A HEURISTIC FOR ENVIRONMENTAL VALUES AND ETHICS, AND A PSYCHOMETRIC INSTRUMENT TO MEASURE ADULT ENVIRONMENTAL ETHICS AND WILLINGNESS TO PROTECT THE ENVIRONMENT

DISSERTATION

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ABSTRACT

The need for instruments to objectively and deeply measure public beliefs concerning environmental values and ethics, and relationship to environmental protection led to a project to integrate analytical techniques from ethics and educational psychology to identify beliefs in theories of value and obligation (direct and indirect), develop a 12-category system of environmental ethics, and a psychometric instrument with 5 scales and 7 subscales, including a self-assessment instrument for environmental ethics. The ethics were tested for ability to distinguish between beliefs in need to protect environment for *human interests* versus the *interests or rights* of animals and the environment. A heuristic for educators was developed for considering 9 dimensions of environmental and the ethics, and tested favorably.

An exploratory survey (N = 74, 2001) of adult moral beliefs used 16 open-ended questions for moral considerability of, rights, treatment, and direct and indirect moral obligations to the environment. A 465 - item question bank was developed and administered (N = 191, 2002) to Ohio adults, and reduced to 73 items in 12 Likert-type scales (1-7, 1 strongly disagree) by analyzing internal consistency, response variability, interscale correlations, factorial, and ANOVA.

The results (beliefs concerning the general environment): Scale 1) Environmental Capacity (suffer mentally and physically) $\mu = 5.0$, $\alpha = 0.85$; 1.1) Conativity, $\mu = 4.2$, $\alpha = 0$

.84; 1.2) Sentience, μ= 5.0, ą= 0.85; Scale 2) Value, μ= 5.0, ą= 0.92 ; 2.1) Intrinsic Value, μ= 3.4, ą= 0.84 ; 2.2) Animal and Environment's Rights, μ= 4.95, ą= 0.90; Scale 3) Moral Need to Protect, μ= 5.0, ą= 0.84; 3.1) Moral Acceptability of 4 Uses (medical research, zoo's, eating, killing to eat) μ= 4.8, ą= 0.89; 3.2) Usefulness, μ= 5.54, ą= 0.89; 4) Environmental Ethic ą = 0.73 (95% in ethics 7-12, the ecological ethics), highest population mean: "Ecological Phenomenalism", then "Ecological Ecocentrism"), modal category: "Ecological Ecocentrism" ; and Scale 5) Willingness to Protect Environment, Legally, μ=5.2, ą= 0.83. One factor per scale (2 factors for 2 dimensional environmental ethics scale). ANOVA: 4 scales independent, Scale 5 dependent: high predictive capacity -adjusted r^2= 0.78. Scales demonstrated good reliability to measure complex moral beliefs.

Dedicated to my grandmother and mother, whose love of learning enriched my life, and my brother.

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PUBLICATIONS

Research Publication

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FIELDS OF STUDY

Major Field: Natural Resources

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CHAPTER 1

INTRODUCTION

The field of environmental education has a historical purpose of developing citizens that are knowledgeable about the biophysical and sociocultural environment, aware of environmental problems and alternatives for solving these problems, and motivated to act responsibly in developing diverse environments that are optimum for living a quality life (Roth, 1969). That purpose has continued to evolve and differentiate into various approaches that maintained an emphasis on the importance of educating citizens to understand the environment, the impacts of human actions on the environment, the sociopolitical arena in which decisions about environmental policies are made, and to increase citizen concern for and action to protect the environment in order to improve human quality of life. This emphasis upon knowledge, and increasing citizen interest in considering the environment and the need to consider how human actions on the environment affect human welfare, has increasingly included concern for environmental values, a tremendously complex and controversial aspect of environmental issues, and one that is challenging the profession.

During the founding of the profession a rough consensus developed that, whatever the private beliefs of educators', they should promote the goal of environmental protection by somewhat indirect means: that of promoting and providing education that

included direct experience with the environment, a scientific understanding of environmental processes and the value of the environment to humans well-being, and developing the social and civic skills of learners. The goal was to support the development of a citizenry that was well informed about environmental issues, a citizenry that was one with the tendency to cooperatively identify and work towards solutions to environmental issues. This approach complemented traditional educational approaches, and trusted that learners who were provided with sound education about the environment would make wise decisions concerning its use, management, and preservation.

Environmental education has a long history, with roots in the conservation movement and conservation education. Roth (1980) suggested that the conservation movement arose out of concern for protecting human's well being from the adverse effects that occur from environmental degradation, clearly implying that it is *human* life that is of primary concern, and that the environment is to be protected to assure human survival. Rosen (1997) argued that nearly all environmental protection policies, including preservation of endangered species and wilderness areas, can be justified from this perspective, if human well-being is broadly defined to include the need to protect the environment for aesthetic, ecological, and sustainable interests of humans for present and future generations. Thompson and Barton (1994) defined anthropocentrism as the complex belief that only humans have intrinsic value, have rights or interests, and deserve direct moral consideration. They also defined ecocentrism as the belief that the environment has intrinsic value, rights or interests, and deserves direct moral consideration. Given the statements of purpose of the field of environmental education (Belgrade Charter (1976), Tblisi Declaration (1978)), it appears that the field has

historically stated an official view that human welfare is the reason for protecting the environment, a view that is consistent with Thompson and Barton's definition of an anthropocentric position. In the official statements of the purpose of environmental education, there was no direct of implied assertion that the environment deserves protecting because it has rights or interests, thus, they reflect a position that does not support an ecocentric belief. While it is clear that there is a deep appreciation and respect for the Value of the Environment, particularly the value of wilderness, and a sense of obligation to protect it, this position reflected a focus on the human impacts of environmental degradation and the need to improve human welfare.

This anthropocentric position is increasingly challenged by those who argue for non-anthropocentric values (i.e., biocentrism, ecocentrism, etc.) and environmental rights, and is a source of increasing tension in the field of environmental education. Norton (1993) argues that environmentalists are too divided, and need to unite, to find the common values that environmentalists share, to create a movement that can achieve environmental and economic sustainability. The need for more precise terms and concepts to describe environmental values has been suggested by Disinger (1990), Norton (1991), Kempton, Boster and Hartley (1995), and others. It is this researchers observation that the effective engagement of environmental values and ethics has faced tremendous challenges from simple miscommunication about what things in the environment are being argued to be deserving of protection, and for what reason. With this brief introduction, the primary goals of this research project ought to be summarized, so the overall direction of the research is provided. The goals are part of a superordinate goal: the clarification of what is meant in discussing environmental values and ethics.

What is meant when discussing environmental values and ethics requires conceptual clarity about the concepts in discussion, and a shared meaning between the parties about the concepts. To the extent that this project provides useful conceptual tools for facilitating more meaningful dialogue about environmental values and ethics, it will be considered a contribution to our endeavor to engage these vital and complex ideas. What is meant when discussing environmental values and ethics also depends not only upon being conceptually clear, but in measuring the prevalence of various beliefs, so as to better understand the values and beliefs of humans. Thus, a general goal of this research was to provide others with tools to assess the prevalence of various environmental values and ethics, and to discover the relationship among these values and willingness to protect the environment.

More specifically, there were three goals of the research project. Given the conceptual difficulty of values and ethics, and how divisive discussion of these concepts has been (Norton, 1991), a heuristic is developed to help educators and others interested in environmental issues to consider their environmental values and ethics, in ways that foster careful consideration, communication, and the identification of shared values. The heuristic includes a proposed common language for discussing environmental values and ethics, one that does not judge whether or not the ethic is "right" or "wrong", and one that does not, by the categorical scheme that is employed, judge people's ethics by the names it gives to different belief systems.

Given the importance of, complexity, and strong interest in the relationship of environmental values and support environmental policies, the second research goal was

to develop a short (ten – twenty items) self- administrable instrument to help educators and others self identify and explore their beliefs concerning environmental ethics.

The third goal was to develop a more comprehensive measurement tool for researching beliefs about environmental values and ethics. The instrument to identify environmental ethics would comprise a portion of a larger instrument that would include four additional scales: beliefs in the capacity of various entities in the environment (including animals) to suffer, beliefs in the direct moral considerability and morally acceptable treatment of various entities in the environment (including animals), beliefs in human need to protect various entities in the environment for human welfare, and beliefs in the need for laws to exist to protect various entities in the environment. These five scales, taken together, were to provide a set of scales to support the exploration of their prevalence and covariance. This tool can be used to document in more depth the prevalence of these beliefs, and their relationship, for educators, policymakers, and researchers.

This last point will be elaborated upon at length, but for now, it is important to note that developing a tool so we can better understand the relationship of environmental values and ethics to support for environmental protection is a project which goes to the heart of many debates today, the debate over what values and ethics are necessary to hold in order for a person to support environmental protection.

Chapter One reviews the background of this project, with Chapter Two reviewing the literature in environmental education and environmental ethics related to environmental values and ethics. Chapter Three introduces the heuristic for considering environmental values, while Chapter Four reviews the methods used from philosophy to

develop the conceptual level variables and operationalize them. Chapter Five documents the results of the administration of the exploratory survey and instrument, while Chapter Six reviews the findings, provides suggestions for use of work in environmental education and for further research.

Public and Academic Concern for the Environment

Environmental issues have become a topic of great public and academic interest in this century. In 1995, Kempton, Boster and Hartley reported that Americans have become considerably more pro-environmental since the 1960's, particularly since 1980, a change in core values and fundamental beliefs about the world; has transformed markets and voting behavior. This pro-environmental stance includes a self-identification with environmental protection, shown through a Gallup poll (1990) finding that 73% of Americans consider themselves environmentalists (in Kempton, et al, 1995). These concerns have persisted and increased over several decades, extending beyond a desire to maintain the status quo of existing protection laws. A series of Roper Polls from 1972 to 2000, investigating whether or not the public thought that environmental protection had: "gone too far", had "struck the right balance", or "had not gone far enough", found that the percent of the public answering "not far enough" changed from 34 to 70 percent (Kempton, et al, 1995, Roper, 2001). These responses reflect a remarkably consistent increase in positive attitudes towards environmental protection that led to the passage of numerous major environmental laws since Earth Day, 1970.

The increased public interest and concern for the environment has been accompanied by an increase in academic interest in environmental issues, giving rise to

numerous new fields of study that seek to understand environmental quality, and the relationship of human knowledge and attitudes, including values and behavior toward the environment. An increasing body of literature has developed claiming that there are strong moral obligations to protect the environment for future generations, and a number of academic works that explore the relationship of attitudes and values to environmental protection.

The scholarly inquiry into environmental values in higher education is now found in environmental education, psychology, sociology, environmental ethics, political science, and public policy, among many other fields and disciplines. This academic interest includes the development of numerous research projects and works in recent decades concerning environmental values that have established the study of environmental values and ethics as an area of inquiry in many fields, as noted above. One aspect of this line of inquiry investigates the relationship of beliefs in environmental values and ethics and support for environmental protection.

Seminal works that engage environmental values and ethics for environmental professionals, such as Muir's Thousand Mile Walk (1916), and Leopold's Sand County Almanac (1949), long ago explored the value of the environment, human impacts on the environment, and their beliefs about what the human environment relationship ought to be, significantly influences popular and academic cultures to this day. Their works, like many others in academe and the popular press, carefully explored beliefs, but were aimed at identifying the type of environmental ethic that they believed people ought to have. This frequently included empirical studies of environmental conditions, personal observations of environmental attitudes and behavior, and conceptual analysis of

attitudes, beliefs, and behavior in narrative accounts to explain the causes of environmental degradation in terms of human beliefs environmental attitudes and values.

Researchers in psychology and political science, such as Bem (1964), Rokeach (1973), and Fishbein and Aijzen (1975) advanced social sciences methods for surveying attitudes, and their relationship to behavior, demonstrated respectively, that attitudes are persistent enough and bear sufficient relationship to behavior to warrant examination. Their work is widely used in education, sociology, and political science. Building upon these and other approaches to studying attitudes and values, Dunlap and Van Liere (1978), and Kempton, Boster and Hartley (1995), among many others, developed and used instruments to measure environmental attitudes, values, paradigms and worldviews. Additionally, the field of environmental education has developed a body of research into environmental attitudes, knowledge and behavior by building on these and other works.

The quantity of research in environmental education is significant, as Iozzi (1984) identified numerous studies addressing environmental affect that were published between 1971 and 1982, and Marcinkowski and Mroczek (1996) identified 185 studies between 1980 and 1990. Relatively few of these studies investigated the value that people place on the environment, or their moral and ethical beliefs, but focused on the impacts of educational programs on knowledge, attitudes, and behavior. Hines, Hungerford, and Tomera (1986) developed a research program to explore multiple variables, developing a conceptual model of the relationship of environmental attitudes and pro-environmental behavior, a model tested and revised using data collected through assessment and survey methods. These studies included limited investigation of the moral aspects of environmental values, such as beliefs in the obligation to protect the environment but did

not focus extensively upon the moral aspects of environmental values. This study found that no instruments had been developed that objectively and systematically distinguished, measured, and characterized beliefs in environmental values and ethics, that placed respondents into multiple, mutually exclusive categories of ethical belief systems.

The study of environmental values and ethics in environmental education occurs within a complex professional and social context. This context, which creates the need for this study, will be addressed next.

The widespread interest in environmental values and ethics, and their relation to environmental quality, has been a subject of academic inquiry for many years. From Muir's work that argued for a pantheistic view of nature, to White's (1967) arguments that the Judeo-Christian/anthropocentric view of nature led to environmental destruction, there are now a growing, and increasingly influential, group of environmental ethicists who have argued for the need for humanity to adopt a new environmental ethic that is ecocentric or biocentric. This has inspired the development of a number of posited environmental ethics, worldviews, and paradigms, and a body of research to investigate these views. A number assert, to differing degrees, that adherence to a particular view is necessary for ensuring environmental sustainability, or a morally sound relationship with the environment (e.g., Muir, 1916; Naess, 1989; Leopold, 1949; Thoreau, 1947; Singer, 1979; Rolston, 1988; Warren, 1990; Knapp, 1999). These works have significantly influenced the professional and academic communities engaged in environmental issues, particularly those involved in environmental education and environmental policy. This influence is described in greater detail to show the context and need for this study.

Environmental education has been a profession comprised of individuals who hold a remarkable diversity of views concerning the appropriate human-environmental relationship, ranging from those in the Green party and movement (Hunter, 1979; Tokar, 1987; Goodin, 1992) who developed educational materials and programs that advocated a ban on nuclear power plants and internal combustion engines and a return to a simpler lifestyle, to those in organizations such as the Edison Electric Institute who promote the responsible use of these sources of energy to maintain American lifestyles. Like other professions, environmental education occurs in a larger social setting that interacts with and affects it, by affecting the views of a number of its members who are part of the larger social setting (Weber, 1905; Kempton, Boster, and Hartley, 1995). When individual views are widely shared in a society, Kempton, et al, term them cultural views in their exploration of American cultural views concerning the environment and environmental values. As noted above, they found widespread concern for the environment in American culture, and a variety of views concerning the proper human-environment relationship.

Environmental education as a profession has been concerned with the human-environment relationship and human attitude and behavior toward the environment. Much curriculum and teaching effort has addressed, either directly or tangentially, what they believe humans ought to believe about the environment, and how humans ought to relate to the environment. For example, educational programs concerning rainforests advocate for changes in many beliefs, including those concerning the value of rainforests, and the need for their protection. When programs such as People for the Ethical Treatment of Animals advocate for a complete ban of the use of animals in research and

as food sources, using arguments that animals have rights, they seek to change beliefs about the intrinsic value of animals and human need to respect their rights or interests.

The field of environmental ethics is also concerned with beliefs about the human-environment relationship, particularly the moral aspects of those beliefs. VanDeVeer and Pierce (1998), in a view frequently found by those who write about environmental ethics (Muir, 1916, Leopold, 1949; Rolston, 1988; Singer, 1975; Naess, 1989), define an environmental ethic as the morally proper set of beliefs and/or behaviors of humans towards the environment, and state or imply that the purpose of the field is to advance individual and societal adoption of a specific environmental ethic, usually the ethic advocated by the author. This view differs from the dominant view of ethicists, and environmental ethicists, such as Rosen (1996), who stated that environmental ethics is the study of moral phenomenon concerning the human-environment relationship, and show that there are many different environmental ethical theories, some more plausible than others. The implications for environmental education of this difference of views will be explored more thoroughly in Chapter Two. The point here is that a number of environmental ethicists write influential works to change human beliefs about environmental values and ethics, an effort that is arguably concerned with similar subject matter as environmental education. For this study, environmental ethics and environmental education will be considered to be two fields that are subcultures of a larger culture of concerned environmental professionals.

This view of the two fields as subcultures within a culture of concern is substantiated by the similarity of language and interest in environmental values and ethics concepts used by both cultures. For example, Knapp (1999), like many in environmental

education, discusses the virtues of a biocentric and/or ecocentric ethic, and, while cautioning against indoctrinating students, also stresses the importance of primary and secondary educators teaching their students the value of such beliefs, drawing upon the writings of John Muir (1916) and Aldo Leopold (1949). The rich variety of formal and nonformal curricular resources available and used in environmental education contains ethical statements and worldviews that are also found in environmental ethics. Terms such as ecocentric, biocentric, anthropocentric are common, as are assertions that adoption of a particular environmental value or ethic is morally required are found in the literature of both fields (Armstrong & Botzler, 1993; Van DeVeer & Pierce, 1998; NAAEE, 1995; NAAEE, 1996; NAAEE, 1997; Gigliotti, 1996). These observations show that the field of environmental education operates in a milieu of influence about environmental values and ethics that suggests the need for careful treatment of such values by educators.

Evaluating what types of beliefs are appropriate for educators to change, and what educational methods are appropriate to use, is extremely complex, and addressed by NAAEE Materials Guidelines for Excellence. The Materials Guidelines call for educators to utilize non-indoctrinative methods to increase learner awareness of and consideration of environmental issues. This dissertation project may help meet this challenging call by developing and applying heuristic tools for evaluating beliefs concerning environmental values and ethics. So far, we have briefly explored public and academic interest in environmental issues, values, and ethics, but have not addressed what the field of environmental education views as its purpose: this follows to provide

additional background on how different views of values are present in environmental education, note the research already conducted, and provide context for this study.

History and Purpose of Environmental Education

The history of environmental education provides insights into the development of increased interest in the profession in different types of environmental values, and the context of this study. Roth, Cantrell, and Bosquet (1980) identified four educational movements in the 20th century that significantly influenced the development of environmental education: nature study, conservation education, progressive education, and science education.

