	9	6	16
		% within NEPclass	6.3%	56.3%	37.5%	100.0%
		% within SAclass	6.3%	28.1%	35.3%	24.6%
	Med	Count	7	17	10	34
		% within NEPclass	20.6%	50.0%	29.4%	100.0%
		% within SAclass	43.8%	53.1%	58.8%	52.3%
	High	Count	8	6	1	15
		% within NEPclass	53.3%	40.0%	6.7%	100.0%
		% within SAclass	50.0%	18.8%	5.9%	23.1%
Total	Count	16	32	17	65	
	% within NEPclass	24.6%	49.2%	26.2%	100.0%	
	% within SAclass	100.0%	100.0%	100.0%	100.0%	

Objective 5

To investigate the relationship between general and specific measures of pro-environmental intended behavior

- 5 *There will be no relationship between the measure of general environmentally responsible intended behavior and specific environmentally responsible intended behavior (Not Rejected)*

There was no significant relationship found between the general and specific measures of ERB, however there was a positive relationship found between the two variables (see Table 4.33). This relationship had a Kendall's tau-b of .208 and was not significant ($p=.059$). There was an observable tendency for individuals who scored high on the general scale to also score high on the specific scale and individuals who scored low on the general scale to also score low on the specific scale.

Table 4.33. Test of the relationship between general ERB and specific ERB for the 2009 OHV/ATV Recreation Survey statistics (Kendall's tau=.208; $p=.059$).

			Specific ERB group			Total
			Low	Med	High	
General ERB group	Low	Count	6	5	2	13
		% within GERBclass	46.2%	38.5%	15.4%	100.0%
		% within SERBclass	35.3%	15.2%	9.1%	18.1%
	Med	Count	9	23	15	47
		% within GERBclass	19.1%	48.9%	31.9%	100.0%
		% within SERBclass	52.9%	69.7%	68.2%	65.3%
	High	Count	2	5	5	12
		% within GERBclass	16.7%	41.7%	41.7%	100.0%
		% within SERBclass	11.8%	15.2%	22.7%	16.7%
Total	Count	17	33	22	72	
	% within GERBclass	23.6%	45.8%	30.6%	100.0%	
	% within SERBclass	100.0%	100.0%	100.0%	100.0%	

Exploratory Question/Objective 6:

Explore the relationship between individuals who have one or more children under the age of 18 living in their household and environmental attitudes and pro-environmental intended behavior

6.1.1 There will be no differences in the relationship of general environmental attitudes for individuals who have children under 18 living in their household and those who do not (Not Rejected)

There was no relationship found between measures of general EA and parenthood. Cramer's V was equal to .152 and was not significant ($p=.445$). The measures of general EA for respondents who had no children under the age of 18 living in the household and those who did were almost equal (see Table 4.34).

Table 4.34. Test of the relationship between general EA and parenthood for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=.152$; $p=.445$).

			General Environmental Attitude Group			Total
			Low	Med	High	
Parenthood	no children	Count	7	19	10	36
		% within Child18	19.4%	52.8%	27.8%	100.0%
		% within NEPclass	38.9%	54.3%	58.8%	51.4%
	children	Count	11	16	7	34
		% within Child18	32.4%	47.1%	20.6%	100.0%
		% within NEPclass	61.1%	45.7%	41.2%	48.6%
Total	Count	18	35	17	70	
	% within Child18	25.7%	50.0%	24.3%	100.0%	
	% within NEPclass	100.0%	100.0%	100.0%	100.0%	

6.1.2 *There will be no differences in the relationship of specific environmental attitudes for individuals who have children under 18 living in their household and those who do not (Not Rejected)*

In regards to specific EA and parenthood there was no significant relationship found. The value of Cramer's V was .171 ($p=.377$) and the measures of specific EA were found to be approximately equal for individuals who had children under the age of 18 in the household and those who did not.

Table 4.35. Test of the relationship between specific EA and parenthood for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=.171$; $p=.377$).

			Specific Environmental Attitude Group			Total
			Low	Med	High	
Parenthood	no children	Count	9	21	7	37
		% within Child18	24.3%	56.8%	18.9%	100.0%
		% within SAclass	56.3%	61.8%	41.2%	55.2%
	children	Count	7	13	10	30
		% within Child18	23.3%	43.3%	33.3%	100.0%
		% within SAclass	43.8%	38.2%	58.8%	44.8%
Total	Count	16	34	17	67	
	% within Child18	23.9%	50.7%	25.4%	100.0%	
	% within SAclass	100.0%	100.0%	100.0%	100.0%	

6.2.1 *There will be no differences in the relationship of general pro-environmental intended behavior for individuals (Not Rejected)*

There was no relationship found between measures of general ERB and parenthood. The value for Cramer's V was .175 and was not significant ($p=.318$). Measures of general ERB for individuals who had children under 18 living in the household had a tendency to score in the medium group for general ERB (see Table 4.36) while this trend was not observed for individuals who did not have a child living in the household.

Table 4.36. Test of the relationship between general ERB and parenthood for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=.175$; $p=.318$).

			General ERB group			Total
			Low	Med	High	
Parenthood	no children	Count	10	24	7	41
		% within Child18	24.4%	58.5%	17.1%	100.0%
		% within GERBclass	71.4%	49.0%	58.3%	54.7%
	children	Count	4	25	5	34
		% within Child18	11.8%	73.5%	14.7%	100.0%
		% within GERBclass	28.6%	51.0%	41.7%	45.3%
	Total	Count	14	49	12	75
		% within Child18	18.7%	65.3%	16.0%	100.0%
		% within GERBclass	100.0%	100.0%	100.0%	100.0%

6.2.2 *There will be no differences in the relationship of specific pro-environmental intended behavior for individuals (Not Rejected)*

There was no relationship found between individuals who had a child under 18 living in the household and those who did not with respect to the measure of specific ERB (see Table 4.37). The Cramer's V was .079 and was not significant ($p=.798$).

Table 4.37. Test of the relationship between specific ERB and parenthood for the 2009 OHV/ATV Recreation Survey statistics (Cramer's $V=.079$; $p=.798$).

			Specific ERB group			Total
			Low	Med	High	
Parenthood	no children	Count	9	20	11	40
		% within Child18	22.5%	50.0%	27.5%	100.0%
		% within SERBclass	52.9%	58.8%	50.0%	54.8%
	children	Count	8	14	11	33
		% within Child18	24.2%	42.4%	33.3%	100.0%
		% within SERBclass	47.1%	41.2%	50.0%	45.2%
Total	Count	17	34	22	73	
	% within Child18	23.3%	46.6%	30.1%	100.0%	
	% within SERBclass	100.0%	100.0%	100.0%	100.0%	

Summary

Survey respondents tended to be males (92%), between the ages of 35 and 54 years (55%) who were evenly distributed between having a high school education, some college/an associate's degree and a bachelors' or graduate degree. Individuals involved in the survey considered themselves to be slightly liberal/conservative (44%) to moderately conservative (29%) and were split between having no children under the age of 18 living in the household and having between one and three children living in the household.

Most of the survey respondents rode ATVs (92%), mainly for trail and leisure riding, hunting and utility/work purposes. Well over half considered themselves to be advanced or an expert in their riding ability level (68%) and while there were some novice riders who had only been involved with the sport for five years or less (24%), in the study population the majority of riders had between 11 and 30 years of experience. Most OHV/ATV riding took place on club lands (70%) or private lands and the majority of the respondents rode between 0 and 30 days/year or 31 to 60 days/year (37% for each). Most households had one or two riders and owned a similar number of OHV/ATVs.