They explained that nature study arose from concern with teaching methods that emphasized memorization, books and lectures, and isolation from nature, leading to efforts to teach about the natural world in outdoor settings. Conservation education arose from concerns about misuse of soil, rangelands, forests, and wildlife, leading to programs to teach conservation practices, in order to protect the environment to improve human welfare. The progressive education movement influenced environmental education through John Dewey's work to develop educational philosophies that led to curriculum that met children's needs both for direct experience with the their world and consideration of how their actions in it affect their welfare. The application of this approach to education to the study of the environment led to student-oriented approaches, including a range of outdoor educational programming. Science education brought a more orderly, science-based approach to education. Each of these methods emphasized improvement

of human quality of life through education, be it to increase appreciation of nature, or to increase the long-term productivity of human utilization of natural resources.

Roth (1969) stated that the purpose of environmental education is to develop citizens who are knowledgeable about the environment, aware of environmental problems and management alternatives useful in solving these problems; and who are motivated to act responsibly to develop diverse environments that are optimum for a quality life. Similarly, the Environmental Education Act of 1970 stated that environmental education is to promote citizen understanding of and concern for the environment, and responsible action to improve the quality of life. The Tblisi Declaration of principles for environmental education stated that environmental education should increase awareness and sensitivity to the environment to lead to actions to protect the environment.

The definition provided by Hungerford, Peyton, and Wilke (1980) has had great influence in environmental education: that environmental education aid citizens in becoming environmentally knowledgeable, skilled and dedicated to working toward an balance between quality of life and quality of the environment. Hungerford and Volk's (1990) Environmentally Responsible Behavior Model (ERB Model), shows that a major, and necessary, variable for learners to hold is environmental sensitivity. Volk and McBeth (1997) discussed their work, noting that " . . . more research is needed to clarify the relationships between these variables and responsible environmental behavior.

Thus, environmental education developed into a field with a purpose of developing citizens who are knowledgeable about the biophysical and sociocultural environment, aware of environmental problems and alternative solutions, with concern

for the environment, and who are motivated to act responsibly to improve environmental quality and the quality of human life. Environmental education, though, was part of a broader culture of concerned environmental professionals and activists who advocated adoption of environmental values ethics that protected the environment because of the rights or interests of the environment (Singer, 1975; Naess, 1989, Rolston 1988).

These advocates for adherence to stronger environmental values and ethics, (including animal and earth rights), worked to increase learner concern and responsible behavior, but frequently pushed environmental education toward teaching methods that appeared indoctrinative, included more spiritual (i.e., ecospiritual) elements and calls for adoption of ecospiritual beliefs. This was a change from environmental education's anthropocentric approach, creating increasing tensions in the field in the latter decades of the 20th century and the early 21st century. Thus a need arose for additional research and more careful treatment of environmental values and ethics in environmental education. This research project will help distinguish various types of values and ethics, to increase the tools that educators and researchers have for engaging these complex aspects of environmental issues. In response to the field's continued growth, and concerns to ensure excellence in teaching, the North American Association for Environmental Education developed the Project for Excellence in Environmental Education, to identify guidelines for development of curriculum and programs. That project briefly addressed environmental values and ethics, in ways that this research project supports.

Materials Guidelines for Excellence in Environmental Education

In 1996, the North American Association for Environmental Education (NAAEE) published the professional guidelines for the development of materials curriculum (Materials Guidelines). The Materials Guidelines stated, in part, that the goal of environmental education is to develop an environmentally literate citizenry with the capacity to address environmental issues. The Materials Guidelines emphasized the need to provide balanced, unbiased, appropriate education to value use of scientific methods, evidence, and civic skills, including the valuation of others views on issues. The Materials Guidelines support for teaching students to value the aforementioned ideas and skills is interpreted by Meyers and Bonnell (1998) as support for certain values (the use of reason, evidence, and investigation into issues, of consideration for others in society, of the development of civic skills and engagement of policy formation processes). The Materials Guidelines call for exposure of students to a variety of positions on environmental issues, including different points of view about the environment, and for students to make their own conclusions about issues and beliefs, is a clear rejection of indoctrinative approaches to education, not just for what goals and particular strategies should be used in environmental issues, but also for indoctrination into any particular religious or spiritual tradition. This interpretation of the Materials Guidelines is that they support some values, as explicated above, but do not support indoctrinative approaches to education which impose others values or spiritual or religious beliefs. Rather, the emphasis upon balanced educational methods, which do not impose educator values, reflects the field's desire to clarify what is considered excellence in teaching, including the teaching of values.

As noted previously, the field of environmental education is part of a broader environmental movement that includes many who advocate for the adoption and teaching of learners to adopt biocentric and ecocentric views. The Materials Guidelines were developed at a time when the field was increasingly subject to influence from the broader environmental community. Heimlich and Harako (1994), Heimlich and Norland (1994), Heimlich and Meyers (1998), Knapp (1999), and the Materials Guidelines (1996) call for educato

rs to increase their self-understanding of their values, and for the field to enhance efforts to help educators do so. This project is intended to help meet these suggestions.

Research Challenges in Environmental Values and Ethics

In 1972, Christopher Stone published his now-famous argument, "Should Trees Have Standing?" that trees and selected other entities in the environment have intrinsic value, and that human's have direct moral obligations to protect them. With the rise of the "animal rights" movement (Singer, 1975), and the rise of environmental ethical theories that argue that all living things (Regan, 1983) have rights, or that all things in the environment have rights (Naess, 1989), the moral integrity of anthropocentrism has been increasingly controversial. A body of academic work has grown that seeks to establish the moral correctness of non-anthropocentric ethical views or worldviews or paradigms. Also, much work has explored various aspects of environmental values and ethics. Environmental education is at a crossroads, as the growing social movement for animal rights and earth rights includes many members of the profession who hold such views, believe they have a moral obligation to teach such views, and believe that the profession

should teach some type of non-anthropocentric view, in ways that conflict with the historical purpose of the field. This growing social movement includes a tremendous body of popular and academic literature. Further, many educational materials and resources address environmental values and ethics by advocating or employing the use of highly emotional and exhortive approaches to changing people's beliefs and feelings about the environment. These educational methods also conflict with the historical emphasis in the field for developing learner civic capacity to make their own choices about what are appropriate values and beliefs to hold.

For academics and professionals in the field who are interested in empirical studies of environmental values and ethics, the tremendous complexity of these beliefs has complicated efforts to document the prevalence of beliefs in various environmental values and ethics, to assess their relationship to environmentally friendly behavior, and to the state of the environment. These relationships are of tremendous interest to the field. There are relatively few instruments that seek to measure in depth the environmental values and ethics of adults, and none that draw upon analytic techniques from ethics to systematically identify key covariants of ethical beliefs.

The work of Dunlap and Van Liere (1978) to develop the New Environmental Paradigm has been regarded as a successful measure of a pro-environmental attitude or worldview (Noe and Snow, 1990). Dunlap and Van Liere focused upon measuring beliefs about human ability to upset the balance of nature, whether there are limits to growth for society, and human right to "rule over" nature. It has been incorporated and slightly modified by many researchers, and was recently updated to the New Ecological Paradigm (Dunlap, Van Liere, Mertig, and Jones, 2000). Their collective work

contributed greatly to the study of environmental attitudes, and has been broadly used to measure general attitudes towards the environment. Their instruments will be evaluated in Chapter Two to identify why additional instrumentation is needed for investigating environmental values and ethics.

Thompson and Barton (1994) developed a continuum to describe a range of moral/ethical attitudes towards the environment. One anchor, as noted before, is the belief that only humans have intrinsic value and deserve protection, and the biocentric/ecocentric end indicating that all of the environment has intrinsic value and deserves protection. Chapter Two will show how their operationalization of items failed to distinguish between beliefs about the use value of the environment to humans, (via anthropocentric beliefs in the need to protect the beauty and diversity of the environment to meet human needs), and beliefs about the intrinsic value of the environment that would lead to biocentric or ecocentric beliefs in the need or obligation to protect the environment. Additionally, the operationalization of items failed to distinguish between beliefs about indirect moral obligations to protect the environment in order to secure human benefits from the environment, from direct moral obligations to protect the environment that arise from beliefs that the environment is intrinsically valuable. However, the anchors they used in their Continuum of Environmental Ethics, and conceptual basis of the definitions of terms they used in their instrument were similar to the anchors and conceptual definitions developed in this study.

Negra and Manning (2000) found seventeen environmental ethics in the literature, in five categories, and surveyed for fourteen of these, finding three subgroups: spiritually based stewardship, religiously based anthropocentrism, and secular ethical extensionism.

Herzog and Galvin (1998) included one item related to moral consideration that should be afforded non human animals versus humans, finding that the moral consideration afforded the non human animals varied with different animal capacities, and recommending further research into beliefs concerning the moral aspects of animal treatment. The literature review in Chapter Two will review selected instruments that contain one or more items related to the moral beliefs concerning the environment, or measures of ethical views. Despite the large body of research that has investigated different aspects of environmental values, and significant research that has looked at multiple aspects of environmental attitudes and behaviors, no instrument was found that systematically investigates the moral considerations afforded a broad range of environmental entities, nor support for environmental protection policies.

The complexity of beliefs in environmental values and the need to more finely assess the relationship of these beliefs to support for environmental protection warrants the development of a more highly resolved measurement tool, the development and use of a set of terms, heuristic tools, and instruments, to support a systematic, precise, and more objective investigation of environmental values and ethics.

Affect

Research in environmental education has frequently focused upon knowledge, affect, and behavior as part of an effort to assess the impacts of educational programming, or to understand the relationships among these. This orientation can be distinguished from research in environmental sociology that has studied worldviews and paradigms, such as Dunlap, et al (1978, 2000) and Kempton, Boster and Hartley (1995)

which are also used by environmental educators in their study of affect. Given the significance of emotional affect in environmental education, and environmental values and ethic, the following account of the relationship of emotional affect and beliefs in environmental values and ethics is provided.

For environmental education, human affect is an important component of the environment -- human relationship. If affect is values, attitudes, and behavior, (Babbie, 1995), then environmental education's essential purpose as stated by the field is to change affect (UNESCO/UNEP, 1978; Hungerford, 1980; Disinger, 1993). Since affect can be defined as human characteristics as diverse as values, attitudes, and behavior, clearly identifying what is meant by affect is sometimes critical to communicating what kind of affect is being addressed. For environmental education studying how affect predicts or is correlated to behavior is important to the field in the effort to understand how humans behave towards the environment, a research priority documented by Marcinkowski and Sivek's (1996) evaluation of research in environmental education between 1980 and 1990 which found 185 studies in environmental education that included affect variables.

One aspect of affect that has received significant attention in environmental education is "sensitivity", a complex concept in itself. One type of sensitivity emphasizes the emotions, positing that emotions are primary to or of more significance than cognitive aspects of affect, such as knowledge of the environmental and sociopolitical knowledge. Research by Perry (1970), Gilligan (1982), and Belenky (1986) advocated recognition of the emotions as an important and legitimate factor in ethics, rejecting the more cognitive view of ethics historically held by philosophers and psychologists. Warren's (1994) germinal work integrated a critique of patriarchy and

reason with White's (1967) critique of the Judeo-Christian, anthropocentric ethic as the cause of the objectification and degradation of nature. This body of work supports a view held by many who have influenced and practiced environmental education (Gough, 1990; Corcoran, 1994; Palmer 1996), that particular types of ethics are necessary to hold, such as an ethic of caring that is biocentrist, and ecocentrist, and that research in this arena should focus on emotion.

Scheffler (1991) and Dewey (1916) argued that direct experience with entities, when cognitively judged to improve our well being, lead to increased emotional attachment to that thing, increased valuation of it, and increased willingness to protect it. They also noted that reflecting upon experience to understand how various aspects of the physical or sociopolitical environment are related to and affect our interests is a powerful tool for increasing our knowledge, and that such reflections can change our valuation of the environment. It is important to note that direct or reflective experience, if it shows that an entity or phenomenon is harmful to our well being, leads to negative affect toward and lower valuation of the entity as part of cognitive and affective reaction. Thus, not all increased knowledge is claimed to lead to increased valuation and positive affect, but only knowledge that shows that something has positive utility. This account provides a theoretical basis for linking direct experience with the environment, to cognitive recognition of the value of the environment, increased valuation of the environment, and increased dispositions to protect it. Increased appreciation also may lead to recognition of the existence value of entities (Dewey, 1916), a complex value notion that is easily conflated with intrinsic value.

Rosen (1998) stated that valuation of a thing can increase as the understanding of the use value, or use value increases. He distinguished use value, which is defined as usefulness for obtaining another thing of value, from intrinsic value, which is something that has value in and of itself. For example, an ordinary shovel that is useful for planting has use value for planting. While there are many differences of beliefs about what is of intrinsic value, a number of environmental ethicists appear to believe that a plant that is an endangered species has intrinsic value. If it is assumed that they believe that planting an endangered species as part of a restoration project is a good thing to do, then the act of planting it would have intrinsic value. An ordinary shovel used to plant would have use value for the planting. Thus, most people would believe that a shovel has use value for digging, but not have a belief that the ordinary shovel has intrinsic value. Interestingly, one would also expect that most people would believe that it is wrong to arbitrarily destroy a shovel, but the wrongness would more than likely be because of a belief that doing so wasted the money, effort, and resources used to make the shovel, not because they believed that the shovel has intrinsic value, or any rights or interests in remaining a shovel. Thus, an entity may have use value, but not intrinsic value.

Many things and actions are believed to have both intrinsic and use value. For example, if the shovel were a work of art, or made of gold, many would believe that the shovel had intrinsic value (although some would disagree), and using it to plant would give it both use and intrinsic value. Questions to distinguish these types of values must be carefully constructed and interpreted to maintain the integrity of the analysis of value.

As noted above, Scheffler (1991) proposed that positive emotional affect towards an entity increases when a person has a positive experience with the entity, when they

understand that an entity has use value. Thus, increasing a person's knowledge of the value of an environmental entity leads to increase in emotional affect toward that entity, and desire to protect the entity. This increase in affect can be measured as an increase in valuation or an increase in concern for the entity, or an increase in willingness to protect the entity, using any number of methods identified by Babbie (1995) and used in environmental education (Volk & McBeth, 1997). The educational approach of increasing emotional and attitudinal affect by increasing knowledge is an indirect approach to increasing affect, because it does not directly seek to increase affect by directly appealing to emotions and avoiding engagement of the cognitive processes, even though it relies upon direct experience at its root. This study will seek to measure the valuation of the environment in cognitive terms, as judgments about the types and degrees of beliefs in value that respondents assign to various aspects of the environment, rather than exploring the more emotional aspects of affect. This will be addressed in more depth in Chapter Two.

Environmental Values and Ethics

Historically, in ethics, only humans have been considered morally considerable, for a variety of reasons. The rise of environmental ethics in the 19th and 20th centuries has occurred as the question of what other things, non-human animals, etc, deserve consideration. In ethical theories, the type of capacities that an entity in the environment has, such as a the capacity to have a soul, or be self aware, use tools, make plans, or to feel pain, have been used to justify or deny direct moral considerability to entities. As mentioned in Chapter One, Bentham (1789) argued that animals that had the capacity to

suffer similar to humans deserved direct moral consideration and had rights to not be unnecessarily caused pain. Singer (1979) reiterated this argument for modern society, and Naess (1989) extended it to everything in the environment. Building on the work of environmental ethicists, ethologists such as Herzog and Galvin (1989) and Hills (1999) have shown through survey research that adult beliefs about animal capacities can be reliably measured, and the first two of these have documented relationships between belief in capacities and the acceptability of actions (i.e., use in animal research, et al) towards the animals.

The previously noted complexity in environmental values and ethics suggests that there may be need to draw upon rigorous methods of conceptual analysis from ethics for this study. To show the research context for adapting these methods, three general approaches to academic inquiry about environmental values and ethics are described below, as well as selected research challenges to them.

The first academic approach seeks to identify the one ethical theory or worldview that is most plausibly correct to hold, from an ethical perspective, and advocates that others adopt the particular environmental ethic. Aldo Leopold, in a Sand County Almanac, advocated for the ethical correctness of, and need for the public to adopt, a "land ethic", in order to prevent environmental destruction. Leopold's "Land Ethic" has been interpreted by White (1967), and Callicott (1989), as an ecocentric ethic, one that roughly holds that humans have direct moral obligations to protect all living things, ecosystems, and the land, due to the intrinsic or intrinsic value of these things. Writers such as Muir (1916), Leopold (1949); Singer (1979), Rolston (1988), Naess (1989), Warren (1990), and Knapp (1999) posited a number of different ethical theories,

worldviews, and paradigms, that are broadly known as biocentrism or ecocentrism. These were developed in efforts to ensure environmental sustainability, or a morally sound relationship with the environment. These works have had, and continue to have, significant influence in the professional and academic communities engaged in environmental issues, particularly those involved in environmental education and environmental policy. A standard method used in this approach is to show the beauty and value of, and human need for the environment, and trends in the destruction or exploitation of the environment. The cause of the destruction is usually argued next, as the writers seek to link a particular set of values and/or an environmental paradigm, worldview, or ethic, to the human behavior and environmental degradation or mistreatment.

As previously noted, this study is not to identify the most plausible or true ethic to hold, nor to evaluate the relative merits of such arguments: however, the contents of such arguments are used to develop the categories used in the heuristic devices to analyze and categorize the diversity of environmental values and ethics, and to help develop the items for the survey instrument. There are many ways that these materials can be used in public education to develop educated citizens who are aware of and concerned for the environment. However, the use of these materials in public education settings to indoctrinate students as to the correctness of such views is of concern to the profession, as it is neither effective pedagogy nor androgogy, nor considered appropriate use of public resources (Kauchek, Krall and Heimsath, 1978; Heimlich and Haraka, 1994; Hungerford and Volk, 1980; and NAAEE, 1996). By providing those in the field with additional tools for evaluating their and other's environmental values, and to support

efforts to increase their self-awareness of their values and ethics, educators ability to avoid these problems may be increased (Heimlich and Meyers, 1999).

A second approach to environmental ethics and values involves a more philosophically or analytically comparative study of ethical beliefs, with the intention of providing a systematic comparison of ethical theories. The key distinction is in the use of philosophical techniques to systematically compare ethical beliefs. Ethicists such as Rosen (1995) and Hubin (1997) seek to carefully distinguish and compare the content of environmental ethical theories and beliefs that employ this approach. Ethicists may also seek to evaluate the plausibility of various ethical views, worldviews, and paradigms, and may seek to identify and advocate for the most plausible and correct view, but the educational method is to develop learner capacity for independent thought, judgment, and action, so avoiding indoctrination. Thus, this approach is consistent with the methods used by these ethicists and will be drawn upon to help develop the heuristic devices to systematically compare beliefs in values and ethics and select the concepts and variables used in this study.

A third approach to environmental values and ethics utilizes methods from the social sciences, such as educational psychology, to develop methods to measure values. This can range from decidedly qualitative methods, such as hermeneutical inquiries, to psychometrically based instruments to measure beliefs that can measure the prevalence of beliefs in values across populations, and test assertions regarding the relationships of values. This study will use the latter approach.