The most popular outdoor recreation activity was by far ATV riding (80%) followed by fishing (53%), hunting (46%), hiking/backpacking (45%) and camping (43%). The most common 'most important' recreation activity chosen by respondents was ATV riding (47%), and intense resource utilization activities accounted for 61% of the sample population. Moderate resource utilization activities (hunting and fishing) accounted for 19% of the individuals and the remaining 16% considered a slight resource utilization activity to be most important to them.

The large majority of respondents were not active in environmental organizations (88%) and those who were tended to be members of local organizations or recreation related organizations. The survey consisted mainly of members of the NCATVA, however only 73% of the survey respondent claimed to be active members of an OHV/ATV organization. There were eight individuals who were members of both environmental and OHV/ATV organizations.

The general EA scale had a reliability alpha of .84 and was treated as a unidimensional scale. Respondents were split into three groups by score: low (31-45) with 19 individuals, medium (46-56) with 35 individuals, and high (57-64) with 17 individuals. The specific EA scale had a reliability alpha of .62 and was also split according to score. The low specific EA group included individuals with scores ranging from 34-42 (n=16), the medium group had scores of 43-48 (n=36), and the high specific EA group had scores of 49-60 (n=17). General and specific ERB were both treated as unidimensional scales and individuals were separated into groups in a method similar to the one used for EA. The general ERB scale had a reliability alpha of .46 and the specific ERB scale had a reliability alpha of .67. While there were relatively high levels of participation (42-78%) for items on the specific ERB scale, the only items that received high participation in the general scale was recycling (99%) and green consumerism (55%).

A discussion of the results of the hypothesis testing is included in Chapter 5. In summary, there were several relationships that were found to be significant. Outdoor recreation participation was found to have relationships with specific EA and specific ERB. Participation in environmental organizations was related to measures of general EA and ERB while participation in OHV/ATV organizations was found to be related to specific measures of EA and ERB. The final relationship was seen between measures of general and specific EA, and no relationship was found between measures of ERB or between parenthood and any other variable.

Chapter 5

Discussion and Conclusion

This chapter presents a summary of the methodology and findings obtained during the data analysis process. In addition, observations made during data analysis and collection will be reviewed. The study's hypothesis will be reviewed and compared to the original purposed model. This chapter will present a review of the study's findings in the following sections:

- 1- Summary of procedures and results,
- 2- Review of study goals and objectives,
- 3- Summary of hypotheses testing,
- 4- Summary of study implications,
- 5- Implications for management, and
- 6- Recommendations for future research

Summary of Procedures and Results

Selection of Subjects

The 2009 OHV and ATV Recreation Survey was implemented, in part, as a addition to the Adirondack Visitor Survey. The first portion of this study was conducted in the southeastern quadrant of the Adirondack Park in the summer of 2009 (June 1-August 31) as the mail survey portion of the Visitor Study. Due to a low number of respondents; an effort was made to contact OHV/ATV clubs that were active in this area of the park. The North Country ATV Association (NCATVA) was the only club/organization that agreed to participate in the study and was sent a package of 140 survey packets to send to its active members in the fall of 2009 (September 1-October 31). An overall response rate of 50% was obtained for the study.

Demographic information was only collected for variables that were determined in the literature to have an effect of either EA or ERB; they include: gender, age, education, political orientation, and parenthood (number of children living in the household). Overall the survey population was 92% male between the ages of 35 and 54 (55%). Education level was equally split between those who had a high school education or less (33%), individuals with some college or an associate's degree (35%) and individuals with a bachelors or graduate degree (32%). Political orientation leaned toward individuals who defined themselves as being

conservative (41%), while an additional 44% defined themselves as being slightly liberal/conservative. The majority of respondents did not have any children living in their household (54%).

Instrumentation

The survey instrument consisted of 6 pages and had a total of 21 questions. The questionnaire was divided into six sections: (1) outdoor recreation participation, (2) involvement in environmental and OHV/ATV organizations, (3) OHV/ATV ownership and use history, (4) opinions toward the environment and OHV/ATVs, (5) background information and (6) environmental behavior.

Summary of Survey Results

Outdoor recreation participation was measured using two questions. The first asked respondent to select all activities that they participated in within the Adirondack Park and the second asked the respondent to select their ‘most important’ activity for the list. Activities were split into categories based upon their degree of resource utilization: slight, moderate and intensive. The main activity participated in by respondents was ATV riding (80%) followed by fishing (53%), hunting (46%), hiking/backpacking (45%) and camping (43%). Approximately 61% of the respondents choose a intensive resource utilization activity as their ‘most important’ activity (ATV riding accounted for the majority), 19% choose a moderate resource utilization activity (hunting/fishing) and the remaining 16% choose a slight resource utilization activity (camping, hiking/backpacking).

Community participation measured active involvement in environmental and OHV/ATV organizations. Respondents were asked to indicate if they participated in these types of organizations and then to list the names of organizations that they were active members of. As patterns emerged during data coding clubs and organizations were split into groups (i.e. recreation, local, nature, snowmobile etc.) to better organize data and observe possible patterns. There was only a small portion of respondents who were active in environmental organizations (n=9) of these individuals eight were also members of an OHV/ATV organization. As expected, the majority of respondents were active members of an OHV/ATV organization (94%), this

classification included not only membership to NCATVA, but to out of state organizations and mountain biking/snowmobiling clubs as well.

OHV/ATV ownership and use gathered information regarding OHV/ATV riders experience and use characteristics. This section collected information regarding what type of OHV/ATV the respondent rode, what activities they used the vehicles for, how often they rode and where, their riding ability level and how many vehicles they owned. By far the majority of riders used ATVs (92%) for trail/leisure riding (99%), hunting (53%) and utility/work (52%). Most defined themselves as being an expert rider (55%) or an intermediate rider (29%) who rode between under 30 days a year (37%) or 30 to 60 days per year (37%). Club land was the riding area of choice, followed by private land (70% and 44% respectively) and there was approximately an even number of riders who had between 0 and 30 years of experience riding. There were usually one or two riders per household (58%) and a corresponding number of OHV/ATVs owned (70%).

Measurement of EA was split into two categories, general and specific. General EA was measured using the revised NEP scale (Dunlap et al. 1992) and activity specific EA was measured using questions developed from the literature based on attitude theory. The NEP was used as a single dimension scale ($\alpha = .84$) and split into three score categories using quartiles for analysis: low, medium and high. There were 19 individuals who scored in the low group (31-45), 35 in the medium group (46-56) and 17 in the high group (57-67). A high score on the NEP reflected that an individual had a higher level concern about the environment and its problems (highest possible score is a 75), respondents to the 2009 OHV/ATV Recreation Survey had a mean score of 50.39 (med=52, sd=8.127). The specific EA scale was designed to measure three issues related to OHV/ATV use: (1) creation of new trails, (2) riding where use is prohibited and (3) environmental and social impacts of OHV/ATV riding. The OHV/ATV specific scale was also treated as being unidimensional ($\alpha = .62$) and like the general scale split into three categories for analysis. The low category consisted of 16 individuals (34-42), the medium group had 36 individuals (43-48), and the high group had 17 individuals (49-60). A high score for this scale represented someone who had attitudes that were less OHV/ATV-centric, so respondents were expected to have low overall scores for this measure. The highest score obtainable for the

specific EA scale was 85, survey respondents had a mean score of 45.99 (med= 45.50, sd= 5.167).