Given that such studies of held beliefs are studies of the beliefs of people who may not have studied environmental values or ethics, their beliefs tend to be

pretheoretical in nature. That is, their beliefs tend not to have been subjected to a rigorous process of reflection and comparison to adjust them so they are more consistent with each other, as part of an effort to fit within some type of theoretical framework. To reduce bias in surveying beliefs, the survey instrument should not indicate which types of beliefs are "correct" to have, nor should it force beliefs into categories that are inappropriate (Babbie, 1995). This point is important for the study of beliefs in environmental values and ethics, as the present level of resolution of instruments does not appear to provide a sufficiently large and diverse set of categories to describe these beliefs, and it is not clear if the dominant instrument in the field that measures the New Environmental/Ecological Paradigm is administered to prevent bias.

In particular, prior studies of beliefs in environmental values and ethics may be deeply informed by psychological theories, and bring substantial perspectives on environmental values, ethics, and worldviews, but they have not incorporated methods from the study of ethics to systematically disaggregate a number of dimensions of beliefs in environmental values and ethics to develop survey instruments that objectively measure beliefs in depth. This study incorporates elements from the social sciences and philosophical analysis to achieve that goal.

Given the familiar belief among environmental educators that there is a strong link between beliefs in environmental values and ethics, and the quality of the environment, and that a growing number of educators state that it is necessary and obligatory for educators to teach learners to adopt a biocentric or ecocentric ethic (Dunlap and Van Liere, 1978; Caduto, 1985; Alprin, 1986; Callicott, 1989; Gough, 1990; LaChapelle, 1991; Orr, 1991; Caldicott, 1992; IUCN, 1993; Gigliotti, 1992; Bookchin,

1994; Corcoran, 1994; PETA, 1997; Knapp, 1999; Schaeffer, 1999), it is noteworthy that assessing and measuring the relationship of individual beliefs in environmental values and ethics to environmental quality is quite challenging. A significant body of research has been conducted in environmental education to assess the relationship of attitude, knowledge, and affect to responsible environmental behavior, broadly defined. This includes a variety of measures that account for about half of the variance between attitudes and behavior. However, the linkage between attitude and values, education, attitudinal and value change, and changes in environmental behavior and policy that affect environmental quality has not been well enough researched. This research project aimed to provide tools for inquiry as an answer to questions about these relationships, and to develop heuristic tools and a survey instrument for educators and those involved in environmental policy to further explore, document, and if possible, identify predictive models for these relationships.

The assertions made by environmental ethicists about the necessity of adopting a particular set of environmental ethics or values in order to increase personal and social commitment to environmental protection has, as noted before, led to the development of instruments that assess environmental values, ethics, worldviews and paradigms. These will be individually reviewed in Chapter Two. However, this study has identified common challenges to these instruments and the calls for biocentric or ecocentric values/ethics that define the direction of this study.

The first challenge is terminological and methodological. While inconsistent definitions of terms are not unusual, the failure to develop consistent definitions has resulted in significant confusion in the field concerning environmental values and ethics.

Unfortunately, beliefs in environmental values and ethics, and support for environmental quality are sufficiently complex that this confusion can, and has, too easily resulted in innovative research using broad concepts of worldviews and paradigms that are defined so broadly that they lead to conflation of different types of values and ethics, especially by those who interpret such research.

For example, the authors cited above call for educators to teach children and others to adopt biocentric or ecocentric values or ethics. A biocentric or ecocentric value or ethic is sometimes used synonymously, as in Thompson and Barton (1994) who define it to mean that there is some degree of human belief in the intrinsic value of the entire environment (and the belief that there are direct moral obligations to protect it). They distinguish this from an anthropocentric value or ethic, which is defined as only humans have intrinsic value (and the belief that there are no direct moral obligations to the environment to protect the environment). Conceptually, their terms, definitions, and scale are clear and useful. However, as will be detailed below, the items in their scale do not measure what it is stated to measure – beliefs in intrinsic value in the environment – it measures whether or not people believe that the environment has either value, and ought to be preserved for either reason. Thus, the operationalization of the item used to measure beliefs about sound constructs (anthropocentrism and ecocentrism) actually measures if people believe that the environment has either intrinsic value or use value, two distinctly different types of value.

Instruments and items that utilize instruments with these problems repeat such problems unless corrected. For example, items intended to measure belief in whether or not an entity has intrinsic value, frequently ask something like, “Do you think that natural

areas are beautiful?" or, "Do you think that wilderness should be preserved?" When affirmative answers to such items are interpreted to mean that the respondent has a belief in the intrinsic value of nature and wilderness, they would have failed to allow for a plausible alternative interpretation: that the respondent appreciates the beauty of nature *because it gives them pleasure or value*, or that the respondent recognizes that wilderness provides *human's with value because humans appreciate the existence value of wilderness*, or that the respondent recognizes the value of wilderness for *providing humans with uniquely "wild" experiences*, or for the value it provides *to humans* by sustaining endangered and threatened species that are important to preserve because of a belief that future-human well being depends on preserving biodiversity. Thompson and Barton (1994) articulated broadly held definitions of anthropocentrism and biocentrism/ecocentrism: that anthropocentrism is the belief that only humans have intrinsic value, and that biocentrism and ecocentrism are the beliefs that everything in the environment has intrinsic value, where intrinsic value means that the environment has value in and of itself, independent of humans. Thus, the question "Do you consider nature to be beautiful?" only asks if the respondent has either of two notions of value, and does not distinguish between respondent beliefs in anthropocentrism or biocentrism/ecocentrism.

Interpreting a response as an indication of the presence of anthropocentric or biocentric/ecocentric values or attitudes would appear to be an error, unless there were other data to support such an argument, due to the poorly defined question. If different types of values are conflated when analyzing the relationship of values, the analysis can neither maintain the integrity of the relationship of the values, nor conclusions about

those relationships. Put differently, if there is a failure to maintain the integrity of the dependent variable (a particular belief in an environmental value) to the independent variable (support for environmental protection) the research conclusions concerning the relationship of the variables are invalid. This research develops and documents a systematic method for distinguishing and naming different types of environmental values and ethics, and a heuristic for evaluating beliefs in environmental values and ethics.

The second aspect of this challenge looks at the relationship within a person of their beliefs in environmental values and ethics, and that person's willingness to support environmental protection. This goes to the question of whether or not a particular environmental value or ethic is necessary for a person to hold for them to have a sufficient willingness to protect the environment. A significant body of the environmental values research has developed significant interest in environmental values by using approaches that identified the degree to which respondents agreed with what appears to be the authors view on what was the "correct" ethic, or value to hold (Dunlap and Van Liere, 1978; Gigliotti, 1992), using, as Kempton, Boster and Hartley (1995) argued, overly broad categories of environmental values such as anthropocentrism, biocentrism, or ecocentrism.

Work by Kempton, et al (1995) to distinguish values found three broad sources of values in American culture: religiously inspired, such as stewardship values to protect the environment because of religious obligations, anthropocentric values, such as an understanding of the need to protect the environment to protect human welfare; and biocentric values that indicate that nature should be protected because it has intrinsic worth. They stated that they had no " . . . strong theoretical commitment to organize the

values we found into precisely these three categories but find them useful for ordering our presentation of material" (p 88). They noted that the tools to theoretically categorize environmental values into more precise categories had not been developed, and would be a useful contribution to the field.[1] As previously noted, this project does not seek to judge the normative "correctness" of the ethics or values of respondents against a predetermined standard of correctness, but to objectively and fairly document a wide diversity of beliefs, in order to systematically compare beliefs in environmental values and ethics and their relationship to support for environmental protection using methods from the social sciences, so the investigation is more scientific, and less normatively judgmental.

The third aspect of this problem, which this study does not attempt to address, except here, arises from the challenge of establishing whether or not particular environmental values and ethics cause, or are even correlated to, the quality of the

1 Dunlap, Van Liere, Mertig and Jones (2000) interpreted the three broad sources of values stated Kempton, et al's 1995 work significantly differently in their arguments for the content validity of the New Environmental Paradigm (NEP) Scale. They correctly claimed that Kempton, et al found widespread public belief in the view that a lack of contact with nature has led society to devalue nature. They omitted Kempton, et al's finding that the same public also holds a widespread and strong belief in the need to protect the environment, in significant part due to beliefs in the obligation to provide for future generations, and for religious respect for a creator. The belief among the public that others do not care about the environment, but they do, suggests that the public holds an erroneous belief about the degree of public environmental concern that exists – and the cause of a purported lack of public support. The use of the erroneous belief of the public that it does not support environmental protection to support conclusions that the public does not believe in support environmental protection would also be in error. Dunlap, et al significantly mischaracterized the three broad sources of values that Kempton, et al found, when stating that Kempton, et al found that one of the three basic American values was that the public was materialistic, out of contact with nature, and devalued nature. Kempton, et al did tentatively state that one of the three basic values seemed to be anthropocentrism, (belief that humans had intrinsic value and nature did not) but that this value was often coupled with a stewardship ethic of belief in the need for environmental protection. The other two tentatively identified values were biocentric/ecocentric beliefs in the need to protect the environment, and a religious belief in the need to protect the environment. These concepts are substantially different from the three core concepts in the NEP.

environment, and how portions of the environment, such as animals, are treated. Atfield (1991) asks,

> "What kind of an ethic and what kinds of international action are needed to tackle environmental problems . . . ."

And concludes,

> "The suggestion is not that changed individual attitudes would be sufficient (as opposed to necessary) to solve the problems; for political, economic, and social structures also need to change" (p. 95).

Atfield concisely provides a valuable statement on the role of individual attitudes and their beliefs in environmental values and ethics to environmental quality. He indicates that attitudes need to change, but that improvements to environmental quality also require changing social, political, and economic structures, a lesson from the fields of public policy, political science, and political philosophy, that is important for the field of environmental education, insomuch as it is a field concerned with the relationship of education that changes environmental policy. Atfield's assessment that attitudes need to change leaves as an open question which attitudes need to change, and how much, in order to help bring about changes in social, political, and economic structures.

In order to obtain improved environmental quality and policies, it is difficult to overstate the importance of changing environmental, economic, and social policies. The general quality of the environment, especially the major environmental problems such as global climate change, biodiversity losses and the ubiquitous chemical and biological contamination of surface waters, are in large part dependent upon the policies and norms that regulate individual and collective behavior towards the environment. The fields of

public policy, political science, and sociology have significant bodies of literature that grapple with the question of how these policies and norms are made. As Kempton, Boster, and Hartley (1995) have documented, a majority of adults have favored stronger environmental policies for decades, and opposed weakening of existing policies, leading to the enactment of a series of environmental policies from the 1960's to the 1980's. Still, the public has consistently favored even stronger policies. They also documented that (under their three general categories for American values towards the environment , of religious, anthropocentric, and biocentric) that there was strong support for biocentric values, and that environmentalists should draw upon this finding in their work. This dissertation addresses the care with which environmental educators must treat such a recommendation, given their professional responsibilities to not indoctrinate learners, a point explored elsewhere. As Kempton, et al (1995) and others (Disinger, 1990) have noted, there is a need to assess what is meant by environmental values more precisely, so more rigorous research can be done to assess the relationship of environmental values to support for environmental protection, the superordinate objective of this work.

This high degree of public support for stronger environmental policy, but lack of a passage of stronger laws, suggests that public opinion favoring these laws, and their high valuation of the environment, is not translating into passage of stronger laws. This type of phenomenon is extensively addressed in political science, where barriers to enactment of legislation favored by supermajorities of public opinion are explored, and the role of special interests, campaign contributions, and other factors are explored to explain the disconnect between public opinion and legislation. The question of how to obtain the passage of environmental policies to protect the environment is a complex and

worthwhile endeavor that this study leaves for others, even as the goal is to provide another survey tool for researchers to use.

Attitudes are broad constructs, and include more than professed support for stronger environmental policies, or other aspects of support for environmental policy. Attitudes include values, a broad construct in itself. In environmental education, some advocates for stronger environmental policies ascribe the lack of attainment of stronger environmental policy to a lack of a particular environmental value, ethical holding or worldview, (usually the particular values, ethics or worldview being advocated for). Thus, a closer examination of beliefs in environmental values and ethics, and support for environmental policy, may be useful for developing a richer understanding of the relationships, and is a contribution that this study seeks to contribute.

The number of empirical studies in environmental education that measure the ethical aspects of values is markedly fewer than the 185 studies of environmental education conducted between 1980 and 1990 found by Marcinkowski (1996). The work by Dunlap and Van Liere on the New Environmental Paradigm (NEP), and Milbrath's (1984) Dominant Social Paradigm (DSP) from environmental sociology were used as the basis for a number of studies that investigated the relationship of the NEP and/or DSP to other variables of interest to researchers in environmental education. The NEP includes one question that asks if "Nature should be preserved for its own sake?" which is an inquiry into the intrinsic value of nature, and whether or not we should protect nature. Dunlap and Van Liere are clear in their writings that such questions investigate whether or not there are beliefs that humans have dominion over nature, as one indicator of whether a person has the NEP. Their research suggests that a "no" answer to the

question, indicates a lack of belief in the intrinsic value of nature, and a positive correlation with "no" answers to items that ask if there are limits to societal growth, and negative correlation to questions on the value of technology. The broad construct of the NEP is interpreted by many to suggest that the NEP is a biocentric or ecocentric ethic, in that nature, or living things, are assigned intrinsic value and/or rights. This accords with Kempton, et al's (1995) definition of anthropocentrism and biocentrism. The NEP paradigm is widely used by environmental educators and others who are concerned with the environment, as an indicator of whether or not a person or group is adequately concerned about the environment, and is willing to protect it.

However, Kempton, et al's (1995) call for more precise definitions is demonstrated by the following hypothetical. If, as Kempton, et al, and others have found, that over 73% of Americans self-identify as environmentalists, and over 50% consistently support stronger environmental policies, where do these people fit onto the NEP, and what implications are there for educators? If people believe in an anthropocentric type of environmentalism, that is, if they believe in a stewardship ethic, then they would appear to be in the old Dominant Social Paradigm, and non-NEP. The instruments, and ways of viewing values, have advanced awareness that there appears to be some type of change in American culture vis a vis their views towards the environment, but leave a difficulty in categorizing and measuring differences between those who support environmental protection for anthropocentric reasons, from those who do not support environmental protection, and those who may have beliefs in the intrinsic value of the environment, the ecocentric or biocentric ethic, but do not support environmental protection.

This becomes more problematic when strategies for increasing learner and public support for environmental protection use morally pluralistic approaches to education and draw upon diverse value systems, as many advocate (Dewey, 1916; Kauchek, Krall & Heimsath, 1978; Stapp & Cox, 1979; Heath & Weibel, 1980; Dennis & Knapp, 1997; Hungerford and Volk, 1990; Gordon, 1993; Heimlich & Harako, 1994; Norton, 1995; Connell, 1997; Gutek, 1997; Negra & Manning, 1997; Chapman, 1999). The problem in teaching learners to hold a biocentric or ecocentric ethic (defined as belief in the intrinsic value of the environment, that the environment is valuable in and of itself and deserves protection) *even if it is done without indoctrination* (which is advocated by some as a necessary evil in order to accomplish the greater moral good of protecting the environment – an approach that this research finds too problematic (i.e., MacArthur Foundation, 2000)) is that it is viewed as religious indoctrination by a number of people in society and government, a move which threatens environmental education's perceived legitimacy and federal funding.

Without exploring the highly political debate over the accusations that environmental education is too indoctrinative, it is still important to recognize that the field needs tools to assist educators and researchers in developing clear concepts to identify and distinguish between anthropocentric, biocentric, and ecocentric beliefs. At the present, survey instruments are not available for environmental researchers and educators to distinguish among these beliefs so that those interested in assessing the relationship of values, ethics, and support for environmental protection can do so. For example, no available instruments distinguish between a person who supports environmental protection for anthropocentric reasons from a person who supports

environmental protection for biocentric or ecocentric reasons. As Rothenberg (1994) noted, the lack of definitions causes significant problems for the environmental movement, because their lack leaves us without a common vocabulary with which to discuss a complex topic, and an inability to communicate about the relationship of values, ethics, and the environment, at a time of great concern and interest in the relationship. This conceptual challenge extends to the ability to measure, document, and explore relationships among values and various moral beliefs that have import in environmental education and environmental policy.

It is important to note that extensive work has been done to develop instruments and models that engage environmental attitudes, including sensitivity to the environment, and environmental values. Within the field of environmental education, as noted before, Hungerford, et al (1980, 1990) sought to develop a body of work related to Responsible Environmental Behavior. Negra and Manning (1997) investigated environmental behavior, ethics and values of visitors to a Vermont State Park. From the literature, they identified seventeen types of posited environmental ethics or paradigms, and posited that three concepts held through the seventeen types of environmental ethics. The first, an anthropocentric-biocentric continuum, where anthropocentric meant that moral relationships with nature should be determined solely by human needs, and biocentric meant that " . . . these relationships should be determined by the intrinsic rights of both humans and nonhumans."

The second concept, ethical extensionism and egalitarian ethics, holds that humans and nonhumans are morally equivalent. The third set of beliefs, secular, religious and spiritual beliefs, distinguished secular beliefs as based on rationality, with

religious beliefs drawing upon religious teaching, and spiritual beliefs based upon posited spiritual qualities of nature.

In addition to the previously described work by Dunlap, et al on the New Environmental Paradigm, the New Ecological Paradigm, and Milbrath's (1984) work on the Dominant Social Paradigm, and the work by Kempton, et al (1995) to investigate values, there were a series of interrelated studies from psychology that investigated ethical ideology and moral beliefs regarding the treatment of animals, finding a number of strong moral beliefs concerning their treatment.

Forsyth (1980) posited that there are two dimensions of "ethical ideology": relativism and idealism, developed the Ethical Position Questionnaire (EPQ), a psychometric instrument, and measured "ethical ideology" along two dimensions: relativism and idealism. Relativism is the belief that there are no universal moral principles; while idealism is the belief that well being is maximized through cost-benefit analyses of individual acts. Forsyth posited four ethical positions from these two dimensions: situationists (high relativism, high idealism); absolutists (low relativism, high idealism); subjectivists (high relativism, low idealism); and exceptionists (low relativism, low idealism). The EPQ was used by Herzog, et al (1991) to investigate attitudes towards animals and the environment.

Herzog, et al (1991) developed the Animal Attitude Scale to assess beliefs in the acceptability of various human behaviors towards animals. Galvin and Herzog (1992) applied a modified EPQ to "investigate the relationship between individual differences in moral philosophy, involvement in the animal rights movement, and attitudes toward the treatment of animals" (p. 141). They found that most animal rights activists were

absolutist in orientation, while a comparison student group had lower proportions of beliefs in absolutism (25% v 76%) and higher proportions of situationists (30% v 18%), subjectivists (18% v 0%), exceptionists (29% v 7%). Galvin and Herzog concluded, ". . . differences in personal moral philosophy are related to how individuals feel animals should be treated" (p. 147).