ERB was also measured using two sections, general and specific. Each section consisted of seven items that were designed to measure three aspects of ERB: personal change, individual civic action and cooperative civic action. A higher score in each of these scales indicated someone who was more active in respect to environmentally responsible behavior, the highest obtainable score for each of the scales was seven. The general ERB measure was found to work best as a single scale ($\alpha = .46$), had a mean score of 2.87 (med=3.00, sd=1.388) and was separated into three categories for further analysis. Individuals who scored low on the measure had scores of 0-1 (n=14), medium had scores of 2-4 (n=49) and high had scores of 5-6 (n=12). None of the survey respondents scored a seven on this measure. The specific ERB scale was also used as a single scale ($\alpha = .67$) and had a mean score of 4.14 (med=4.00, sd=1.961). The low category included individuals with scores of 0-2 (n=17), medium had scores of 3-5 (n=35) and the high category had scores of 6-7 (n=22). Overall respondents scored higher for all items on the specific ERB scale than on the general ERB scale with the exception of participation in recycling.

Results obtained from the survey are detailed in Chapter 4, the remainder of this chapter will focus on providing a review of the results and discussing their implication in relation to the literature and to management of OHV/ATV use.

Review of Study Goals and Objectives

As stated in Chapter 1 this study had three main goals: (1) to investigate the relationship between EA and ERB at both the general and activity specific level, (2) to test the multidimensionality of the NEP scale and (3) to further investigate the inconsistencies found in measures of EA for OHV/ATV recreationists. To achieve these goals six study objectives were created with associated hypotheses.

Objective 1:

To investigate the relationship between participation in outdoor recreation activities, with respect to their degree of resource utilization, on measures of environmental attitudes and environmentally responsible behavior.

There was a significant relationship found between participation in outdoor recreation activity, specific EA and ERB. Due to the fact that a large majority of the survey respondents were members of an OHV/ATV organization who considered ATV riding to be their ‘most important’ activity this relationship was not surprising; however the direction of the relationship was surprising. Recall that a low score on the specific EA measure indicated an individual was more OHV/ATV-centric. Thus it was expected that individuals in the slight resource utilization category would have higher specific EA measures and individuals in the intense resource utilization category would have a low measure of specific EA. Data analysis found a different trend. Overall there was a positive relationship between specific EA and outdoor recreation group; as the measure of EA increased the category of resource utilization for the respondents ‘most important’ activity also increased. Closer inspection of this trend found that individuals who had a slight resource utilization as their most important activity tended to have low specific EA scores, those who selected an moderate activity tended to have medium specific EA scores and those individuals who selected a intensive score tended to have medium or high specific EA; scores. This relationship could be skewed to due the low number of participants who selected a slight or moderate resource utilization activity as their ‘most important’.

The measure of specific ERB also had a relationship with outdoor recreation participation. This measure included activities that were related to OHV and ATV use, thus individuals in the slight and moderate ‘most important’ activity groups were not expected to have as high of a score as those in the intensive group, most of whom selected ATV riding as their ‘most important’ activity. Individuals who were in the slight group tended to have a lower score on the specific ERB scale and those in the moderate group had a bell shaped distribution for specific ERB score. Respondents who were in the intense resource utilization group had a tendency to have the highest scores for the specific ERB scale.

Objective 2:

To investigate the relationship between active participation in a community organization or club on measures of environmental attitude and pro-environmental intended behavior.

This objective tested two types of community participation (environmental and OHV/ATV) to measures of EA and ERB. There were four significant relationships found. Active participation in environmental organizations was found to be significantly related to general EA and general ERB, while participation in OHV/ATV organization was found to be significantly associated with specific EA and ERB.

Individuals who were active in environmental organizations were found to have higher scores on the general EA scale (the NEP) suggesting that they had a high level of environmental concern compared to those who were not members of an environmental organization. Membership in environmental organizations was also found to have a relationship to general ERB. Individuals who were active members of an environmental organization tended to score higher on the general ERB scale than those who were not active members in an environmental club/organization. Most of the respondents, regardless of whether they were active in an environmental organization or not, had a tendency to score within the medium ERB group. It should be noted, however, that there was a small number of individuals who were active members of environmental organizations (n=8).

Respondents who were active members of OHV/ATV clubs and organizations had a tendency to score higher on measures of specific EA and ERB than those who did not. While this trend was not surprising for the specific ERB, indicating that members of OHV/ATV groups preformed more environmentally responsible behaviors that related to OHV/ATVs than those who were not members, it was unexpected for specific EA. Similar to the results found for Hypothesis 1.1.2, it was expected that individuals who were not members of an OHV/ATV organization would have a higher measure of specific EA indicating that they were less OHV/ATV-centric, however, this is not the case. This result may be due to the low number of respondents who were not members of an OHV/ATV club or organization (n=4). For measures of specific ERB, all of the individuals who scored in the medium and high ranges were members of an OHV/ATV organization, and all of the individuals who were not members of an

OHV/ATV organization had a low specific ERB score. However, it should be noted that the number of respondents who were not members of an OHV/ATV organization was extremely low (n=3).

Objective 3:

To investigate the relationship between environmental attitudes among outdoor recreationists and the relationship to measure pro-environmental intended behavior.

There were no significant relationships observed between the measures of general and specific EA and ERB. However there were two tendencies found between the variables, between the measures general EA and general ERB and between specific EA and general ERB. For individuals who scored high on the NEP scale (general EA) there was an skewness in the distribution toward having a higher measure of general ERB, however this relationship was not significant ($p \geq 0.05$). There was also a slight skewness found for respondents who had medium measures of specific ERB to have medium general ERB scores and those who had high specific EA score to have lower general ERB scores, these relationships were also not found to be significant ($p \geq 0.05$).

Objective 4:

To investigate the relationship between general and specific measures of environmental attitude.

There was significant negative relationship found between measures of specific and general EA. The tendency was for individuals who had a higher measure of general EA to have a lower measure of specific EA. This relationship suggests that when individuals have a higher measure of general EA, or a more environmental worldview, they have a lower measure of specific EA, meaning they are more OHV/ATV-centric. This relationship was unexpected; individuals with higher measures of general EA were also expected to have higher measures of specific EA (individuals who were more environmental in their worldview would have a tendency to be less OHV/ATV-centric). This may be due measurement error or possibly due to the difference in the way the two EA measures were designed. While specific EA scale was designed using the three dimensions of attitude (cognitive, affective and conative) the general EA scale was already an established measure. The specific EA scale should be tested further with

other groups to see if this trend continues and if certain questions are responsible for the unexpected relationship.

Objective 5:

To investigate the relationship between general and specific measures of pro-environmental intended behavior.

While a significant relationship (at the 0.05 level) was not found between general and specific ERB there was an association between the two variables that should be noted. There was a positive relationship ($p=.059$) between the measures of general and specific ERB, suggesting that respondents who scored high on the general ERB scale would also score high on the specific ERB scale. This suggests that individuals who act in an environmentally conscious manner generally will also perform these behaviors in their specific recreation activity.

Objective 6:

Explore the relationship between individuals who have one or more children under the age of 18 living in their household and environmental attitudes and pro-environmental intended behavior.

There were no relationships found between parenthood and the concepts of EA and ERB at the general or specific measurement level. Parenthood was expected to correspond to high scores for EA and ERB at both the general and specific levels. Hawthorne and Alabaster (1990) suggested that parenthood was linked to a sense of social responsibility and that children of school age had a greater influence over their parents when it came to environmental issues. However constraints to perform the behaviors were not taken into account (time, knowledge of how to act, ease of performance etc.), these variables may have had an effect on the number of individuals who actually performed the behavior.

Summary of Hypotheses Tested

Hypothesis 1 tested for the existence of a relationship between outdoor recreation participation (a categorical variable), EA and ERB (both ranked ordinal variables) using Contingency C. Before analysis outdoor recreation participation was separated into three categories by 'most important' activity: slight, moderate and intensive. In addition, EA and ERB were separated into their low, medium and high score categories. Hypotheses 2 and 6 were tested

using Cramer's V to examine if there was a relationship between participation in community organizations and parenthood with the measures of EA and ERB. Both community participation and parenthood were limited to a yes/no dichotomy. Hypotheses 3, 4, and 5 were tested using Kendall's tau since all of the variables were classified as being ranked ordinal. A summary of the results obtained can be seen in Table 5.1, and will be discussed individually by objective.

Table 5.1. Results of hypothesis testing.

Objective	Independent Variable	Dependent Variable	Results
1	Outdoor Recreation Participation	General EA	Not Rejected
		Specific EA	Rejected
		General ERB	Not Rejected
		Specific ERB	Rejected
2	Community Participation: Environmental	General EA	Rejected
		Specific EA	Not Rejected
		General ERB	Rejected
		Specific ERB	Not Rejected
	Community Participation: OHV/ATV	General EA	Not Rejected
		Specific EA	Rejected
		General ERB	Not Rejected
		Specific ERB	Rejected
3	General EA	General ERB	Not Rejected
		Specific ERB	Not Rejected
	Specific EA	General ERB	Not Rejected
		Specific ERB	Not Rejected
4	General EA	Specific EA	Rejected
5	General ERB	Specific ERB	Not Rejected
6	Children U18	General EA	Not Rejected
		Specific EA	Not Rejected
		General ERB	Not Rejected
		Specific ERB	Not Rejected

Review of Study Model

A review of the study model purposed in Chapter 3 can be seen in Figure 5.1. Only the significant relationships are noted (from Table 5.1).

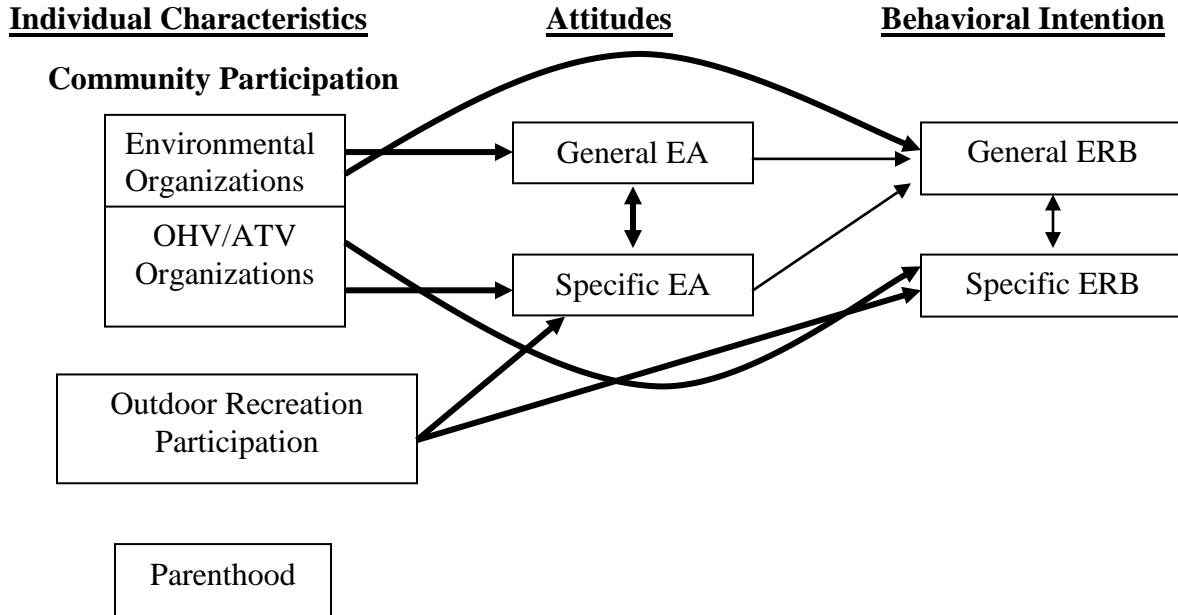


Figure 5.1. Significant relationships observed between study concepts. (Note: significant relationships are represented by thick solid lines; relationships with non-significant associations, but observed tendencies are represented by a thin line)

Summary of Study Implications

In 1975 Dunlap and Heffernan originally proposed that there was a positive relationship between participation in outdoor recreation activities and measures of environmental concern; and that this relationship was stronger with appreciative activities than with consumptive activities. While several studies have examined this relationship, the support for this association is generally weak to mixed (Dunlap & Heffernan 1975; Geisler, Martinson & Wilkening 1977; Pinhey & Gries, 1979; VanLiere & Noe 1981; Jackson 1986; Nord, Luloff & Bridger 1998). The inconsistent findings are usually deemed to be the result of weak operationalization of key variables EA and outdoor recreation participation. To address this issue, a commonly used tool for the measurement of general environmental attitudes was used, the NEP scale (Dunlap et al. 1992). Similar to the original authors, this study found that the NEP scale worked best as a single measure and did not identify any factors. Outdoor recreation participation used the respondents ‘most important’ activity to divide individuals into groups. Two recent studies (Nord et al. 2000;

Theodori, Luloff & Willits 1998) found fairly strong support for the relationship between outdoor recreation participation and ERB. Both of these studies used general ERB as a unidimensional construct.

This study aimed to further explore the relationship between outdoor recreation participation, environmental attitudes and intended environmentally responsible behavior by examining the variables at both a general and activity specific level. Using a particular recreation group, OHV/ATV riders, the relationship between outdoor recreation participation, EA and ERB was investigated. Previous research has suggested that specific attitudes generally correspond to specific behaviors and general attitudes to general behaviors; however this study failed to find strong associations between EA and ERB.

Two additional variables were also proposed to have a relationship with EA and ERB, participation in community organizations and parenthood. This study failed to find significant relationship between several of the variables that, from findings in previous studies, were hypothesized to have a relationship with EA and ERB. The lack of associations found could have resulted from several factors including the low sample size that was used for this study.

Outdoor recreation participation was predicated to have a relationship with all measures of EA and ERB. Jackson (1986) found strong support for this trend stating that “a stronger relationship existed between outdoor recreation and attitudes to specific aspects of the environment necessary for pursuing such activities than between outdoor recreation and attitudes more ‘distant’ or general environmental attitudes (p.20). In this study an increased level of participation in outdoor recreation activities (mainly OHV/ATV riding) lead to higher measures of both specific EA and ERB but had no relationship with general measures of EA and ERB.

There was a positive association found between participation in environmental community organizations and measures of general EA and ERB. Another positive relationship was found between participation in OHV/ATV organizations and activity specific measures of EA and ERB.

While previous research has found that there is a relationship between parenthood and pro-environmental behavior (Hawthore & Alabaster 1999; Uzzel 1994; Maloney, Ward & Bridger 1975; Bamburg & Möser 2007) this research failed to find a link between the two variables. While there was almost an equal split between individuals who had a child living under the age of 18 living in the household and those who did not (46% and 54%, respectively)

there was no difference found between these groups with respect to the measures of EA and ERB.