New Environmental Paradigm

As noted earlier, Dunlap et al's (1978) research to study environmental values worldviews through the development and use of the New Environmental Paradigm (1978) was recently updated to the New Ecological Paradigm (2000). They developed an instrument to measure public adoption of this worldview, by investigating three aspects of environmental values and beliefs: 1) degree of belief in the ability of humans to upset the balance of nature, 2) degree of belief in the existence of limits to growth for human societies, and 3) degree of belief that humans do not have the right to rule over nature. This 2000 update provided more gender-neutral language, created items that were both pro and anti NEP (the 1978 version was unidirectional), replaced the concept of environmental with ecological, and added items to investigate belief in human exceptionalism and an ecocrisis.

Research Needs

Environmental education is a field that is historically interested in protecting the environment through changing beliefs. In 1996, Hungerford and Volk called for additional research into the relationships between environmental sensitivity and responsible environmental behavior and in 1999 stated that additional research on

environmental values was needed. In 1997, Volk and McBeth suggested that additional research needed to be conducted to clarify relationships between environmental sensitivity and responsible environmental behavior. Increasingly, many in the field advocate for changing beliefs about the moral necessity of protecting the environment because of its rights or interests, given various asserted values, bringing another dimension to the research needs: one of the necessity for conceptually clarifying environmental values (Disinger, 1990), their relationship to responsible environmental behavior, and developing research tools to explore these relationships.

As noted, researchers in the field have investigated various aspects of affect, attitudes, values, intentions to act responsibly, or beliefs in support for environmental protection. They seek a better understanding of what adults and children already believe about the environment, particularly their attitudes towards environmental protection, leading to significant investigation of beliefs about environmental values and support for environmental protection. However, the complexity of environmental values and ethics brings distinct challenges for researchers interested in understanding the relationship among different types of values, and support for environmental policy. Given the complexity of values, their conflation is a risk (i.e., between intrinsic and use value, and direct and indirect obligations, etc). If the values are conflated when documenting the prevalence or relationship of values, or the relationship to support for environmental policy, such analyses are likely to arrive at erroneous conclusions about the prevalence of beliefs about a specific value. The example of the conflation of intrinsic and use value in Thompson and Barton's (1994) work was one such example. This presents serious challenges to the field if we cannot accurately document the prevalence of various values

that are of such interest to the field, nor maintain the integrity of the relationship of the values, nor conclusions based upon those relationships. Given the increasing interest in values, and their complexity, this research is focused on defining beliefs in values and ethics, developing a systematic method - a heuristic - for considering environmental values and ethics and their relationship to support for environmental protection, and developing two survey tools that can be tested for use as reliable and valid tools to accurately document the prevalence of the public's environmental values and ethics.

Purpose of the Study

The limited in-depth empirical studies to date, the emphasis upon identifying the "correct" environmental beliefs or ethics to hold, and the tremendous interest in values and ethics led to this research project to use social science methods to develop an instrument that will support more in-depth study of beliefs in environmental values and ethics, and how beliefs about animal capacities, environmental values, environmental ethics, and willingness to support environmental policies covary.

Research Objectives

1. Develop a set of heuristic tools (algorithm) for systematically disaggregating and identifying pretheoretical beliefs environmental values and ethics. The heuristic tools should distinguish environmental values so they are mutually exclusive.

2. Develop a more objective, discriminating and robust set of definitions of environmental ethical categories that are normatively non-judgmental.

3. Develop a valid, self-administrable survey instrument for educators and practitioners to use to self-identify their environmental ethic. The instrument should include approximately 25 or fewer items.

4. Develop a valid, self-administrable survey instrument to measure beliefs about the capacities of the environment, environmental values and ethics, beliefs in environmental ethic, and support for environmental policy. Five primary scales will be incorporated into the instrument. These should include scales to measure beliefs in:

4.1 environment's capacities;

4.2 the value of the environment, incorporating beliefs in both intrinsic value and use value;

4.3 a scale to measure moral beliefs in the treatment of the environment, incorporating beliefs concerning the direct moral considerability of the environment, the moral acceptability of various common uses of the environment, and need to protect the environment;

4.4 environmental ethics;

4.5 willingness to protect the environment.

The instrument will should include approximately 40 to 50 items.

5. Correlate population demographics to beliefs in environmental ethical categories.

Methods from Environmental Ethics

The methods that were used from the field of environmental ethics depended upon the particular type of purpose for the field that was selected for the study, as the purposes

varied quite widely. VanDeVeer and Pierce (1998) state that the purpose of environmental ethics is to foster an environmental ethic, an ethic of concern for the environment. This view emphasizes changing the ethical systems of people. However, Armstrong and Botzler (1993) state that environmental ethics is, ". . . the field of inquiry that addresses the ethical responsibilities of human beings for the natural environment." This definition seeks to investigate the ethical responsibilities of humans towards the environment, with less stated intent to change the ethical views of people, and more stated intent to investigate what is ethical in the human environment relationship. The latter definition corresponds more closely with traditional methods of ethical analysis, which seek to understand ethical notions through analytic techniques (Rosen, 1993). These techniques seek to understand environmental ethical positions by identifying the posited Normative Ethical Theory (NET) of an author or speaker, and are, as noted before, the methods that are used in this study.

Normative Ethical Theories and Environmental Normative Ethical Theories

A Normative Ethical Theory (NET) is a moral or ethical theory that includes a proposed theory of obligation, a theory of value, and how the two combine to provide moral guidance. A theory of obligation asserts what actions or belief are considered permissible, impermissible, obligated and forbidden under the NET, while the theory of value states what is of intrinsic, inherent, extrinsic, or use value. In order to be a complete moral theory, a theory of value and theory of obligation are well developed and are linked to provide a picture of what types of entities are due what types of moral considerations (Rosen, 1993).

For this study, NETs which address environmental issues will be termed environmental NETs, or ENETs. Since environmental ethics is concerned with the human-environmental ethical relationship, ENETs propose various theories about what moral considerations exist and do not exist. Using a philosophical approach to understand environmental issues provides a well-developed method to critically examine moral and ethical holdings about the human-environment relationship. Chapter Three will address how the ethical analysis of NETS was applied to help develop the conceptual level variables of the study.

Those writing about environmental ethics often use terms intended to connote ethical beliefs systems, such as the words anthropocentric, biocentric and ecocentric, or worldviews, such as the Dominant Social Paradigm or New Environmental Paradigm. VanDeVeer and Pierce (1998) and Kempton, Boster and Hartley (1995) stated that the terms are only general indications of an attitude toward the environment, and that the terms are philosophically loose. Given the many writers that now use the terms anthropocentric, biocentric, and ecocentric when discussing environmental issues and attitudes, and the disparate definitions attached to the terms (that will be discussed in Chapter Two) this study sought to develop a method to assess what is meant by various writers when they speak of an anthropomorphic, biocentric or ecocentric attitude or policy, and develop rigorous definitions.

Continuum of Environmental Entities

The robustly different writings of environmental ethicists provided a rich variety of beliefs in environmental values and ethics from which to begin the development of the

theoretically-based heuristic devices to systematically identify values. Given the diversity of objective things and phenomena in the environment, and Hardin's (1968) observation that it is important to be clear about what part of the environment is being considered, a method was sought for categorizing the environment. The categories needed to be relevant to beliefs about environmental values and ethics, so the writings of environmental ethicists were used to identify the types of entities in the environment that were given different types of moral considerations. The Continuum of Environmental Entities was developed to provide a tool for making clearer what part of the objective environment was being referred to by a writer or respondent.

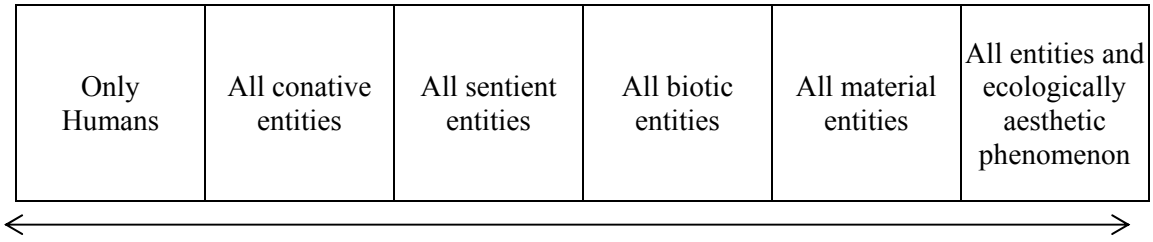

Figure 1: Continuum of Environmental Entities

The anchors of, and categories within, the continuum were derived from assessing and consolidating the criterion used in the environmental ethical literature to distinguish what types of environmental entities were due moral considerability.

The first anchor reflects Guthrie's (1967) sharply defined position, asserting that, ". . . the inclusion of other organisms as primary participants in our ethical system is both logically unsound and operationally unfeasible." This criterion about a class of entities in

the environment restricts moral consideration only to human beings, and excludes all other entities in the environment, including all non-human animals, etc.

Figure 2: Anchors for Continuum of Environmental Entities

The opposite of restricting moral considerability to only humans is to provide it to everything in the objective environment, and this construct will anchor the other end of the continuum. Naess (1989) and Rolston (1988) both argue (as do religions such as the Janists) that everything in the environment has intrinsic value and deserves direct moral consideration.

In a more inclusive view of what entities deserve moral consideration, Feinberg (1974) argued that the ability to have conscious aims, called conativity, conferred moral considerability, and that any species that has that capacity ought to be given moral consideration. The criterion of conativity will be used to distinguish another type of environmental entity.

The third type of environmental entity is defined as that type of entity that is sentient, or has the capacity to suffer. Bentham (1789) argued that sentient entities deserve moral considerability, because the suffering is a disvalue, and causing disvalue is wrong, causing suffering unnecessarily is a disvalue, and therefore causing suffering unnecessarily is wrong. This view was extended by Singer (1975) who argued that many

animals could suffer, and for the extension of moral consideration and protection to many types of animals.

The fourth type of environmental entities are those that are alive. This criterion arises from the many influential environmental ethicists who posit criteria for moral considerability that depend upon the criterion of being alive, as well as other posited principles (Schweitzer, 1948; Regan, 1983; Taylor, 1986; and Goodpastor, 1978). To simplify this study, which is not a philosophical study of the arguments used to justify beliefs, the differences of their complex justifications, and the meaning of their difference, are not investigated further, leaving that for others, but the likeness of the criterion they have drawn is used.

So far, the categories include everything in the environment that is alive. On the continuum of entities, this leaves abiotic entities and immaterial environmental phenomenon. A number of environmental ethicists confer moral considerability on living as well as the inanimate environment, such as the air, the waters in lakes, rivers, and oceans, the soil, mountains, earth, and the beauty that people observe in the landscape (Muir 1899; Rolston, 1988; Naess, 1989; Callicott, 1989; and Hargrove, 1989). Again, the authors provide different justifications for their positions, yet they hold roughly similar views on the types of environmental entities that deserve direct moral consideration. The abiotic elements of the environment, such as rocks, water, and air can logically be held to have value, and direct moral considerability, without requiring commitment to intrinsic value or direct moral considerability to phenomena such as beauty and wildness. Thus, a category for abiotic entities is included.

The last category includes ecological, aesthetic, and other unique environmental phenomena. It arises from the intangible elements of the landscape, such as wildness, aesthetic phenomenon, and group's properties, such as ecosystems, and species. Hargrove (1989), Muir (1916), Leopold (1949), Rolston (1989) and Callicott (1989) refer to wildness and aesthetic beauty as unique values deserving of direct moral rights to protection.

This leaves the question of where to assign in the Continuum of Environmental Entities the phenomena of ecosystems and species. Some treat the ideas of ecosystems and species as epistemologically questionable entities, in that they are groups, and groups do not exist, but only their constitutive elements. This notion is controversial among environmentalists, who are aware of the synergistic nature of the constitutive parts of the environment. Despite this view, recent work in ecology suggests that ecosystems that were once thought to be "real" ought to be recognized as regions defined for the convenience of scientific or policy work. To prevent the conflation of categories of entities, ecosystems will be treated as their constitutive elements, an unsatisfactory compromise done for the goal of not conflating any parts of the scale. Similarly, Dawkins (1996) noted that the idea of a species is an artificial construct, because no physical or biological criterion or criteria can be drawn to precisely define a species. Since the preservation of a species is linked closely to the preservation of a number of the individual of a species, the preservation of a minimum number of individuals will be considered the preservation of the species. Therefore, no separate category for species will be provided. Further work to address this may be conducted in the future.

Methods from Educational Psychology

Babbie (1995), Miles and Huberman (1994), Rossi and Freeman (1993) and Bourque and Fielder (1995) provide comprehensive guides to developing self-administered surveys, and for developing psychometric instruments. They will be used to develop procedures that will maximize the potential for instrument to be found valid and reliable. Guidelines for development of the conceptual variables and operationalization of the variables into items are provided. The employment of these methods is documented in Chapter Three.

Constructs and Variables to Investigate

The methods from environmental values and ethics that were used to develop the four step heuristic were applied in the next step of developing the constructs to investigate. The four step heuristic contained nine different types of moral considerations about environmental values and ethics. These nine types of considerations were conceived of as nine parallel dimensions, each constructed similarly to the Continuum of Environmental Entities. These were used to systematically explore beliefs about values and ethics for each of the six categories of environmental entities identified above. They are:

Continuum of Environmental Capacities: a tool to consider if, and if so, how much, capacity an entity is a non-material phenomenon, or is alive, or has the capacity to be sentient or conative, or to be a human.

Continuum of Value: a tool to consider how much, if any total value is believed to exist for an entity on the Continuum of Environmental Entities.

Continuum of Intrinsic Value: a tool to consider how much, if any, intrinsic value an entity on the Continuum of Environmental Entities is believed to have;

Continuum of Use Value: a tool to consider how much, if any, use value to humans for an entity on the Continuum of Environmental Entities is believed to have;

Continuum of Moral Consideration: a tool to consider the total amount of moral consideration that is believed due an entity on the Continuum of Environmental Entities.

Continuum of Direct Moral Obligations: a tool to consider how much, if any, direct moral consideration and obligation is due an entity on the Continuum of Environmental Entities;

Continuum of Indirect Moral Obligations: a tool to consider how much, if any, indirect moral consideration and obligation is due an entity on the Continuum of Environmental Entities;

Continuum of Environmental Ethics: a twelve category system of ethical categories that incorporates a wide range of combinations of possible environmental ethics that reflect diverse beliefs in intrinsic value, use value and the need to protect the environment.

Continuum of Willingness to Protect: a tool to consider how much, if any, a person believes that we need to have laws to protect an entity on the Continuum of Environmental Entities.

Each continuum is parallel, using the same categories used for the Continuum of Environmental Entities. When the continuums are used sequentially, in the order shown above, they are provide a heuristic device for considering different moral aspects of

environmental values and ethics. Table 1 shows the nine continua. The process used to develop items for the survey is in Chapter Three.

Continua
Continuum of beliefs about capacities of environmental entities
Continuum of beliefs about value of entities
Continuum of beliefs about intrinsic value of entities
Continuum of beliefs about use value of entities
Continuum of beliefs about moral considerability of entities
Continuum of beliefs about direct moral consideration due entities
Continuum of beliefs about entities deserving indirect moral obligations
Continuum of beliefs in environmental ethics
Continuum of beliefs in willingness to protect entities

Table 1: Nine continua for mapping beliefs about environmental values and ethics

Assumptions and Limitations

Adults have sufficiently coherent environmental ethical holdings to be categorized. This assumption will be tested during the development of the instrument, by measuring the internal consistency of the items, and conducting factor analysis.

The approach of considering and measuring beliefs in environmental values and ethics employed in this work, which focuses on the moral and value choices that people have concerning the environment, and which puts less emphasis on the deontological reasons people may have to justify their choices, is a contribution to the field of environmental education.

The heuristic for considering environmental values and ethics, and the instrument, will be useful to the field, an assumption partially tested through consultation with experts in environmental education, environmental policy and political science, through

presentation of the proposed project at the North American Association of Environmental Education's 1998 and 2002 annual conferences, to favorable reception.

Administration of the instrument will have a limited and beneficial test effect on beliefs in environmental values and ethics, as respondents consider their beliefs and engage in efforts to reconcile beliefs. Rokeach (1973) suggested that self-reflection upon values during administration of surveys has positive results of reconciliation of disparate beliefs and reduction in value dissonance.

The instrument will adequately measure beliefs in environmental values and ethics despite limited test effects on those beliefs. The heuristic has been conceptually developed but materials for independent use have neither been developed nor tested. The instrument has been developed but not yet tested. Testing needs to occur before internal consistency for populations other than those used in the study can be assured.

The instrumentation process was conducted primarily in Columbus, Ohio. Use for different groups than those used to develop the survey is not yet tested. Additional research to test the instrument with different populations is suggested.

The instrumentation process used intentional group selection to identify maximum variation of beliefs and test the instrument against a variety of beliefs. Subsequent steps in instrument development will need to include random surveys to test for broader reliability.

The instrument includes limited assessment of knowledge of the environment, a factor associated with beliefs in use value. The instrument should be tested using additional items to measure environmental knowledge.

The validity of the instrument as a measure of behavioral changes has not been checked by assessing stated beliefs concerning the importance of the environment, or the importance of protecting the environment, against behavioral indicators of same.

Summary

Academic inquiry into environmental values and environmental ethics includes bodies of literature that often address the relationship of environmental values and ethics to environmental policy and environmental quality. The scholarship concerning how environmental policies are formed is complex, with many lines of inquiry in numerous disciplines that seek to unravel the social and political aspects of policy initiation, formulation, passage, and implementation. Separate, yet often intertwined lines of inquiry, seek to understand the values and beliefs of individuals, sometimes exploring their prevalence, origins, relationship to individual and group behavior, and relationship to observed situations in the world. Given the complexity of the relationship between individual beliefs and attitudes concerning environmental values and ethics, researching the formation of environmental policy and environmental quality is dauntingly complex. This dissertation project seeks to study selected aspects of this relationship, developing heuristic methods and tools to systematically understand environmental values and ethics, their relationship to environmental policy, and to develop an instrument to objectively measure the prevalence of environmental values and ethics, and support for environmental policy. Chapter One provides an introduction to the study.

Chapter Two is the literature review, in three sections. Given the interdisciplinary nature of the study, the literature review sought to identify research and scholarship

concerning the measurement of environmental values and ethics, and their relationship to environmental policy in the fields of environmental education and environmental policy. The field of environmental ethics was drawn upon to inform the methods used in the study, and to identify the distinguishing characteristics used in the major environmental ethical theories that affect environmental education. The first section focuses upon empirical studies of environmental values and ethics, while the second section reviews literature in environmental ethics, identifying the variables used in the study. Chapter Three documents the heuristic that was developed to aid this research into environmental values and ethics, while Chapter Four states the methods used for the study.

The first section of Chapter Four contains the methods from environmental ethics that were used to develop a series of heuristic devices to more deeply and systematically investigate environmental values. This work comprised a significant portion of the study, and achieved several research goals. The second section of the methods chapter shows how the heuristic tools were applied to develop a social science-type survey instrument to investigate individual beliefs about environmental values and ethics. Chapter Five presents the results, by showing and analyzing the data collected during the instrumentation process. Chapter Six explores the implications of the study for environmental education and provides suggestions for future research.