Implications for Management

While research has examined environmental attitudes of outdoor recreationists under the assumption that attitudes precede behaviors, this relationship has not been consistent. Caro and Ewert (1995) suggested that if attitude does predict behavior, then as participation among recreation in outdoor activities has significantly increased over the last decade and this growth is expected to increase, especially for day hiking and backpacking (camping) activities, then outdoor recreation activities may be the most effective way to increase EA and thus increase ERB. This research also has policy and practical implications. For example, Nord, Luloff & Bridger (1998) suggest that “if outdoor recreation leads to increased environmentalism then funding, promoting, and operating parks and outdoor recreation facilities and programs may be an effective strategy for protecting and improving the natural environment (p.236)”. Individuals who participate in outdoor recreation activities already show they have an affinity for the natural environment, this provides an easy access point for managers to provide information regarding environmental problems and how individuals can make a difference (environmental action strategies).

By demonstrating that attitudes are associated with the intention to engage in behaviors an access point for managerial influence on behavior is provided (Manfredo, Yaun & McGuire 1992). While this study did not find significant relationships between EA and ERB, it did find relationships between outdoor recreation participation and community participation. This suggests that providing information about environmental issues and knowledge of how to act using these points may be the most effective way to influence attitudes and increase environmentally responsible behavior.

Previous studies that have used the TPB in the context of outdoor recreation participation (Ajzen & Driver 1992; Hrubes, Ajzen & Daigle 2001; Bright & Manfredo 1995) agree that the relationship between outdoor recreation and attitudes is an efficient way to better manage recreationists. In addition, this study found that there was a positive association between involvement in community organizations and measures of ERB. Specifically those members of environmental organizations have higher measures of general ERB and members of OHV/ATV

organizations had higher measures of specific ERB. Accessing clubs/organizations may be another efficient way to have a positive effect on a target population by providing them with the appropriate information on particular environmental issues.

Recommendations for Future Research

While the relationship between EA and ERB has been the focus of several studies the actual relationship is still unclear. This study explored these concepts in the context of a specific recreation activity to aid in the development of a more complete model of the relationship between EA and ERB. This study aimed to explore the relationship between general and specific EA and ERB among a particular group of recreationists, and during the investigation there were several observations and concerns that can be used to help guide future research. This document was only one study that has focused on the relationship between attitudes and behaviors, more studies are needed to better understand the association between EA and ERB in a particular recreation group.

One successful method used in this study was the operationalization of outdoor recreation participation by 'most important' activity (Thapa 2000; Thapa & Graefe 2001). Unlike prior measures that used the appreciative, consumptive and motorized terminology, or slight, moderate and intensive terminology; adding this additional step allowed for a more effective separation of survey respondents. Previous studies (Thedori, Luloff & Willits 1997) noted that a recreationist may participate in more than one activity on a single trip. By selecting their 'most important' activity, this issue was able to be addressed and was also able to account for groups who participate in several activities. This will become increasingly important when measuring larger sample groups who participated in several similar activities. For example, it is suggested that this research be continued using other motorized activities to see if the results found in this study persist with other similar recreation groups (snowmobilers, motor boaters, etc.).

One of the goals of this research was to measure the multidimensionality of the revised NEP scale, for this study the NEP worked best as a single scale in agreement with the scale authors (Dunlap et al 1992). However, this measure needs additional testing since several studies have found two or three factors using the revised NEP scale and none of the factors are comparable between studies.

The relationship between attitudes and behaviors is complex. This study was not able to examine several variables that have been reported to have an effect on these concepts or the relationship between them. Tarrant & Cordell (1997) suggest that research that examines the relationship between attitudes and behaviors should also examine the effect of external variables on the relationship including, socio-demographics, normative behavior, personality characteristics (LOC, knowledge, political orientation and situational conditions). The key to effective management is having an understanding of individual's relationship with the environment, this includes their attitude, and the basis on which their attitudes are founded (Fulton, Manfredo & Lipscomb 1996; Bright & Manfredo 1995). The literature establishes that that environmental attitudes exist, but what is still largely unknown is under what circumstances attitudes are formed. Minor adjustments to the scales used to measure the concepts of EA and ERB may also be needed as this study found that some of the questions may not be effective in all situations. For example, for the general ERB scale one question referred to the attendance of public protests, this was found to be the lowest participated in activity for both the general and specific scales.

ERB was measured in this study as self-reported behavior not actual behavior. While measuring self-reported behavior is considered to be the best option for research (Tarrant & Cordell 1997) measuring self-reported behavior may not be as accurate as using measures of actual behavior. Several studies have ranked behaviors by their difficulty to perform, by considering the ease of performance of each of the measure activities the accuracy of the measure may improve.

In addition, further studies are needed to replicate this research with a more representative sample of OHV/ATV recreationists. It might be useful to access other motorized recreation groups as well including, snowmobiling, motor-boating and jet skiing for comparison samples. This research was an exploratory study to investigate if the relationship between attitudes and behaviors among a specific group of recreationists, a larger sample size could provide increased precision of estimates of various properties of the population and the relationships between test variables.

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Appendix A:
2009 OHV/ATV Recreation Survey,
Cover Letter & Reminder Letter

2009 OHV and ATV Recreation Survey

State University of New York
College of Environmental Science and Forestry



The SUNY College of Environmental Science and Forestry (SUNY ESF) is studying the attitudes and behavior of individuals who participate in “Off-Highway Vehicle” (OHV) and “All-Terrain Vehicle” (ATV) riding within the Adirondack Park to better understand riders and how to reduce impacts while providing riding opportunities.

This questionnaire is divided into sections to make it easier for you to answer. Some of the questions will ask about your OHV and ATV riding background and other questions will ask you about your attitudes toward the environment and about environmental issues. The estimated time to complete this survey is 20-30 minutes.

Thank you for participating in this study.

Section A: Outdoor recreation activities in the Adirondacks

1. During the last 12 months, did you participate in any of the following activities in the Adirondack Park? Please check the box next to the activities you participated in:

- | | |
|--|--|
| <input type="checkbox"/> Hiking/backpacking | <input type="checkbox"/> Hunting |
| <input type="checkbox"/> Skiing (cross-county or downhill) | <input type="checkbox"/> Fishing |
| <input type="checkbox"/> Snowshoeing | <input type="checkbox"/> Insect collection |
| <input type="checkbox"/> Picnicking | <input type="checkbox"/> Mushroom hunting |
| <input type="checkbox"/> Bird watching/Wildlife watching | <input type="checkbox"/> Horseback riding |
| <input type="checkbox"/> Viewing Scenery | <input type="checkbox"/> Snowmobiling |
| <input type="checkbox"/> Swimming | <input type="checkbox"/> Off-highway vehicles (OHVs)
riding |
| <input type="checkbox"/> Canoeing/kayaking | <input type="checkbox"/> All terrain vehicles (ATVs)
riding |
| <input type="checkbox"/> Photography | <input type="checkbox"/> Motor boating |
| <input type="checkbox"/> Jogging/trail running | <input type="checkbox"/> Other (<i>Please list</i>) |
| <input type="checkbox"/> Mountain Biking | |
| <input type="checkbox"/> Camping | |

2. In general, which one of these activities listed above is the most important to you? (*List one only*)

Most important recreation activity: _____

Section B: Involvement in environmental and OHV/ATV organizations

3. Do you actively participate in any environmental or conservation organizations that are either based on a local, regional, national or international level?