Definition of Terms

Because this study is the development of an instrument, rather than the application, these are the terms used in the conceptual development of the items and the instrument. Therefore, only conceptual operational definitions are offered for the

purpose of the study. The connotative definitions are embedded in the literature and the item measurement operational definitions are the findings.

Conativity - the condition of having the potential to have conscious states that include all of the following: self-awareness, conscious aims, and emotional states attached to fulfillment or lack of fulfillment of aims, in ways that are qualitatively similar to humans.

Construct - a complex set of concepts, usually disaggregated into variables during their operationalization into a study.

Ecocentric – For this study, the theory of value that the earth and all things on it have intrinsic value

Environmental ethics - the study of moral phenomenon concerning the relationship of humans and the environment. (See definitions for twelve posited types).

Definitions of Twelve Posited Types of Environmental Ethics

•Anthropocentrism: only humans have intrinsic value, deserve direct moral consideration. Little need to protect the environment to ensure human welfare.

•Ecological Anthropocentrism: only humans have intrinsic value, deserve direct moral consideration. Need to protect the environment to ensure human welfare.

•Conativism: conative entities have intrinsic value, deserve direct moral consideration. Little need to protect the environment to ensure human welfare.

•Ecological Conativism: conative entities have intrinsic value, deserve direct moral consideration. Need to protect the environment to ensure human welfare.

•Sentientism: sentient entities have intrinsic value, deserve direct moral consideration. Little need to protect the environment to ensure human welfare.

•Ecological Sentientism: sentient entities have intrinsic value, deserve direct moral consideration. Need to protect the environment to ensure human welfare.

•Biocentrism: living entities have intrinsic value, deserve direct moral consideration. Little need to protect the environment to ensure human welfare.

•Ecological Biocentrism: living entities have intrinsic value, deserve direct moral consideration. Need to protect the environment to ensure human welfare.

•Material Ecocentrism: material things (soil, air, etc) have intrinsic value, deserve direct moral consideration. Little need to protect the environment to ensure human welfare.

•Ecological Ecocentrism: material things have intrinsic value, deserve direct moral consideration. Need to protect the environment to ensure human welfare.

•Phenomenal Ecocentrism: all things (including the aesthetic characteristics or properties of nature, such as beauty or wildness, or group phenomena such as species or ecosystems) have intrinsic value, deserve direct moral consideration. Little need to protect the environment to ensure human welfare.

Environmental normative ethical theory (ENET) - a normative ethical theory that addresses the human - environment relationship. A full theory includes a theory of value, theory of obligation, and how the two interact to produce judgments about what is of intrinsic value, what is morally considerable, and what actions are morally permissible, morally forbidden, and morally obligatory.

Fact-value distinction - "the apparently fundamental distinction between how things are and how they should be . . . That people obey the law (or act honestly or value money) is one thing; that they should do so is obviously quite another. The first is a matter of fact, the second, a matter of value". Hume is usually credited with drawing the distinction, when he noticed that one cannot uncontroversially infer an 'ought' from an 'is' (the is-ought distinction).

Holding - a broad construct that denotes any thought, value, attitude, belief, or disposition of individuals. It is similar to Babbie's affect. To paraphrase Norland on Babbie, affect includes such things as attitudes, perceptions, values, opinions, intentions, beliefs, while orientation variables include attitudes, beliefs, personality traits, prejudices, predispositions, and the like" (Norland, 1998.)

Inherent value - see value.

Intrinsic value – see value.

Moral acceptability - when an action is considered to be morally permissible.

Moral agent - an entity that has free will, knowledge of the moral and nonmoral consequences of their actions, acting in the moral domain.

Moral concerns - those having to do with rightness, wrongness, permissibility, and impermissibility of actions (Hubin, 1998). There are many levels of moral considerations which will be explored by variable one, such as the permissibility of killing an entity, the permissibility of using it for research, the impermissibility of doing these things, as well as causing pain.

Moral considerability - an entity with characteristics that engender their consideration in moral questions. There are two types of considerability: direct and

indirect. What types of entities are morally considerable and what considerations they deserve are the key questions in ethics.

Moral consideration (Direct) – an entity with characteristics that requires the consideration of its welfare in moral questions. Criterion for direct moral considerability varies among NETS, but is usually the requirements for being a moral patient, which usually requires the capacity to suffer. Ecocentric environmental ethicists such as Naess and Holmes give direct moral considerability to all entities. When an entity is judged to be one that meets the criterion of moral considerability, actions that may affect the entity must be considered in light of their moral acceptability.

Moral dilemma - situation where an agent has a *strong* moral obligation or requirement to adopt each of two alternatives, and neither is overridden (by the relative importance of the other, ed)., but the agent cannot adopt both alternatives.

Moral domain - questions or actions that are considered to be moral questions or actions.

Moral intuition - commonly means the first approximation of an answer to a moral question or moral dilemma, sometimes posited to be from transcendental. This study rejects the notion that moral intuitions are received by humans from any posited transcendental entity.

Moral patients - entities that are morally considerable but not moral agents. What is moral action towards moral patients depends upon a NET, or ENET. A minimum capacity for most ethicists is the capacity to suffer; for many environmental ethicists it is the characteristic of existing, or being alive.

Moral phenomenon - Belief or behavior with a moral dimension, where *moral* is defined as having to do with questions, assertions, or judgments about what ought to be. Often refers to moral questions or concerns that have arisen but have not been examined in much depth.

Moral permissibility - a moral judgment that an action or belief is permitted because it does not violate moral obligations towards a morally considerable entity.

Moral situation - an interaction between moral agents and/or moral patients, an interaction which should be universalizable i.e., the moral agent could will that any moral agent in the same situation would act in the same way, and reversible, (i.e., that another moral agent would act in the same way toward oneself).

Normative ethical theory (NET) - when complete, it contains a theory of obligation (or right action), a theory of value, and the relationship between the two.

Partial normative ethical theory - incomplete normative ethical theories, usually containing portions of either the theory of value or the theory of obligation, but not both.

Partial environmental normative ethical theory - incomplete environmental normative ethical theories, usually containing most are all of either the theory of value or the theory of obligation, but not both.

Phenomenon - entities with highly questionable ontological status (e.g., classification schemata like phylum or species) or environmental qualities of inanimate objects or processes that induce perceptions of aesthetic beauty (e.g. rock formations, waterfalls, rainbows, etc).

Pretheoretical holding - the conceptual holdings of individuals before systematic examination and revision of the holdings into a more coherent and systematic body of thought.

Scope problem - the question of the universality of moral consideration. There are three aspects: the universality of the types of environmental entities that are due moral consideration by an ENET. For example, the narrowest scope of moral consideration would be humans alone, and most broad would be all types of entities. The second aspect is the length of time a type of entity must be considered. For example, some ENETs hold that we have moral obligations to protect the interests of seven generations of human children, thus the ENET proposes a temporal scope of consideration for humans of seven generations. The third aspect is the universality of the community of consideration for the type of entity. For example, all traditional NETS assert that justice requires universal moral consideration such that all humans who meet a set of specified characteristics are to be given the same moral consideration. Some feminists (Gilligan, 1982; Merchant, 1983) have asserted morality is a duty to care, and that justice is not harming others with whom a person is in relationship. This approach requires moral consideration of the relationship between individuals, and suggests that moral obligations depend upon the particular relationship with an individual, limiting the community of moral considerability to smaller groups of individuals, and types of obligations that are due to the particulars of the relationship.

Sentience - a state of consciousness that includes, at minimum, the capacity to feel physical pain in ways qualitatively similar to humans.

Temporal aspect - the length of time into the future the respondent agrees we ought to protect/conserve various environmental entities.

Theory of Obligation (TOO) - The part of a normative ethical theory that addresses what actions, beliefs or traits are morally required, permissible, or forbidden.

Theory of Value (TOV) - describes what is posited to be of intrinsic and extrinsic value, used to determine what entities are moral agents and require moral consideration

Value – four types are usually recognized in philosophy: Intrinsic, Inherent, Instrumental and Contributory (Cambridge, 1995). For this study, it is the held belief of the respondent, as indicated by the responses to questions asking about the particular type of value.

Intrinsic Value- it is the basic value, and others are defined in terms of it. There are many attempts to explicate value, some deal with the source of value, others in terms of the fittingness of the value for certain emotions. The first view holds that the intrinsic value of x is the value that x has in virtue of its intrinsic nature. The second view is that x has intrinsic value or good only if it is worthy of desire in and of itself (Cambridge, 1995). For this study, which is of held beliefs of the public, and not an attempt to determine which view is true or best justified, it was judged that the public may not differentiate between these views, and that the level of distinction did not need to kept in order to increase the ability to understand the public's environmental values. The operationalization of the questions concerning what is believed to be of intrinsic value took several forms, each attempting to elicit whatever notion of intrinsic value that is held by the respondent. Entities with intrinsic value usually are given direct moral consideration when the theory of value is linked with the theory of obligation. What

entities are believed to be of intrinsic value varies considerably among NETS and ENETS, from Aristotle's limitation of it to virtuous human interactions, to Naess' ascription of it to everything.

Inherent Value - when the contemplation or experience of the entity or phenomenon is of intrinsic value, such as the *experience* of being in an ancient forest, the ancient forest is said to have inherent value. For this study, the question of what is of inherent value is not directly investigated by the instrument. However, it was judged that entities that are believed to carry inherent value should be treated as having high use value for obtaining the *experience* that is believed to have intrinsic value, such as being in an ancient forest.

Instrumental Value - the entity or phenomenon has usefulness as a means of obtaining something of intrinsic value. For this study, instrumental value is called *use value.* For example, an unremarkable bicycle is not usually considered to have intrinsic value, but does have instrumental value for the usefulness it provides as transportation. If the experience of riding a bicycle is held to be of intrinsic value, then the act of riding it would be judged (under this definition) to have high use value, as does the bicycle, because it has inherent value and contributes to the possibility of having the intrinsically valuable experience of riding the bicycle.

CHAPTER 2

LITERATURE REVIEW

Education

Dewey (1916) had a profound and lasting impact on education (Ryan, 1999) when he developed an educational philosophy stating that the aim of education was to increase the experience of learners and develop them into citizens who could achieve their aims. As noted in Chapter One, one aspect of his work was to answer the question of what types of values are appropriate and necessary to teach in the public sector. This led him to distinguish secular, or civic, values from sectarian, or religious/spiritual values. The secular values included belief in the value of education, belief in the importance of developing learner's ability to think for themselves, belief in the value of knowledge and research, and belief in the value of democracy. Environmental educators have noted that Dewey addressed the importance of the environment to human welfare, the need to educate citizens to understand and investigate human impacts on it, and to work to identify solutions to environmental challenges (Boisvert, 1998; Dennis & Knapp, 1997; Meyers, 1999; Ryan, 1995; Stapp, 1979). Thus, the pragmatic, learner-oriented, experiential model of education that develops active citizens appears to be one of the founding philosophies of environmental education. However, since environmental

education is an extremely complex enterprise it must be noted that many scholars before and after Dewey have contributed to the philosophies and practices of the field as it is practiced today.

History and Purpose of Environmental Education

The history of environmental education provides insights into the development of increased interest in the profession in different types of environmental values. Roth, Cantrell, and Bosquet (1980) provided this overview,

> "Environmental education, regardless of emphasis or definition, has emerged as an interdisciplinary process with significant historical roots . . . . Of special significance are four intellectual thrusts of the last century, namely: nature study; conservation education and related resource-use education; progressive education; and, science education . . . . Nature study arose from a growing concern about the inadequacy of 19th century pedagogical techniques that emphasized rote learning, knowledge acquisition primarily through books and lectures, and isolation from real world phenomenon. Louis Agassiz was credited with being the first to verbalize the need to emphasize the study of nature rather than relying entirely on the written and spoken word" (p. 85)

And,

> "Conservation education and resource-use education, while arising from concerns about conservation problems related to the misuse of soil, range, forests, and wildlife resources, emanated largely from various governmental programs. . . . . Approaches to conservation education were deemed important and followed earlier attempts to legislate and enforce conservation laws that did not provide solutions to the problems. Several laws requiring the teaching of conservation were passed, and resident teacher workshops that provided college credit were established to educate teachers about resource issues, conservation practices . . ." (p. 70).

They summarized progressive education,

> "The progressive education movement similarly influenced . . . the development of environmental education. John Dewey, following Comenius, Rousseau, Pestalozzi, and Froebel encouraged the development of curricular strategies that were responsive to the needs of children and produced curricular reform that had far-reaching implications. The move toward holistic, interdisciplinary and real world approaches, with the dictum, "learn by doing" still interests people today" (p. 73).

Science education benefited from and contributed to the mix of philosophical thought concerning education, and resulting changes in education. Science education itself brought a more orderly, science based approach to education, that was also experientially oriented. Roth, et al, noted that conservation education arose from concerns about misuse of soil, rangelands, forests, and wildlife, leading to programs to teach conservation practices. The progressive education movement influenced environmental education through John Dewey's work to develop curriculum that met children's needs, broadly defined, and engaged them in learning by doing and reflecting. Each of these methods emphasized improvement of human quality of life through education, be it to increase appreciation of nature, or to increase the long-term productivity of human utilization of natural resources.

Roth (1969) stated that the purpose of environmental education is to develop citizens that are:

> "1. knowledgeable about the biophysical and sociocultural environment of which people are a part;
> 2. aware of environmental problems and management alternatives of use in solving these problems; and
> 3. motivated to act responsibly in developing diverse environments that are optimum for living a quality life (p. 41)."

As environmental education grew as an international endeavor, the Tblisi Declaration (UNESCO, 1978) demonstrated an international consensus regarding the purpose of environmental education. It held that environmental education ought to help individuals and groups acquire an awareness and sensitivity to the environment and a set of values and feelings of concern for the environment, based on the belief that doing these things leads to increased action to address environmental problems, which would in turn lead to increased environmental protection. The emphasis upon sensitivity, feelings, and concern includes varying degrees of emphasis on the more cognitive and skill dimensions of citizen understanding of environmental issues.

Hungerford, Peyton, and Wilke (1980) proposed a superordinate aim for environmental education,

> ...to aid citizens in becoming environmentally knowledgeable and, above all, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment (p.43, in Volk, p.4, 1997).

This definition focuses upon the importance of increasing citizen cognitive knowledge and action skills, as well as dispositions for being dedicated to and acting to balance quality of life and quality of the environment. They proposed four subordinate goals which curriculum should include. Each is focused upon increasing cognitive/knowledge and citizen capacity to address environmental issues. However, they also " . . . suggest a prerequisite goal of environmental sensitivity, which 'is probably critical to . . . being willing and able to engage profitably in Levels II, III, and IV of this set of goals (p. 45, 1980)'" (in Volk and McBeth, p.4, 1997). Volk and

McBeth (1997) discussed this research, noting that " . . . more research is needed to clarify the relationships between these variables and responsible environmental behavior" (p. 7) (Italics added).

This history shows the development of environmental education into a field with a purpose of developing environmentally responsible behavior by developing citizens who are knowledgeable about the biophysical and sociocultural environment, aware of environmental problems and alternative solutions to these problems, and motivated to act responsibly, in order to improve environmental quality and the quality of human life. This involves changing attitudes and helping people develop a set of values and feelings of concern for the environment. These statements of purpose included an emphasis upon developing knowledge of the environment and making informed choices about how to engage the sociopolitical system to improve the environment to improve the quality of human life.

Environmental education, though, as noted in Chapter One, was part of a broader culture of concerned environmental professionals that included ethicists and activists who advocated for the need to educate people to adopt environmental values and ethics that strongly promoted protecting the environment for its own sake (Naess, 1989; Rolston,1988, et al) or because of the rights or interests of some parts of the environment (Singer, 1975). A number of educators and researchers state a view that we are obligated to teach people to hold a biocentric or ecocentric view, including Kuhn and Jackson (1983), Gigliotti (1992), and Corcoran (1994). It is not the purpose of this project to evaluate these claims, but to explore their presence, broad influence on educators, and

provide tools for assessing the relationship of beliefs to support for environmental protection, and tools for educators to self assess, explore, and discuss their beliefs.

The educator advocates for adherence to stronger environmental values and ethics, including animal and earth rights, have worked to increase learner concern and responsible behavior, but frequently used approaches to teaching that had a clear pro-environmental agenda, tended toward indoctrination, and occasionally included more spiritual (i.e., ecospiritual) elements. These approaches were a fundamental departure from environmental education's historical approach to pedagogy and androgogy, created increasing tensions in the field in the latter decades of the 20th century and the early 21st century, and spurred a need for additional research and more careful treatment of environmental values and ethics in environmental education.

The Challenge of Environmental Values and Ethics in Environmental Education

As noted in Chapter One, environmental education has historically supported an anthropocentric approach to education, where the appreciation, conservation, and preservation of the human environment was a goal (albeit an indirect goal that would be achieved by educating learners to make responsible environmental choices) that was established in order to improve human welfare. This goal is the stated purpose of environmental education in international declarations (UNESCO, 1976; UNESCO-UNEP 1978; et al).

Environmental values are an integral component of environmental education, as educators are challenged to provide excellence in educating learners while being offered curricula and programming that relies upon a wide diversity of environmental ethical

theories (Meyers & Bonnell, 1997). These theories include a wide variety of ethical positions concerning the human-human, human-environment relationship that reflect, roughly speaking, various forms of anthropocentrism, biocentrism, ecofeminism, ecospirituality, new age spirituality, Native American spirituality, and various strong ethical positions concerning the human-environment relationship.

As introduced at the end of the previous section, a number of educators and researchers have stated views that we are obligated to teach people to hold a biocentric or ecocentric view. We noted that influential environmental ethicists such as Muir (1916), Naess (1989), Leopold (1949), Thoreau (1947), Singer (1979), and Rolston, (1988) stated biocentric or ecocentric views, claimed that these were the proper and morally obligatory views to teach and hold, and that these views are found in resource materials developed for the field, or cited by some formal and nonformal environmental educators. The ethical writings contain extraordinarily complex views of environmental values and ethics that are difficult to accurately identify, compare, and summarize, even for philosophers and ethicists, making these beliefs challenging for educators to work with. Developing better self-understanding of beliefs in environmental values and ethics may aid educators in improving their teaching practice (Heimlich and Norland, 1994; Heimlich and Meyers, 1998). This study seeks to help meet this need by developing heuristic tools for disaggregating different types of environmental values, and an instrument for educators to use to self-assess their environmental ethic.