_____ Yes _____ No

If yes, please list _____

4. Do you actively participate in any OHV or ATV riding clubs or organizations?

_____ Yes _____ No

If yes, please list _____

Section C: OHV and ATV ownership and use history
--

5. What types of OHVs or ATVs do you ride?

- | | |
|---|---|
| <input type="checkbox"/> ATVs (4 and 6-wheelers) | <input type="checkbox"/> Off-highway 4WD Jeep, automobile, or sport utility vehicle |
| <input type="checkbox"/> Off-highway motorcycles or dirtbikes | <input type="checkbox"/> Other (please specify): _____ |

6. What activities do you use OHVs or ATVs for? (*Check all that apply*)

- | | |
|---|--|
| <input type="checkbox"/> Trail/leisure riding | <input type="checkbox"/> Fishing |
| <input type="checkbox"/> Sport riding | <input type="checkbox"/> Transportation |
| <input type="checkbox"/> Racing and competition | <input type="checkbox"/> Utility and work |
| <input type="checkbox"/> Hunting | <input type="checkbox"/> Other (please specify): _____ |

7. What is your OHV or ATV riding ability level? (*Please check one box*)

- ☐ Novice ☐ Intermediate ☐ Advanced ☐ Expert

8. For how many years have you been riding OHVs or ATVs? _____ years

9. How many days per year do you ride your OHV or ATV ? _____ days/year

10. What areas in the Adirondacks do you ride your OHV or ATV? (*check all that apply*)

- | | |
|---|---|
| <input type="checkbox"/> State lands (e.g. wild forest areas) | <input type="checkbox"/> Private lands |
| <input type="checkbox"/> County, township, or city lands | <input type="checkbox"/> Club-owned lands |
| <input type="checkbox"/> Other (please specify) _____ | |

11. How many OHVs or ATVs do you own in your household? _____ OHVs/ATVs

12. How many OHV or ATV riders live in your household? _____ riders

Section D: Opinions toward the environment and OHVs and ATVs

13. We would like your opinion on a wide range of environmental issues; please circle one number for each statement that best reflects how you feel.

Statement	Strongly disagree	Moderately disagree	Neutral	Moderately agree	Strongly agree
We are approaching the limit of the number of people that the earth can support.	1	2	3	4	5
Humans have the right to modify the natural environment to suit their needs.	1	2	3	4	5
When we interfere with nature, it often produces disastrous consequences.	1	2	3	4	5
Human ingenuity will ensure that we do not make the earth unlivable.	1	2	3	4	5
The earth has plenty of natural resources if we just learn how to develop them.	1	2	3	4	5
Plants and animals have as much right as humans to exist.	1	2	3	4	5
Humans are severely abusing the environment.	1	2	3	4	5
The balance of nature is strong enough to cope with the impacts of modern industrial nations.	1	2	3	4	5
Despite our special abilities humans are still subject to the laws of nature.	1	2	3	4	5
The so called "ecological crisis" facing human-kind has been greatly exaggerated.	1	2	3	4	5
The earth is like a spaceship with very limited room and resources.	1	2	3	4	5
Humans will eventually learn enough about how nature works to be able to control it.	1	2	3	4	5
If things continue on their present course, we will soon experience a major ecological catastrophe.	1	2	3	4	5
The balance of nature is very delicate and easily upset.	1	2	3	4	5
Humans were meant to rule over the rest of nature.	1	2	3	4	5

14. To what extent do you agree or disagree with the following statements concerning your opinions about OHV and ATV riding? (Circle the number corresponding to your answer)

Statement	Level of agreement or disagreement with statement				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
In general, I have a positive opinion about OHVs and ATVs	1	2	3	4	5
I dislike OHV and ATV riders who create new trails in areas where riding is prohibited	1	2	3	4	5
In my opinion OHVs/ATVs generally do not have a large impact on the environment or other park users	1	2	3	4	5
I believe that use of ATVs and OHVs on public trails where OHV/ATV use is prohibited is okay	1	2	3	4	5
I have a negative opinion about people who ride OHVs/ATVs on prohibited trails	1	2	3	4	5
It is more acceptable to ride OHVs/ATVs on prohibited roads than on prohibited trails	1	2	3	4	5
The creation of new trails in an area where OHV/ATV use is prohibited is unacceptable, even if there are not many other riding opportunities in the area	1	2	3	4	5
It's important to permit OHV and ATV use in public natural areas in the Adirondack park.	1	2	3	4	5
OHV and ATV riding experiences should be permitted on public lands in general.	1	2	3	4	5
In general, I know a great deal about OHVs and ATVs	1	2	3	4	5
I know a lot about the negative impacts associated with OHV and ATV use.	1	2	3	4	5
I get annoyed when other OHV/ATV riders ride on trails that are prohibited	1	2	3	4	5
I care that my development and/or use if unauthorized OHV and ATV trails could result in harm to the environment and/or the disturbance of other users.	1	2	3	4	5
I support the closing of trails where OHV and ATV has a negative impact on the environment	1	2	3	4	5
I know that using my OHV/ATV in areas where use is prohibited can result in me getting ticked	1	2	3	4	5
I believe that OHV/ATV use should be permitted on public roads	1	2	3	4	5

Section E: Background Information

16. What is your gender? ☐ Male ☐ Female
17. What is your age? _____ years
18. What is the highest year of school you completed?
- | | |
|---|---|
| <input type="checkbox"/> Junior High School | <input type="checkbox"/> Associates Degree |
| <input type="checkbox"/> High School | <input type="checkbox"/> Bachelors Degree |
| <input type="checkbox"/> Some College | <input type="checkbox"/> Graduate/Advanced Degree |
19. How many children (18 or under) live in your household? _____
20. *Circle* the statement that best describes your political outlook at the present time
- | | | | | |
|-----------------|-----------------------|----------------------------------|----------------------------|----------------------|
| Very
Liberal | Moderately
Liberal | Slightly
Liberal/Conservative | Moderately
Conservative | Very
Conservative |
|-----------------|-----------------------|----------------------------------|----------------------------|----------------------|

Section F: Environmental behavior

21. In the **past year** have you participated in any of the following activities?

Regularly sort materials for recycling?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Refused to buy a product for environmental reasons?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Contacted government /industry /media about environmental issue?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Donated money to a local environmental group?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Attended public meeting about a local environmental issue?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Attended public protest about a local environmental issue?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Joined a local clean-up effort	<input type="checkbox"/> Yes	<input type="checkbox"/> No

22. In the **past year** have you participated in any of the following activities related to ATV use?

Educate yourself on how to reduce impacts created by ATVs?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Performed maintenance on your ATV to help reduce emissions?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Taken a class, online or in person, regarding ATV safety?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Donated money to an ATV club/organization (excluding fees)?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Contacted your local government/agency regarding an ATV related issue?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Attended a public/club/organization meeting regarding ATV issues?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Assisted in trail maintenance programs?	<input type="checkbox"/> Yes (<i>see below</i>)	<input type="checkbox"/> No

If you assist in Trail maintenance, what type of land do you assist in and how many times per year?

	<u>1-2 times</u>	<u>3-5 times</u>	<u>6-10 times</u>	<u>Over 11 times</u>
<input type="checkbox"/> Private lands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> OHV/ATV club lands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> State agency lands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Other (<i>specify</i>): _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for taking the time to complete this survey!

Additional comments:

Please return this completed survey in the self-addressed, stamped envelope to:

Dr. Chad Dawson and Ms. Lindsey Barker, SUNY College of Environmental Science and Forestry,

320 Bray Hall, One Forestry Drive, Syracuse, NY 13210



Dear Off-Highway Vehicle Rider:

In order to better understand the attitudes and characteristics of OHV recreationists in the Adirondack Park information is being collected throughout the southeastern area of the park to guide future management decisions. This study is part of a larger recreation visitor study being conducted in the park by the SUNY College of Environmental Science and Forestry and the New York Department of Environmental Conservation (DEC).

The results of this study will be compiled and combined with the results from the visitor study to provide the DEC with information to help make decisions regarding the management of OHV riding areas. The 8 page survey enclosed will help us better understand OHV recreationists in the Adirondacks and your opinion is needed!

Please return this study in the next 10 days in the enclosed reply envelope. Be assured that your returned results from this study will be completely anonymous and confidential, your name and address will not be associated with any of the information provided. After we receive your survey your name and address will be erased from our files.

Please take your time to answer each of the questions. The estimated time to complete the survey is 30 minutes. It is important that the questionnaire be completed by the OHV rider to whom the survey was addressed.

If you have any questions regarding the survey or project or if you would like a copy of the results of this survey please contact me at labarker@syr.edu. Thank you for your time and effort in completing this survey, your participation is greatly appreciated!

Sincerely,

Chad Dawson
Professor

Lindsey Barker
Graduate Research Assistant

Reminder postcard: 2 weeks later

Dear Off-Highway Vehicle Rider,
We would like to know more about your attitudes and characteristics regarding OHV recreation in the Adirondack Park. Two weeks ago you were sent a survey about OHV recreation from The SUNY College of Environmental Science and Forestry. We haven't received your completed survey back yet. If you have already completed the survey and returned it, please accept my sincere thanks. If not, please send the survey out as soon as possible. This survey was only sent out to a small number of OHV recreationists in the Adirondack Park and your survey is very important to the study. Thanks you for your help and cooperation.

Sincerely,
Chad Dawson
Professor

Lindsey Barker
Graduate Research Assistant

SUNY College of Environmental Science and Forestry
One Forestry Drive
Syracuse, NY 13210

Reminder letter: 4 weeks later



State University of New York
COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY

Dear Off-Highway Vehicle Rider:

As of today we have not yet received your OHV recreation survey. If you have already completed and returned it, we take this opportunity to thank you.

A second copy of the survey has been included. Please return this survey in the next 10 days. Be assured that your returned results from this study will be completely anonymous and confidential, your name and address will not be associated with any of the information provided. After we receive your survey your name and address will be erased from our files.

Your input is extremely important to our study to help better understand OHV riders in the Adirondack Park in order to help guide future management decisions.

Please take your time to answer each of the questions. The estimated time to complete the survey is 30 minutes. It is important that the questionnaire be completed by the OHV rider to whom the survey was addressed.

If you have any questions regarding the survey or project or if you would like a copy of the results of this study please contact me at labarker@syr.edu. Thank you for your time and effort in completing this survey, your participation is greatly appreciated!

Sincerely,

Chad Dawson
Professor

Lindsey Barker
Graduate Research Assistant

Appendix B

Legal Issues Related to OHV and ATV use in the Adirondacks.

Legal Issues Related to OHV and ATV use in the Adirondacks

The Adirondack Park consists of over six million acres of land that is protected as ‘forever wild’ under Article XIV of the New York state constitution, which states that, ‘the lands of the state, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed’. The Adirondack Park State Land Master Plan (APSLMP) guides the management of each Unit depending on how it is designated and any special circumstances that exist (NYSDEC 2001). For this report only three of the most popular state forest land designations will be included, wilderness, primitive and wild forest areas. Only the laws affecting use of ATVs and OHVs will be considered, snowmobiles will not be included.

Motorized Use on Federal Land

Executive Order 11644, signed in 1972, states that federal agencies have to regulate the use of off-road vehicles on federal land to ‘protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands’. The Council on Environmental Quality (CEQ 1979) also recognized the importance of this legal access issue and set forth specific steps that agencies were recommended to follow to create uniform and legally defensible comprehensive policies regarding off-road vehicle access. These steps included (but are not limited to) recognition of the magnitude of the enforcement problem, determination of how the public wants the land used, the separation of motorized users from other recreational users, monitoring of ORV effects, and reclaiming land that was damaged from ORV use.

New York State Law

In New York ATVs, regardless of where and how they are used, are required under state law to be registered. This \$12.50 annual registration fee¹ is deferred into the General Fund, where it can be used for a variety of state government purposes. The Department of Motor Vehicles (DMV) first required ATVs to be registered with the state in 1986, at that time half of the annual

¹ The annual registration fee was increased from \$10, where it has been since 1986, to \$12.50 in September 2009 as part of New York State Bill A00159 (same as S.59) (NYSORVA 2009).

registration fee went to the ATV trail development and maintenance fund. Up to a quarter of this money could go to the Office of Parks and Recreation. In 1990 the destination of the registration fee changed resulting in harsh criticism of the state government, especially by OHV/ATV organizations such as The New York State Off-Highway Recreational Vehicle Association (NYSORVA). It was estimated that since 1986 over \$10 million in ATV registration fees had been deposited into the General Fund (NYSORVA 2009).

ATV use in the state of New York is regulated by Vehicle and Traffic (V&T) and Environmental Conservation Law (ECL). Under V&T law ATV's are defined as 'any self-propelled vehicle that is manufactured for use on off-highway trails. These vehicles are less than 70 inches wide and weigh less than 1,000 pounds' (New York State Department of Motor Vehicles, NYSDMV 2008). Operation of an ATV is illegal on highways, with the exception of a few specific circumstances. For example, a direct highway crossing to an area posted for legal ATV use. The language of V&T law limits local municipalities jurisdiction in designating roads open for ATV use, a town faces liability risks if it chooses to designate trails in excess of the jurisdiction granted by the law. The Department of Environmental Conservation (DEC) has a 'closed unless posted open' policy toward ATV use. This policy is in accordance with Environmental Conservation Law (ECL) in both a general sense, for the regulation of all motor vehicles in the state (§ 190.8 (m)) and specifically in regards to operation of motor vehicles in the forest preserve (§ 196.1, NYSDEC 2005). Under ECL, ATVs have the same legal access rights as cars and trucks, but under V&T law still may not have access to areas unless they are specifically designated for ATV use.

Recreational Riding in the Adirondacks

The Adirondack Park State Land Master Plan (APSLMP) sets the guiding principles of how lands should be managed within the Adirondack Park. The primary state land classifications in the Adirondacks are Wilderness, Primitive Areas and Wild Forest. Since the existence of roads is inconsistent with the wilderness definition, the use of public vehicles or creation of new roads is prohibited in wilderness areas. The goal of the management of Primitive areas is to be as close to a wilderness area as possible; thus the guidelines that affect motor vehicle use are similar to wilderness areas. Management of a Wild Forest area is guided by less stringent rules than those set in place for wilderness and primitive areas. While they are still subject to the 'forever wild' clause, a higher degree of human use is tolerated in these areas. While public use of motor

vehicles is not encouraged, it is allowed. Since ATVs fall under the definition of motor vehicles in the APSLMP they are legally allowed to ride on DEC roads that are designated for motor vehicle use (under ECL law), but may not necessarily be allowed to ride on public roads under V&T law.

In 2001 a lawsuit filed on the basis of the Americans with Disabilities Act (ADA) allowed access of ATVs on trails to individuals with CP-3 (Commissioner Policy 3) permits would on designated roads in wild forest areas (NYSDEC 2005). In total 65 miles of roads were opened to individuals with CP-3 permits in five wild forest areas. This law also expressed that new trails could not be created to allow additional riding areas.