The field of environmental ethics is also concerned with beliefs about the human-environment relationship, particularly the moral aspects of those beliefs. VanDeVeer and Pierce (1998), in a view that is common among those in environmental ethics, define

environmental ethics as the proper beliefs and behaviors of humans towards the environment, and state that the purpose of the field (of environmental ethics) is to advance individual and societal adoption of an environmental ethic. This view can be sharply distinguished from environmental ethicists such as Rosen, who state that environmental ethics is the study of moral phenomenon concerning the human environment relationship, showing that there are many beliefs about environmental ethical theories, some of which are more plausible than others. This difference in views, has important implications for environmental education. Table 2 identifies selected worldviews and ethics.

Authors	**Description**
Dunlap, R.	2 major paradigms: New Environmental Paradigm Earth's resources are finite Humans do not have right to dominate nature Technology cannot solve environmental problems Existing paradigm
Milbrath, L.	2 major paradigms New Environmental Paradigm Dominant Social Paradigm Earth's resources are infinite Technology can solve environmental problems Human's have right to dominate nature
Kellert, S.R.	3 types of ethics: 1) economic (or instrumental) view 2) biocentric (intuitive, experiential identification with natural world) 3) ecological perspective (a commitment "to a model of scientific understanding of how nature orders itself"

Table 2: Posited values, paradigms, worldviews, and ethics

Materials Guidelines for Excellence in Environmental Education

The North American Association for Environmental Education Materials Guidelines for Excellence (NAAEE, 1996) (Materials Guidelines) provided a " . . . set of recommendations for developing and selecting environmental education materials" (p. 1). The Materials Guidelines state that environmental education is good education, education that,

> " . . . recognizes the importance of viewing the environment within the context of human influences, incorporating an examination of economics, culture, political structure and social equity as well as natural processes and systems. . . . to develop an environmentally literate citizenry (p. 1).

It recommends educational methods that, " . . . build the capacity of learners to work individually as well as cooperatively to improve environmental conditions . . . (p. 2)", and, " . . . encourage learners to explore different perspectives and form their own opinions"(p. 6). The Materials Guidelines recommend balanced, unbiased education to teach learners about the environment and human impact on it, as well as different methods of analyzing environmental issues, including varying personal and societal values and conflicting points of views. The emphasis upon balanced approaches that do not impose educator values reflects the field's desire to clarify what is considered excellence in approaching how to increase appreciation, knowledge and skills of learners in engaging environmental issues. When taken as a whole, the Materials Guidelines recommend educational methods that trust the learner to use evidence about the environment, to be a critically thinking, self-determining, independent agents, and that the imposition of educator environmental values on learners is not recommended.

Environmental education is a profession that occurs in a larger culture of environmental professionals who are concerned with human beliefs about environmental values and a larger culture that frequently asserts, strongly, that we are obligated to change people's beliefs about values. The Materials Guidelines' treatment of educational philosophy and environmental values and ethics were researched by Meyers and Bonnell (1997) and Meyers and Rosen (1997). They were particularly interested in how the Materials Guidelines addressed the development of citizenship skills and secular, pluralistic approaches to values, and the field's efforts to provide Materials Guidelines for how educators, curriculum, and programming ought to treat these relationships.

They applied the work of Dewey (1916), who argued that sound education cannot be value free, and considered what types of values were appropriate for educators to teach in the public sector using public monies. Dewey distinguished two broad categories of values: sectarian, or religious based values, and secular, or civic values. An example of a religious value is a belief that certain things are sacred, because of spiritual or religious teachings, or that that certain behaviors or beliefs are morally forbidden, again because of spiritual or religious teachings. Teaching performed to have learners directly adopt these spiritual or religious values is considered an effort to have people adopt a spiritual tradition or religion. Doing these activities with public funds was considered to be government establishment of religion, an activity Dewey considered anathematic to the maintenance of democracy. Distinguishing which values educators could (and should) teach without breaching the church-state divide, and developing justifiable arguments for those teachings was a challenge Dewey addressed.

Dewey defined secular values as those that do not necessarily rely upon religious or spiritual beliefs, are held by diverse groups and religions in society, and whose teaching in the secular arena does not erode the boundary between church and state. Specifically, these values include belief in the value of education, belief in the importance of developing learner's ability to think for themselves, belief in the value of knowledge and research, and in the value of democracy. Where religions share values, and these values can also be arrived at through non-religious or spiritually inspired texts or teachings, that is, through reasoned consideration, the values could be considered secular.

Dewey argued that secular values were appropriate and necessary for educators in public education to teach young learners to adopt, whereas teaching learners to believe sectarian values was inappropriate in those settings, since it eroded the separation of church and state. Meyers and Bonnell (1997) observed that environmental education has a rich tradition of promoting these secular values, particularly when promoting process skills and responsible citizenship skills such as: valuing the use of science-based approaches to understanding the environment, understanding the social and physical environment, assessing proposed solutions to environmental problems, increasing student capacity to work for their interests, and increasing willingness to cooperate to identify and agree to solutions to problems.

The opposite of these approaches are those methods that teach learners to believe in the correctness of a particular religion or spiritual tradition (including what things are sacred). The rise of ecospirituality, and new earth-centered religions, in the wider culture of environmentalism, is a trend that warrants careful consideration by environmental

educators who teach in the public realm. When environmental educators seek to indoctrinate learners to adopt an ecospiritual view, it can be regarded as an effort to teach learners to adopt a particular religion, and was considered a sectarian teaching approach. In addition to the questionableness of such methods in state-supported educational endeavors, in light of concerns for not using the government to help establish a religion, these indoctrinative methods have been argued to be anti-democratic (Dewey, 1916), to reduce learner self-efficacy (Bandura, 1993), and to lower capacity to make informed judgments about environmental issues. These approaches are regarded as ineffective for increasing the capacity of learners for self-determination (Hungerford & Volk, 1980; Disinger, 1990; NAAEE, 1996). Through the adoption of the Materials Guidelines for Excellence the field of environmental education provided direction for navigating what types of values and teaching methods were considered appropriate to teach.

One approach is to provide a more explicit and detailed account of beliefs in environmental values for educators and researchers, and develop tools they can use to analyze environmental values and ethics. The research supports the Materials Guidelines by providing educators, environmental professionals, and others develop better self-understanding of their beliefs in environmental values and ethics, since educators who self-assess in order to identify self-knowledge of their values and attitudes may find this an aid to improving their teaching practice (Heimlich and Norland, 1994; Heimlich and Meyers, 1998). This study seeks to achieve this need by developing tools for systematically disaggregating and comparing different types of environmental values, and an instrument for educators to use to self-assess their environmental ethic.

Research on Environmental Values and Ethics

Environmental Education

Academic inquiry into environmental values and ethics involves numerous approaches. Three distinct approaches to the academic inquiry regarding environmental values and ethics are identified and described here, due to their influence on environmental education. Each approach, its possible impact, and relation to this study are briefly identified below, in order to provide context for the approaches used in this study. It should be noted that this description focuses upon broad approaches to *inquiry* about values and ethics, and is not focused upon the philosophies or methods for changing learner, or societal, environmental values and ethics. While many environmental educators are interested in and working to change values and ethics, it is beyond the scope of this project to conduct a thorough evaluation the effectiveness of alternative methods.

The first approach to academic inquiry concerning environmental values and ethics includes works that seek to identify which ethical theory or worldview is ethically correct to hold, or which advocate for the adoption for a particular environmental ethic. For example, Aldo Leopold, in a Sand County Almanac (1949), advocated for the ethical correctness, and need for the public to adopt a "land ethic", in order to prevent environmental destruction. Using a variety of initial points of view in their analyses, writers who address environmental ethics posit a wide diversity of ethical theories, worldviews, and paradigms, each advocated as correct and necessary to hold to ensure environmental sustainability, or a morally sound relationship with the environment (e.g.,

Muir, 1916; Naess, 1989; Leopold, 1949; Thoreau, 1947; Singer, 1979; Rolston, 1988; Warren, 1990; and Knapp, 1999). These works have significant influence in the professional and academic communities engaged in environmental issues. These works often critique other ethical theories, worldviews, or values, in order to show how these other beliefs are incorrect, and their system of beliefs is more correct.

A second approach to environmental ethics and values occurs when a more philosophically or analytically comparative study of ethical beliefs is conducted in depth, with the apparent or stated intention of providing a systematic comparison of ethical theories. Such authors may also seek to evaluate the plausibility of various ethical views, worldviews, and paradigms, and may seek to identify the most plausible and correct view. The key distinction is in the use of philosophical techniques to compare numerous beliefs. Ethicists such as Rosen and Hubin, who have sought to carefully distinguish and compare the content of environmental ethical theories and beliefs, fit this approach. The methods used by such ethicists will be drawn upon to help identify the variables used in this study.

A third approach to environmental values utilizes methods from social science, such as educational psychology to develop psychometric instruments to measure values, and survey research to measure the prevalence of values across populations, and test assertions regarding the relationships of values. This third approach is grounded in the ethical beliefs of persons, and, while such studies may be deeply informed by psychological theories, they have not incorporated methods from the study of ethics to systematically disaggregate variables and develop survey instruments that objectively measure beliefs. This study incorporates the latter two approaches to achieve that goal.

The assertions made by environmental ethicists about the necessity of adopting a particular environmental ethic, or environmental value raise the question of how to empirically test assertions regarding the relationship of environmental values and ethics to environmental quality. Three challenges that arise concerning values will be described, and how this research project addresses each follows.

The first challenge is to assess which, if any, of the many posited "environmental ethics" and values are necessary for a person to hold in order for them to have a sufficient willingness to protect the environment. While the environmental values research conducted to date has increased interest in environmental values it has not developed the tools to rigorously assess the relationship of environmental values and ethics to support for environmental policies. This project does not seek to judge the normative "correctness" of the ethics or values of respondents, but to objectively evaluate and document their beliefs. The project does, however, seek to systematically compare beliefs in environmental values and ethics and their relationship to support for environmental protection, using methods from the social sciences for the investigation in order to place such investigations onto a more scientific and less normatively judgmental approach.

The need for more detailed investigation of environmental values is illustrated through the following example. The first part addressees the well known phenomenon of the collective action dilemma. The dilemma shows that even when supermajorities of public opinion agree on the need for a policy change, or agree that their behavior needs to change, until the group makes an agreement to pass a policy, or create some behavioral norm, and also creates a viable enforcement mechanism, the group as a whole is not

likely to change their behavior. This is because a sufficient number of individuals in the group know that their individual actions will not make a significant difference on environmental degradation in the face of a commons problem (Hardin, 1968). Hardin pointed out that individuals who chose to give up personal gain for a greater good, by voluntarily refraining from usage of a resource that benefits them, have a disincentive to continue their behavior when the resource cannot be protected from harm as others pursue their self interest and fully use the resource (i.e., overuse). Until there is an enforceable agreement, the rational actors will not refrain from pursuing their self interest, especially if doing so fails to achieve the intended goal of resource protection, or results in some obtaining unfair advantage.

Occasionally, group behavior can be substantially altered through creation of shared values and strong group enforcement of values and moral agreements through voluntary means (Gautier, 1986). However, he notes that this is a rare or nonexistent phenomenon (in terms of widespread and sustained changes in behavior) in large societies, and is especially difficult to achieve in pluralistic societies that have a high degree of personal freedom. For environmental issues, then, it is valuable to observe that opinion research on environmental values shows that the public has a high degree of support for environmental policy, often exceeding seventy percent approval of increased enforcement of existing laws, or passage of new laws or regulations (Kempton, Boster, and Hartley, 1995; NEETF, 2001).

The lack of passage of stronger environmental laws, when conjoined with this high degree of public support for stronger environmental policy suggests that public opinion favoring these laws, and their high valuation of the environment, is not

translating into passage of stronger laws. As noted before, the complexity of this phenomenon is extensively addressed in political science, where barriers to enactment of legislation favored by supermajorities of public opinion are explored, and the role of special interests, campaign contributions, and other factors are explored to explain the disconnect between public opinion and legislation. However, some advocates for stronger environmental policies ascribe the lack of attainment of stronger environmental policy to a lack of a particular environmental value, ethical holding or worldview, (usually the particular values, ethics or worldview being advocated) such as Dunlap, et al's, research to study environmental worldviews (1978, 2000).

Work by Bem (1964) and Rokeach (1973) demonstrated that people have beliefs in multiple, and remarkably different values, some more central than others, that compete against one another, such as the value of working to provide economic support necessary for our welfare, and the value of recreation. This study is informed by these findings that people can have multiple values. From the notion that people can have divergent and competing values that must be taken into account when assessing their relationship to behavior, a finding of interest when considering how values are related to environmental behavior, it is interesting to note Norton's (1995) work to show that environmentalists with different values can support similar policies, and called on environmentalists to recognize the usefulness of value pluralism in the effort to advance environmental protection.

Norton (1995) provided the example that Muir, a strong preservationist, and Pinchot, the strong conservationist, joining together to establish the Forest Service, in a shared vision of the necessity of managing forestlands. Muir's support of the policy itself

appears to be a case of competing values, where he recognized the legitimacy and necessity of utilizing some forestlands in order to improve human welfare, but expressed a moral duty to preserve forestlands because of their intrinsic value, and supported the policy of establishing the Forest Service in order to increase the wise use of those lands and decrease their exploitation in an effort to preserve some forestlands.

One step in this research project compared the views of a number of ethicists along one dimension of their work: what criterion they used to identify what is of intrinsic value, in order to identify these moral criterion for various uses, including the development of the Continuum of Environmental Entities, and the items in the two surveys conducted in the dissertation process. By incorporating analytical methods and selected content from ethicists, this project will more deeply and precisely identify environmental values. Distinguishing between intrinsic value and use value provides a powerful and important distinction, utilized in ethics to prevent conflation of values during conceptual analysis, and applied in this study to prevent conflation during social science research. Because of the complexity of the concepts in ethics, and in environmental ethics, the use of the tools of distinguishing intrinsic and use value needed to be used within a larger analytic strategy that would provide consistent direction for this project.

Pierce's (1878) seminal work of pragmatism, "*How to Make our Ideas Clear*", was a complex work that suggested that problems can only be made understandable when they are conceived in terms of their potential impacts on human welfare, and the action choices available to humans to solve those problems. Thus, when a concept is developed that reflects a problematic situation, he argued that it is helpful to consider the concept in

terms of the impacts that the problem has on human welfare, and the action options that are available for humans to ameliorate the problem. He argues that problems should be stated in terms of their alternative solutions, with the solutions treated as working hypotheses that can investigated using some empirical methods. There are multiple levels of problems with environmental values and ethics. The larger problem, identified at the beginning of this chapter, is to understand if support for environmental protection can be increased by changing environmental values and ethics, and if so, which ones.

This study operationalizes the problem of why the environment is not sufficiently protected by developing tools that can investigate an hypothesis extant in the environmental education and ethics literature: namely, that (the incorrect) beliefs in environmental values and ethics cause people not to be supportive of environmental protection. The converse is that changing these beliefs in environmental values and ethics to the correct set of beliefs will lead to increased support for environmental protection, increased voluntary and legislated environmental protection behaviors and laws, and an improved environment. It is beyond this study to test this hypothesis, but operationalizing the problem, and developing the instruments useful for gathering evidence to test this hypothesis is one purpose of the overall project. The development of a system of identifying various types of beliefs in environmental values and ethics, an objective categorical scheme and nomenclature, and beliefs in support for different types of actions to protect the environment has helped this researcher, and may help others, better understand the relationship of various environmental values and ethics, and promote future empirical investigation of these relationships. This conceptualization of

the research problem warranted further exploration and documentation of the research in environmental education concerning beliefs in values and environmental ethics.

Chapter One briefly addressed the research conducted in environmental education to identify and summarize research in the field. This included Iozzi's (1984) work to identify affect studies published between 1971 and 1982, Marcinkowski and Mroczek's (1996) effort to identify 185 studies conducted between 1980 and 1990 that addressed environmental knowledge, behavior, and values. Relatively few of these studies investigated the value that people place on the environment, or their moral and ethical beliefs, but focused on the impacts of educational programs on knowledge, attitudes, and behavior. Zimmerman (1996) reviewed a number of studies related to affect, knowledge and environmental education, but did not address beliefs in environmental values or ethics.

Hungerford and Volk's (1990) Environmental Responsible Behavior Model (ERB Model) showed that Environmental Sensitivity is a significant variable that is correlated with Responsible Environmental Behavior. In 1997, Volk and McBeth discussed these results, further clarifying them,

> Hungerford and Volk (1990) hypothesized that although the relationship among the categories of entry-level, ownership, and empowerment variables may be linear, *the variables within categories appear to operate in a synergistic rather than linear manner.* They also noted that *more research is needed to clarify the relationships between these variables and responsible environmental behavior* (Italics added) (p.7).

Environmental education as a field is rich in resources that seek to increase learner environmental sensitivity by using various experiential approaches to increasing

learner sense of wonder, or other, more emotional language to persuade learners to the value of various environmental entities. Educators who use these approaches appear to justify their use by arguing that sensitivity and concern is the most important affect to impact. Hungerford and Wilke (1980), Hungerford and Volk (1990), and Volk and McBeth's (1997) approaches to environmental education can be interpreted to mean that it is necessary to significantly increase environmental sensitivity and concern in order to increase environmental sensitivity sufficiently so learners are motivated to improve the environment. Sia, et al, (1986) found environmental sensitivity accounted for 45% of the variance in Responsible Environmental Behavior. Hungerford and Hines' Model of Responsible Environmental Behavior (1990) (REB) incorporates these and other factors. The variables used in Hungerford and Volk's research accounted for 48% of the variance of REB. They called for additional research to "... better understand the relationships between these variables and behavior" (1990).

Using an approach that emphasized consumption as anti-environmental, Gigliotti (1992) developed a "Willingness to give up Scale" which identified respondent's willingness to give up or reduce use of a variety of artifacts. Chou and Roth (1995) conducted a comparison of faculty at The Ohio State University and the National Taiwan University for their beliefs regarding the importance of what students should know about the environment. In their Q-sort study, respondents first identified the concepts they believed were important to teach in environmental studies. In the second phase of the study, they then sorted 42 environmentally-related concepts into seven "piles" of relative importance. Through a factor analysis (orthogonal, varimax rotation) they identified five constructs, with the most important the teaching of environmental ethics. For Ohio State

respondents, five of the 42 questions loaded onto environmental ethics, while seven of the 42 did so for the Taiwan University respondents. The ethics questions investigated general beliefs about human moral obligations towards the environment.

Environmental sensitivity includes the construct of the learners' desire to protect the environment - a construct which is closely related to learners' valuation of the environment. In the literature of environmental education, sociology, psychology and political science, a significant amount of research investigates beliefs in the need to protect the environment, but no research was found which systematically distinguishes learner or subject beliefs in intrinsic value from beliefs in extrinsic value, while distinguishing beliefs about the need to protect the environment for its own intrinsic value.