Legal riding opportunities that follow the regulations of V&T and ECL law in New York can be summarized into five possible areas: the operators own land, private land (with the owner's permission), designated town roads, public land that is designated for ATV travel and in specified areas for individuals who possess a CP-3 permit (Karasin 2003).

A Review of ATV Laws

Executive Order 11644 (February 1972) reviews off-road vehicle use on public lands. The purpose of this law was to protect the resources and environment where OHV riding was taking place by providing information to the public regarding the location of approved trails and after an initial environmental consultation, monitoring the effects of OHV use (which was to be overseen by the Council on Environmental Quality). Executive Order 11989 (May 1977) amended section 2 of EO 11644 (definitions) and added section 9 (special protection of public lands) to the original order. Section 9 required that whenever it is deemed that any lands are being adversely affected by OHV use that access to that land be immediately closed to OHV use until it is determined that the problem no longer exists or a way is found to fix the problem.

In 2005 the Forest Service revised regulations regarding travel management on National Forest lands; this ruling is considered to be consistent with Executive Orders 11644 and 11989. Unlike the EO 11644 and EO 11989, this ruling specifically states that 'For many visitors, motor vehicles also represent an integral part of their recreation experience' (FR 261, p. 68264). This statement is important because unlike any of the plans for the Adirondack Park (including the APSLMP and the unit management plans), in this document OHV riding is considered to be a recreational activity in itself and not just a way to participate in traditional activities such as hunting and fishing. The rule continues in saying that these recreationists have a right to enjoy

the National Forest lands, ‘in the right places with proper management’ (FR 261, p.68264). During the comment phase of the ruling the Forest Service was asked to be sure that there were quiet areas set aside for non-motorized users across NFS lands. Suggestions that routes closed to OHVs also be closed to bicycles and horses, and compliance with the Endangered Species Act (ESA) and NEPA requirements about cross-country travel, were also included. Suggestions for having the needs of OHV riders included in planning and management of the trails and trail systems was among one of the most commented topics. The Forest Service responded that several of the Forest Service employees are also OHV riders, thus their opinion and thoughts on the management would reflect those of the OHV riding community.

The final rule stated that, in order to designate an area open to OHV use several criteria had to be considered, including effects on natural and cultural resources, public safety, provision of recreational opportunities, access needs, and conflicts among users. Use by OHVs on public lands would be designated and monitored by the agency in charge of those lands, and would consider local regulations in their designations.

The Adirondack Park and OHV Regulations

In March of 2005, the New York DEC published a draft ATV policy for state lands (NYSDEC 2005). This document was specifically formatted to ATV use and highlighted many of the rules and regulations that all OHVs are subject to within New York State. As stated previously in this document, ATV use is not considered a recreational activity on its own, but rather ‘one of several possible means that the public may utilize to access Department programs on public and easement lands...’ (NYSDEC 2005, p.1). Following the criteria set up by V&T law, Forest Service regulations, natural resource protection and the APSLMP there are very few circumstances where public ATV use is allowed within the Adirondack Park. Since public ATV riding is not considered a program (such as hunting, fishing, camping, and hiking) on Forest Service lands, it does not get the same area designation as other activities. Within the park, ATV riding is only allowed on designated public highways and on designated wild forest roads. Section (i) outlines maintenance of these roads and states that ‘maintenance funds must exist to ensure that the road can be maintained to prevent muddy or eroded conditions’ (NYSDEC 2005, p.3). This policy is designed to be implemented through the Unit Management Plan (UMP) process that was established by the SLMP, and the responsibility of the implementation of these regulations was in the hands of the department divisions and staff.

In September 2007, the DEC issued supporting documentation to the 2005 policy (NYSDEC 2007). It reviewed the characteristics of ATVs, impacts to the natural resource, illegal use, enforcement issues, safety concerns, and recreational user's conflicts. The effects on sensitive ecosystems, such as bogs and wetland areas, was one of the main focuses of this report since these areas are often the intended target of some of the 'most aggressive and disruptive riding' (NYSDEC 2007, p.5). The tone of the document is overwhelmingly negative and provided no positive reasons why or where ATV use should be allowed. Illegal use is said to be concentrated on areas that are adjacent to lands where ATV use is allowed, and that these trails are used to 'gain access to areas closed to ATV use' (NYSDEC 2007, p.7).

The Residents Committee to Protect the Adirondacks published a document of similar tone in 2003 (RCPA 2003). This document highlighted ATV damage within the Adirondack Park and recommended that all 63 roads (open at that time) be closed to OHV use, and that no road be opened in the future without the completion of a generic Environmental Impact Statement (EIS). This document also stresses the need for a comprehensive ATV plan that is easily accessed and understood by the public.

The SE Quadrant

The research that I conducted in the summer and fall of 2009 took place in the southeastern (SE) area of the Adirondack Park and was concerned with the attitudes and behaviors of OHV/ATV riders within that area. Unfortunately for the project legal riding areas in the SE area are extremely low. After reviewing several UMPs, trail guides and contacting the managers and town clerks in the area only a handful of legal roads were found, most within the town of Stony Creek that borders the Wilcox Lake Wild Forest. Several of the town roads are open to ATV use but the main road that runs through the town is not, so all legal access is within relatively short roads that do not connect together. In addition there is a designated CP-3 trail on the western edge of town that has recently been closed due to the fact that the trail had no real destination.

Until recently the town of Horicon (near the northwestern end of the Lake George Wild Forest) also allowed ATV use. However, after a battle between the state of New York and the town of Horicon that lasted from 2002-2008, all ATV access sites were closed.

State of New York vs. Town of Horicon

One legal battle in the southeastern area still represents a sore spot for many ATV riders looking for legal areas to recreate (NYSLRB 2007). In September of 2002 the town of Horicon opened eight routes to ATVs traversing through state forest lands. Local Law No. 2 was petitioned to be unconstitutional and in violation of several state statutes, and that in addition it did not comply with the State Environmental Quality Review Act (SEQRA). Respondents to this petition used section 189 of the Highway Law as a defense, which states that “[a]ll lands which shall have been used by the public as a highway for the period of ten years or more, shall be a highway, with the same force and effect as if it had been duly laid out and recorded as a highway...”² (NYSLRB 2007). The Supreme Court sided with the petitioners, saying that since it was state land under the Highway Law, these roads should be regulated by the DEC. The respondents ushered a quick appeal. Several access issues were brought up, however since that town had not been maintaining the roads for the past ten years before the state acquired the property the ruling finally decided that the land was DEC property and all ATV access was closed (this was again upheld in a final legal battle in February of 2008). In the end, the town of Horicon was accused of not taking a ‘hard look’ at ATV law and that they did not consider the environmental impacts that could ensue by allowing ATV use on these areas thus falling short of both the letter and spirit of SEQRA.

² For explanation please visit <http://www.orps.state.ny.us/legal/opinions/v7/56.htm>

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PROFFESIONAL MEMBERSHIPS

- International Wildlife Rehabilitation Council (IWRC) member since: December 2009
- National Wildlife Rehabilitation Association (NWRA) member since: March 2007
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PROJECTS AND PUBLICATIONS

- Master's thesis: "Exploring the relationship between environmental attitudes and behavioral intentions: OHV and ATV riders in the Adirondacks" to be completed May 2010
- Presented at the 2010 Northeastern Recreation Research Symposium. "Exploring the Relationship between Outdoor Recreation Activities, Community Participation and Environmental Attitudes", and published in the 2010 Symposium Proceedings