Affect

Chapter One observed that the degree of public and academic concern with the environment and environmental issues led social scientists in various fields to use a variety of approaches to study human affect toward the environment (Kempton, Boster, and Hartley, 1995). And, Chapter One suggested that human affect is an important component of environmental education. If affect is values, attitudes, and behavior (Babbie, 1995), then environmental education's essential purpose as stated by the field is to address affect (UNESCO/UNEP, 1978; Hungerford, 1980; Disinger, 1993). Studying how affect predicts or is correlated to behavior is important to the field in the effort to understand how humans behave towards the environment. Understanding changes in affect is one method used in formative or evaluative program evaluations in

environmental education (Volk and McBeth, 1997). And, affect is of considerable interest to academic researchers, demonstrated by Marcinkowski's 1997 evaluation of 185 studies in environmental education that included affect variables.

Affect in environmental education has a diversity of stated meanings. Volk and McBeth (1997) assessed thirty studies in environmental education that included affect variables. These diverse affect variables included: the priority of water topics in curriculum, degree of pro-environmental attitudes, self-identification as an outdoors person, varying degrees of concern over different environmental issues, attitudes toward technology as a solution to environmental issues, and materialistic-anti-materialistic orientations. Given Babbie's (1995) broad definition of affect as attitudes, beliefs, values and behavior, it is not surprising that environmental education also has a broad definition. Given the significant interest in affect and its relation to environmentally responsible behavior, and this study's concern with the relationship of affect and support for environmental policy, a careful examination of sensitivity is warranted.

Environmental sensitivity can be interpreted to have many different conceptual meanings that have import for what is of primary, or fundamental, importance to affect in learners in order to obtain changes in environmentally responsible behavior. Two different conceptual meanings that are incompatible can be distinguished. The first is the "sensitivity/environmental rightist" view. This view seeks to increase emotional attachment and concern, by increasing learner appreciation for posited rights of the environment to be protected, and increasing learner sense (generally through indoctrinative approaches) of learner direct moral duty to the environment to protect the environment. The second view, "sensitivity/environment necessary" view, seeks to

increase emotional attachment and concern for the environment by increasing learner appreciation for the aesthetic and use value of the environment and the necessity of protecting the environment in order maintain human well-being, and increasing (through learner understanding) learner sense of indirect moral duty to protect the environment.

Depending upon the degree of emphasis the educator places on sensitivity versus cognition, the sensitivity/interdependent view supports a diversity of approaches, which more or less emphasize sensitivity or cognition, but include both in some degree. All appear compatible with the environmental education profession's Materials Guidelines. Figure 3 shows a conceptual relationship of the views just described.

Sensitivity/Environment Necessary Emotion Primary View	Sensitivity/Environment Necessary Emotions Interdependent View
More direct emotional appeals/less cognitive/critical thinking	More cognitive/critical thinking/less direct emotional appeals/less

Figure 3: Conceptual relationship of environmental sensitivity views and educational implications

The sensitivity/environment necessary view may more strongly emphasize changing learner emotional affect through experiences of wonder and aesthetic appreciation, with less emphasis upon increasing cognitive knowledge of the value of the environment and understanding the socio-political environment. If so, it is a sensitivity/environment necessary/emotion primary view. The sensitivity/environment necessary view may emphasize changing knowledge and citizenship values (consideration of others, disposition to act in consideration of others and act in concert

with others using democratic processes) to change learner valuation of and emotional affect toward the environment. If so, it is a sensitivity/environment necessary/emotion interdependent view. The sensitivity/environment necessary/emotion interdependent view holds that sensitivity is intimately joined with experience and cognition. Learner appreciation and valuation of the environment is sought through direct experience with the environment and activities that increase awareness of the value of the environment for improving their well-being

Cognitive Emotions

Environmental education's interest in affect, including emotion, sensitivity, and values, particularly the interest in increasing the value that learners have for the environment and their willingness to protect it, has been conducted in the context of a broader academic environment that has had significant interest in human emotion and behavior. Given the complexity of affect, including the relationship of experiences, knowledge, emotion, values and behavior, this research project sought a psychological foundation and direction to provide guidance for the development of the constructs and variables used in this study of environmental values.

James (1907) proposed a theory of psychology that became known as a pragmatic view of psychology. This theory is the basis of work by Dewey (1916) and Scheffler (1991) who argued that direct experience with entities, when reflected upon by cognitive processes to reveal the importance of something to our well being, leads to increased emotional attachment, valuation of entities, and cognitive understanding. It is important to note that this direct experience, if it shows that an entity or phenomenon is harmful to

our well being, leads to negative affect toward and lower valuation of the entity as part of cognitive and affective reaction. Thus, not all increased knowledge is claimed to lead to increased valuation and positive affect, but only knowledge that shows that something has positive utility. This view, or rather, a philosophy of psychology, provides an explanatory account of the relationship between direct experience, cognition, emotion, and dispositions to act. These relationships are helpful to developing a theoretical basis for linking direct experience with the environment, to cognition of the value of the environment, and dispositions to protect the environment. The pragmatic view of these relationships includes consideration of the link between aesthetics, cognition, and emotion.

The pragmatists offer a plausible account of aesthetic appreciation as a complex experiential and cognitive event. With direct experience comes appreciation for the direct experience itself, realized through our cognitive capacity to observe that we appreciate the direct experience. Why we appreciate the direct experience with nature is an interesting and challenging question, but not germane to this study. That direct experience with nature increases appreciation for and valuation of the environment is the important element to note, as is the explanation that we use our cognitive capacity to help develop this appreciation. This has implications for environmental education's effort to better understand affect.

Dewey holds that as we appreciate a direct experience, our sense of appreciation for the experience increases. In turn, we emotionally appreciate the entity and increase our attachment to the entity providing the experience, through a desire to protect the source of our enjoyment. However, as we develop, we are able to appreciate the

existence value of entities, and appreciate entities for their sheer existence (Dewey, 1916). This point is amplified by Rosen (1998), who will addressed below.

Dewey is noted for being a strong advocate of experiential education, for direct experience with the environment. If this experience is aesthetically pleasing, or contributes to achievement of aims or welfare, a person realizes this through cognitive judgments and has a positive affective response to the experience. If, however, the aesthetic experience, or consequences of the experience are unpleasant or it is judged that it is deleterious, then the affective reaction is negative. For aesthetics, it would appear that the aesthetically pleasing experience can directly lead to positive affective response, which is then recognized as such by cognitive judgments. These cognitive judgments cause positive affective responses, reinforcing the original positive affective response to the positive aesthetic experience. Alternatively, if no positive affective response is immediately and directly engendered from the aesthetic or direct experience with the environment, but the experience leads to some kind of utility for the person, then a cognitive judgment of the utility of the experience precedes and causes an affective response. In the case of showing people that direct experience with the environment has usefulness to our well being, as in the healthfulness of outdoors experiences, then the cognitive judgment that one will have directly develops positive affect towards the environment, an affect that may be recalled at will. Under this view, affect and cognition are intimately connected, with the development of a cognitive appreciation of the environment sometimes a necessary condition for obtaining a positive affective response, sometimes a complementary and reinforcing condition. Hence, the importance Dewey attaches to developing learner dispositions to reflect on their experiences, and to

investigate whether or not what they encounter, or may encounter, may have utility to their or others welfare, and to not dismiss their experience, and the environment, as useless to their welfare.

Dewey noted that appreciation of the use value, writ large, can lead to appreciation of the existence value to humans, and provide pleasure from knowing that a thing exists. He further suggests that it is a short step to appreciation of existence of a thing, in and of itself, as a part of the environment. In a larger sense, one that environmental education seeks to develop, it is important to develop learner understanding of how ecological value is relevant to human interests, including social, political and economic systems, and how this directly affects our individual and collective welfare.

Rosen (1998) stated that valuation of a thing in the environment increases as the recognition of the use value of the thing in the environment increases, which in turn increases as our knowledge of the utility of a thing to help us achieve our aims increases. While the point is sometimes contested, this body of research holds that the use value can be assigned to a thing without positing that the thing has intrinsic value. However, once a person understands the use value of a thing, Scheffler (1991) and Dewey (1916) proposed that positive emotional affect towards that thing increases. By this approach, increasing knowledge of the value of an environmental entity leads to increases in emotional affect toward that entity and desire to protect the entity. This increase in affect can be measured as an increase in valuation or an increase in concern for the entity, or an increase in willingness to protect the entity, using any number of methods identified by Babbie (1995) and used in environmental education (Volk & McBeth, 1997). The

approach of increasing emotional and attitudinal affect by increasing knowledge is an indirect approach to increasing affect, because it does not directly seek to increase affect by directly appealing to emotions and avoiding engagement of the cognitive processes, even though it relies upon direct experience at its root.

Environmental Values and Ethics

As noted above, Dunlap and Van Liere's (1978) work to develop measures of changes in environmental worldviews contributed to research and public knowledge of environmental paradigms, but was not work that clearly measured environmental values or ethics. In the field of environmental education, significant work was conducted on values by Stapp (1979). His work sought to assist learners and educators in understanding their values. Knapp's (1999) work on environmental values and ethics has been noted previously, but is worth revisiting, given that it is substantial body of work that carefully addresses these subjects, and seeks to increase learner capacity for moral reasoning, understanding of diverse environmental values.

Negra and Manning (1997) developed a sophisticated instrument to define a range of environmental behavior, values and ethics of park visitors in Vermont, to analyze how these visitor characteristics affected park programming. Their analysis of environmental literature identified seventeen environmental ethics, which they grouped into five categories: Stewardship, Utilitarian/conservations, Benign indifference, Radical environmentalism, and Anti-environment; and then developed a questionnaire to measure fourteen of these, using three general concepts. They found three subgroups: spiritually based stewardship, religiously based anthropocentrism, and secular ethical extensionism.

These categories provide comprehensive assessments of complex ethical worldviews, particularly the religious and spiritual aspects.

They adapted prior survey instruments that measured environmental ethics and values (Valliere, 1994; Valliere and Manning, 1995), to measure variables from the model of Responsible Environmental Behavior (Hungerford and Volk, 1990), for the measurement seventeen beliefs about environmental values and ethics. In addition, from the environmental ethical literature, they identified fourteen types of environmental values, and measured the importance of each. They found " . . . little variability among responses to environmental behavior questions" but noted that this measure may have been insensitive. They reported finding four subgroups: a spiritually based stewardship subgroup held 42% of respondents, as they ". . . expressed strong agreement with secular and spiritually based beliefs regarding the need to protect nature", and had slightly higher skill in using action strategies. The religiously based anthropocentrists subgroup comprised 25% of the respondents, with 16% in the secular ethical extensionism subgroup, supporting rights for nature, recognizing nature as a source of raw materials as well as limits to those resources. The spiritually based biocentrism subgroup also comprised 16% of respondents, rejecting anthropocentric perspectives, and more strongly supporting beliefs in spiritual and secular conservation and biocentrism, and moral obligations to nature than other subgroups.

Environmental Ethics

As noted in prior chapters, there are many approaches to the study of environmental ethics. Rosen (1995), among many philosophers, study values though

identifying the components of proposed normative ethical theories (NETS). Such scholars studied human beliefs about environmental values by applying analytical techniques used for studying normative ethical theories to environmental issues. Their analyses of ethicists and environmental ethicists, following general tenants of philosophical analysis, sought to characterize differences in the ethicists by identifying relevant distinguishing characteristics in the posited ethical arguments and assertions. Since the discipline of philosophy has a convention of categorizing and analyzing ethicists into moral theories by distinguishing the theory of value and the theory of obligation, and by identifying how the theory of value relates to the theory of obligation, Rosen (1995) identifies these features of environmental ethicists. The philosophical technique of distinguishing a theory of value from a theory of obligation is used in the research, as was the technique of distinguishing use value from intrinsic value was used in the study (after refinement) in order to more validly account for these variables when correlating the relationship of value to the variables used to measure knowledge.

Sociology and Educational Psychology

Babbie's (1995) work in the social sciences was used to inform the development of the instrument, from his use of philosophy to develop conceptual variables, to operationalization and testing of the variables, and documentation of the results. The previously noted findings of Bem (1964) and Rokeach (1973) that people have multiple and competing values carries with it the understanding that single values are not reliable predictors of behavior. These findings were used to open this study to works that showed that there may be multiple and competing values at play in environmental values and

ethics, and to develop the theoretical approach that was used to identify the concepts and variables in this study. For example, their findings that people have multiple and competing values led to the development of the notion used in this study that people might be willing to protect the same things in the environment for different reasons (i.e., different values, such as interests in protecting water quality to ensure long term resource availability, and different interests such as beliefs that water was intrinsically valuable and had interests or rights in not being polluted), or different things in the environment for the same reasons (i.e., that all sentient creatures, which are now understood to include many types of animals, have special value and deserve not to be unnecessarily caused suffering). Given the substantial methodological challenges of predicting behavior from studies of values, a number of studies seek to correlate various types of values to behavior (or proxy measures, such as intentions to behavior in environmentally friendly manners) and caution against interpreting such correlations as causal.

Measurement of affect has been done using many methods. One approach, of identifying bipolar continuums to describe values, and developing items that can be used to map beliefs onto continuums and categories within the continuums, was conducted by Van Tilburg and Heimlich (1987) and Heimlich (1990). Van Tilburg and Heimlich developed categories to denote the bipolar 'ends' for their particular research purpose - identifying and categorizing teacher's beliefs about teaching styles along multi-dimensional bipolar continuums, as a tool for improving educator-teaching style. The approach of using multi-dimensional bipolar continuums and categories to assess and conceptualize complex values is used in this study.

The fields of psychology and sociology have also conducted research to measure ethical beliefs and their relationship to environmental behavior. As noted in Chapter One, Forsyth (1980) posited that there are two dimensions of "ethical ideology": relativism and idealism, and that four ethical positions: situationists (high relativism, high idealism), who believe that no universal moral principles exist, and that considered individual acts lead to positive consequences; absolutists (low relativism, high idealism), who believe in universal moral principles and that using them increases individual and general well-being; subjectivists (high relativism, low idealism) who neither believe in universal moral principles, nor that considered individual acts bring positive consequences; and exceptionists (low relativism, low idealism) who believe that there are universal principles. Forsyth's (1980) Ethical Position Questionnaire (EPQ) is a psychometric instrument that uses twenty Likert-type questions to measure these concepts.

A series of interrelated studies from psychology investigated ethical ideology and moral beliefs regarding the treatment of animals, finding a number of strong moral beliefs concerning their treatment, yet calling for additional research of moral views, and of the underlying assumptions of researchers and activists.

Galvin and Herzog (1992) developed the Animal Attributions Scale (AAS), "To assess beliefs about the mental capacities of nonhuman species. . . " (p. 240). They administered the questionnaire to 57 males and 112 females in social psychology classes at the University of Tennessee, in 1990. The questionnaire included 198 items. Table 3 shows the eleven questions concerning attributions they asked regarding eighteen species.

Item
Typically, how capable of experiencing pain are each of the following animals?
Typically, how intelligent do you think each of the following animals are?
Typically, how attractive do you find each of the following animals?
To what degree are the following animals typically capable of "consciousness"?
How much do you like each of the following animals?
To what extent do animals feel the types of emotion that humans experience such as joy, anger, and sadness?
Typically, how affectionate are each of the following animals toward humans?
Morally, how much consideration do each of the following species deserve in weighing their concerns against those of humans?
To what degree do the following animals have the capacity to reason?
To what degree do the following animals have the capacity to suffer?
To what degree are each of the following animals self-aware?

Table 3: Eleven items in Herzog and Galvin's Animal Attribution Scale

Table 4 shows the eighteen types of animals that Galvin and Herzog investigated, and the four categories into which they were classified.

Category	**Animal Investigated**
Invertebrates	worms
	spiders
	ants
Non-mammalian species	goldfish
	frogs
	snakes
	turtles
	pigeons
Mammals	mice
	rats
	bats
	pigs
	chimpanzees
	dolphins
	cats
	dogs
Mammals - ontogenetic comparison	kittens
	puppies

Table 4: Animals Investigated in Herzog and Galvin's AAS

For each of the eleven attributions, and each of the species, respondents were asked to identify which of five variations on the following statement best reflected their thinking: "To what degree are the following animals typically capable of 'consciousness': 1. no consciousness; 2. little consciousness; 3. moderate consciousness; 4. high degree of consciousness; 5. humanlike consciousness". They reported dramatic differences in perceptions towards species but did not report the mean scores for each species. However, the scores shown in a bar chart appeared to range from a high of approximately eighteen for chimpanzees, to seven for worms, on the cognition factor. The affect factor scores ranged from about seventeen for dogs and puppies to seven for worms. The sentience scores were nominally lower, at seventeen for dolphins and seven for worms. Their factor analysis (principal components) reported three dimensions. In descending order of their item loadings, they were: cognition (items 9, 11, 4, 5, 2); affect (items 5, 3, 7); and sentience (items 10, 1, 8). They noted, "Of particular interest is the fact that pain and suffering formed a common factor along with moral consideration . . . (and) seems to provide a psychological analog to Singer's (1975) contention that moral status ultimately rests on the capacity for sentience" (p. 247). They compared subject scores on the three factors to their scores on the overall AAS, and reported significant correlations between scores on the AAS and the affect factor ($r = .39$) and the sentience factor ($r = .327$), but not for the cognition factor ($r = 0.15$). Their multiple regression for the three factors, plus gender (due to reports in the literature that gender is related to attitudes towards treatment of animals (Herzog, Betchart, & Pittman, 1991; Driscoll, 1992; Gallup & Beckstead, 1988; Kellert & Berry, 1987)) accounted for 30% of the variance ($r = 0.55$). Table 5 shows the results, from Galvin and Herzog (p. 247, 1992).

Variable	Standardized Regression Weight	Significance
Affective factor	.305	.0001
Gender	.277	.0001
Sentience factor	.270	.0001
Cognitive factor	.110	.0980

Table 5: Standardized regression weights for prediction of attitudes towards animal welfare

They correlated the scores for each species on the three factors as: affect and cognition factors (r = 0.97), sentience and cognition factors (r = 0.99), and sentience and affect factors (r = 0.98).

Galvin and Herzog (1992) explored the ethical beliefs of attendees at an animal rights rally in Washington, D.C., using the a modified EPQ to "investigate the relationship between individual differences in moral philosophy, involvement in the animal rights movement, and attitudes toward the treatment of animals." Using the modified EPQ, they found that 76% of animal rights activists at a national rally were absolutist in orientation, 18% were situationists, 7% were exceptionists, and 0% were subjectivists. A comparison student group had higher proportions of situationists (30% vs. 18%), was higher in subjectivists (18% vs. 0%), higher in situationists (29% vs. 7%), and was much lower in absolutism (25% vs. 76%). They found gender and idealism to be the significant predictor variables. They noted that Forsyth's (1987) investigation of the relationship of the EPQ and Gilligan's (1982) model of women and caring found that idealism was much more strongly related to the ethic of caring than relativism, and that absolutists had the highest caring scores.

They asked, " . . . is it possible that some moral orientations essentially inoculate the holder against becoming involved in social movements?" They also noted Forsyth's (1982) work which found that activists, who tend to stronger beliefs in absolutism, are less willing to compromise their positions than those who believe in relativism, calling for more research to explore the different beliefs of researchers and activists, who they predict would have different orientations from each other, leading to difficulty in " . . . reaching common grounds for discussion." Table 6 shows selected theories of human - attitudes towards animals, drawing from selected contemporary scholars in ethology and sociology.

Author	Date	Theory	Conceptual variables	Specific Variables/Items/Comments
Angyal, A.	1941	science of personality	-autonomy motivation -homony motivation	Behavior f(x) of two motivational tendencies: - autonomy, (instrumental motive to control the environment to meet needs) - homony (or empathy or identification) (integration with others and the environment)
Smith, M.B., Bruner, J.S. & White, R.	1956	opinions and personality	- evaluative vs. expressive attitudes	- evaluative – instrumental significance of attitude object is f(x) of potential for satisfying personal goals/needs - expressive – attitude object represents an underlying concern, satisfaction comes from satisfaction that underlying concern (value expressive attitudes reflect central values/deeply held beliefs)
Arluke, A.B	1988		- identification vs. objectification of animals	- instrumental demands cause animal objectification of animals
Hills, A.M.	1991	motivational bases of attitudes towards animals	- animal instrumentality to humans - empathy / identification -value expressive	- experiences with animals: treatment (tolerates rats & mice in house, etc. to meat eater, would kill animal for food, has killed rats & mice); attitudes towards animals are a f(x) of one or more of 3 motivational bases posited by Angyal - measured as not felt to intensely felt Wild ducks on lake, sheep on truck, feral donkeys, battery hens, poachers kill rhino, killing rats and mice - evaluative and expressive. Posits two conflicting value perspectives: dominance v equality.
Herzog, H. A. & Galvin, S. L.	1991	animal attitude scale	- moral attitudes towards animal treatment	
Herzog, H. A. & Galvin, S. L.	1992	animal attribute scale	- beliefs about animal mind - beliefs about animal treatment	- beliefs about emotional capacity - beliefs about cognitive capacity - emotional affect toward animals - gender - beliefs about moral considerability of animals - beliefs about animal treatment a function of beliefs about animal mind and gender
Galvin, S. L. & Herzog, H. A.	1992	qualitative inquiry for factors influencing approval of use of animals in hypothetical situation	- explore beliefs about ethicality of animal experimentation, animal capacities for suffering, human needs, and how upsetting the procedures	- Ethical Position Questionnaire - 5 animals in five proposed experiments (mice, rats, monkeys, dogs, bears) - Decide if ok to perform research, asked about - ethicality of research - degree of animal suffering - necessity of experiment for knowledge - likelihood of benefits - moral acceptability of procedures - likelihood of discovering important knowledge - sufficient precautions to prevent suffering - applicability to human welfare - how upsetting procedures are

Table 6: Selected research on human attitudes towards animals

In 1992, Galvin & Herzog conducted an extensive exploration of personality factors and moral attitudes towards the use of animals in research with 160 undergraduate psychology students at the Western Carolina University. They administered a four part battery of instruments that included the Ethical Position Questionnaire; a series of questions concerning a hypothetical set of animal research experiments; and a nine - question scale. In the hypothetical exercise, subjects were asked to imagine that they were members of a university IACUC and to decide if the proposed experiments should be permitted. They were also asked to evaluate the merit of the proposals on nine dimensions, using a nine-point rating scale, and then to answer a series of open ended questions concerning the basis for their decisions. Table 7 shows the five types of animals and the procedures used in the hypothetical example.

Animals	**Proposed Experiments**
Mice	explore development of motor patterns (grooming behavior) by amputating forelimbs of newborns and observing development
Rats	explore learning patterns using food deprivation and reward
Monkeys	explore cure for Alzheimer's by implanting tissue from monkey fetuses into brains of adult rhesus monkeys
Dogs	teach surgical techniques to veterinary students using dogs awaiting euthanasia at animal shelter
Bears	study social and territorial behavior patterns of bears by attaching radio collars to them after anesthetizing

Table 7: Animals and medical research procedures used in hypothetical case by Galvin & Herzog

Table 8 shows the nine dimensions that were used to explore ethical beliefs towards animals, and a tenth type of questions asked by Galvin and Herzog (1992).

Dimension	Question (nine point scale)
1.	Beliefs about ethicality of animal experimentation (completely unethical to completely ethical)
2.	Degree of suffering that would be experienced by the animals in the study
3.	How necessary the experiment was to obtain the desired information
4.	Degree of potential benefits of the study
5.	Moral acceptability of the procedures
6.	Likelihood the experiment would result in important knowledge
7.	Whether sufficient precautions would be taken to ensure the well-being of the animals
8.	The applicability of the research to human problems
9.	How upsetting the participant found the procedures
Independent	"Do you believe that your moral decisions are based more on your emotions and feelings or more on your thinking and reasoning about right and wrong?" (5 point scale)

Table 8: Nine dimensions of ethical beliefs explored by Galvin and Herzog

They reported that, " . . . one of the most frequently mentioned species characteristic that entered into the oral calculus was the degree to which the participants felt that the species could experience pain. Many subjects seemed to assume that animals suffer in ways similar to humans" (p. 279).

Philosophy

Environmental ethics is a branch of philosophy, which has several methods of inquiry to difficult questions.[1] Merriam and Simpson (1984) state that philosophical inquiry is,

> . . . concerned with the foundations of a discipline or field of practice. . . . Philosophical inquiry examines the underlying opinion, beliefs, values and assumptions to bring clarity to a field of practice . . . . (It) is as systematic and rigorous as any other form of inquiry (in McKeon (1965)).

> Merriam and Simpson (1984) state that there are three fundamental methods of inquiry in philosophy: the Dialectic, Logistic, and Problematic. The problematic method is ". . . aimed at solving particular problems one at a time and without reference to an all-inclusive whole or to a simplest part. A solution is regarded as acceptable just so long as it 'works'" (Johnstone, 1965, p.22, in Merriam and Simpson, p.80). The format for reporting findings is that they be "presented systematically in the form of an orderly, consistent development of the thinker's views" (Matzak, 1975, p.27 in Merriam and Simpson, p.80).

Merriam and Simpson suggested the two contemporary methods of inquiry are linguistic analysis and phenomenology, where linguistic analysis includes exhibition analysis that is the effort to exhibit the meaning of expressions used by a group. This dissertation study used conceptual analysis to exhibit the meaning of concepts used by the public, and replacement analysis (Karner, 1969, in Merriam and Simpson, p.84) to maintain what is useful in existing concepts while replacing what is problematic in the same concepts.

As noted before, this analysis drew upon William James' theory of psychology, John Dewey's pragmatic philosophy of education, ethics, knowledge and psychology, which provided foundational approaches to framing and identifying the problem statement and research questions. Instrumentation and data analysis were developed and conducted in congruence with these fundamental philosophical approaches as much as was feasible. Building on Dewey, Scheffler (1991) theorized about cognition and affect, asserting that as learners have direct experience with things of utility to them, they increase their affect towards those things.

The general ideas in these philosophical theories have been corroborated by body of research in psychology, including Bandura's theory of self-efficacy, which provided empirical evidence for these assertions. He showed that as learner knowledge of the usefulness of a thing increased, and knowledge of actions a person could take to protect that thing increased, and experience in taking effective actions increased, belief that actions to protect the thing would be effective increased, as did intentions to protect the thing (1993). These philosophical approaches were applied by Hungerford, Volk, Roth, Disinger, and many others in environmental education through their articulation and development of learner centered, action oriented environmental education that sought to build the knowledge and skills of learners. The field of environmental education's rich tradition of promoting the development of tools to increase the cognitive capacities of learners and educators, and of concern with environmental values led to the research objective of developing a heuristic for considering environmental values and ethics. It is described in Chapter Three.

CHAPTER 3

HEURISTIC FOR CONSIDERING DIVERSITY OF ENVIRONMENTAL VALUES AND ETHICS

A systematic method for evaluating environmental values and ethics was sought, one that could provide a standardized approach to evaluating complex ethical writings and concepts that are encountered while considering literature or beliefs. The techniques used in ethics to consider normative ethical theories were adapted into a four-step method that guided this research project. Chapter One describes how the Continuum of Environmental Entities was developed, while Chapter Four describes how the additional eight continua were created. Chapter Four focuses on the use of the Heuristic.

The Continuum of Environmental Entities was developed to ensure that the type of entity being considered was made clear. In sum, the heuristic provides a series of questions that ask: 1) what entity or entities are being considered?; 2A) what use value does the entity have?; 2B) what intrinsic value does the entity have?; 3A) what entities do humans have indirect moral obligations to protect?; 3B) what entities do humans have direct moral obligations to protect, (asked in terms of the acceptability of four treatments (actions) towards an entity)? 3C) which of the twelve posited environmental ethics are most preferred?; and, 4) what entities in the environment should be legally protected?

For each of these questions, a continuum of potential answers is offered, to aid in the systematic consideration and comparison of response. The point of the heuristic is not to judge the justifiability or moral acceptability of the responses from the researchers perspective, but to help elucidate and clarify existing beliefs, for self-reflection, clearer communication, and as a foundation for developing empirical methods for assessing the prevalence and relationship of these values and ethics.

The heuristic is presented as four steps, but the reflection it engenders usually requires multiple iterations of various steps in order to arrive at well considered conclusions. This is considered a virtue of the heuristic, in that ethics, like much of philosophy, requires reflective consideration of various parts of a problem, and the use of judgments made about one part of a problem to help inform the analysis of a separate but related aspect of a larger problem. Again, it is not the purpose of this heuristic or project to evaluate whether or not the beliefs of those using the heuristic are scientifically supported, or meet the beliefs of the researcher, so responses that indicate that some parts of the environment are not believed to be useful, or should not be given direct moral consideration or protected, are regarded as helpful, in that the provide useful information about the beliefs of the respondents. The provision of a heuristic to aid in the critical thinking skills of those who are considering environmental values is seen as valuable enterprise.

Step one is to identify what things in the environment are being considered, and what kinds of capacities the environmental entity has. This is done in two sequential parts: the first is to carefully consider exactly what things in the environment are being considered; the second part is to consider which of these things can feel pain similar to

humans (if so, it is considered *sentient*), if it can experience mental or emotional suffering similar to humans it is *conative*, and if it is regarded as alive but neither conative nor sentient, it is simply alive, and if it is a material type of entity, be it air, or water, that is not considered to be sentient or conative, it is a material entity. Likewise, if an entity is not conative, sentient, alive, or material, but is an phenomena such as beauty, or wildness, then it is in that category. The point of the heuristic is not to impose this categorical schemata upon others, but to provide a method for the clarifying of beliefs. Therefore, what entities that are assigned to these categories should be clearly defined by the researcher, educator or learner. Subsequent steps in the heuristic will provide opportunity to clearly define what types of entities are believed to have which type of characteristic. For example, if environmental phenomenon such as beauty is considered sentient, then it should be categorized as a sentient entity Figure 4 shows the Continuum of Environmental Capacities.

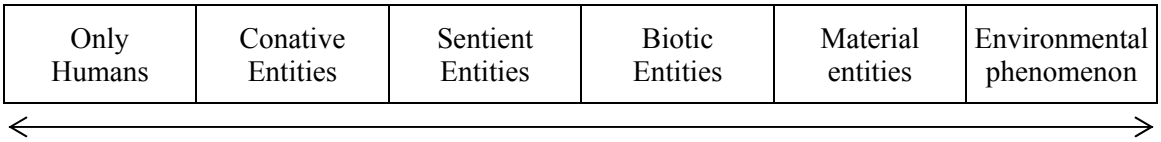

Figure 4: Continuum of Environmental Capacities

Step Two is the consideration of the environment's value. Two parts are considered. Step Two A considers what things in the environment have use value to humans, as these are the most easily recognizable and noncontroversial values. Again, the Continuum of Environmental Entities was more functional when used as a framework

to systematically ask the questions of what things in the environment have use value to humans, moving from one end of the continuum to the other. If respondents wish to disaggregate the categories so they are more finely resolved or they wish to make other distinctions, this is entirely acceptable, and occurred in the course of the research. The goal is to facilitate the critical inquiry into personal beliefs.

Step Two B is to consider what things in the environment have intrinsic value, or are believed to be of value in and of themselves. Things or phenomena may have both use value and intrinsic value, so it is important to allow for something to have both types of value. This may be the most challenging part of the heuristic. The capacity of people to recognize and attach high use value of things appears to be well developed, while the capability of people to distinguish those things that are of intrinsic value appears less well developed, leading to conflation of the two. In the course of using the heuristic in the research, once the researcher was satisfied that he had identified that a thing had either intrinsic value or use value, or both, then the step was completed unless the question arose again. A range of questions were developed for use in the instrumentation phase that can be used in the heuristic to help respondents to consider systematically whether or not each type of environmental entity has intrinsic value. These questions take several forms. Some help respondents determine beliefs about intrinsic value of things in the environment by asking what types of actions are morally permitted to do to those things, or about important characteristics of entities that are often associated with beliefs in intrinsic value, such as if it is believed that an entity has a soul or spirit, has rights, or if it is morally permitted or forbidden for human's to use an entity in a zoo, for medical research, or as food. Different answers to these questions are given by people when they

considered them, and enabled them to systematically identify where the particular environmental entity should be placed on the continuum, after some consideration.

Step Three addresses beliefs in the need to protect the environment. It includes three parts: Step Three A concerns beliefs about whether or not an entity should be protected for any reason; Step Three B concerns beliefs about whether or not humans have direct moral obligations to protect the entity from suffering. Step Three C involves consideration of whether or not the person believes that laws should exist, and if laws need to be increased, to protect each type of environmental entity. This places the consideration of environmental policy support as a distinct notion, separate from the other questions of value. Questions have been developed to help respondents evaluate the range of things in the environment for these three types of beliefs.

Step Four is to consider which environmental ethic the respondent most prefers. The answers from the first steps are used to help guide this consideration. Steps One and Two facilitate the user in determining which category on the "upper part" of the Continuum of Environmental Ethics they most prefer. Their determination of what types of things in the environment have intrinsic value and deserve direct moral obligations to be protected identifies the upper category. The identification of how much of the environment needs to be protected, for any reason, can be used to help them determine if it is important to protect the overall environment. If they determine that it is important to protect the overall environment, then they move from the upper category of the continuum to the category that is below it, the category that adds the term "ecological" before their ethic, in recognition of their belief that it is important to protect the overall environment. These steps in considering their values and obligations helped them find a

category that they believe makes sense for them. However, the complexity of values and the environment led respondents to also respond favorably to multiple environmental ethics that were close to each other on the Continuum. Given the intricacy of values, it was recognized that the categories of environmental ethics were developed to be logically distinct and mutually exclusive – but that the lack of empirical knowledge of the capacities of environmental entities, and the competing values are brought into play in determining whether or not to support legal the protection of those entities, resulted in the appreciation that respondents may support multiple, similar ethics when considering the actual environment and socio-political considerations. Nonetheless, the Continuum of Environmental Ethics provides a systematic and usable graphical tool to clarify environmental ethics and find the one ethic, or set of ethics, that best fits the person. The definitions for each ethics were provided at the end of Chapter One, while the continuum is shown below in Figure 5. The items in the Scale of Belief in Environmental Ethics (Table 26) can be used to identify which ethic, or ethics, a person most favors, using a cumulative score for the two items for each ethic, or a mean score, or by having them identify which one item best describes their beliefs.

Anthro-pocentrism	Conativism	Sentientism	Biocentrism	Ecocentrism	Phenomenal Ecocentrism
Ecological Anthro-pocentrism	Ecological Conativism	Ecological Sentientism	Ecological Biocentrism	Ecological Ecocentrism	Ecological Phenomenalism

Figure 5: Continuum of Environmental Ethics

CHAPTER 4

METHODS

Chapter One introduced the background to the research problem, the purpose of the study, and the general approach the study would take. Chapter Two documented significant environmental ethical ideas in the environmental education and ethics literature, noting the growing attention to environmental ethics, the increasing speculation concerning the relationship of environmental ethical beliefs and willingness to support environmental protection, and research in the field of environmental education. The literature review concluded that the complexity of environmental ethics, the diversity of human beliefs, and the difficulty in assessing the relationship of ethical beliefs to willingness to support environmental protection showed the need for an instrument that could more deeply measure environmental ethics, to aid in the investigation of relationships between environmental ethics and support for environmental protection. Chapter Three documented the heuristic for considering environmental values and ethics. This Chapter documents the methods used to operationalize the variables and develop the items in the final instrument, including the methods used for data collection, analysis, and interpretation.

Methods from Environmental Ethics

As has been shown, the philosophical technique of developing working definitions of terms, including ethical systems, that are helpful to engaging the problem at hand (challenges in understanding and measuring environmental values and ethics) was utilized. This research drew upon the extensive methods and terminology used in ethics to develop terms and tools to identify and maintain the conceptual distinctiveness of important terms and concepts useful for the field of environmental education as it engages environmental values and ethics. How the conceptual distinctions were applied to the project of measuring held beliefs of environmental values and ethics is described below.

Distinguishing Theories of Value and Obligation to Identify Nine Conceptual Level Variables of the Study

The development and operationalization of the conceptual level variables built upon the existing literature in environmental ethics and values. Previous chapters showed how these works were used to develop the six morally salient categories within the Continuum of Environmental Entities, and the eight other continua that were helpful in distinguishing unique aspects of environmental values and ethics. As noted, these continua were created as part of the project to develop methods to support the systematic comparison of diverse beliefs about the value and moral considerability of the extremely diverse entities and groupings of entities that occur when referring to the environment. These methods provided tools to help interpret the rich literature in environmental ethics that discussed various belief systems and concepts in ethics. While this literature has

occasionally contained concise statements of ethical beliefs, it has usually been written in the form of long arguments that extend for hundreds of pages. While summary statements of significant points in arguments may be provided, and become quite well known (such as Bentham's argument that if a being can suffer, we ought not cause it suffering) these statements have rarely provided succinct summaries of a theory of value, a theory of obligation, and the relationship of the two. Therefore, in order to concisely identify and compare these features it is usually necessary to reconstruct the philosophical arguments. It should be noted that such reconstructions can focus on identifying any number of elements of the theory of value, obligation, the linkages, or the justifications for the theories, so there is no one standard method of reconstructing arguments. The nine continua, while helpful for identifying questions to pursue in interpreting ethical writings, or for evaluating beliefs, did not provide immediate guidance for how to operationalize an instrument to measure environmental values and ethics. Several additional conceptual steps were required to develop conceptual level variables, and further operationalize these into an instrument. These are described below.

Each of the continua were considered in light of their utility as a conceptual level variable. As noted earlier, a Deweyan approach to value was drawn upon for this study, one that led this study sought to develop a survey instrument that would investigate beliefs about the way the world appears to respondents, in terms of the capacities of various parts of the environment to be sentient or conative (as the potentially morally relevant capacities), how much intrinsic and use value they attach to it, and their willingness to support actions to protect the environment. Morality and ethics concerning the environment, by applying Dewey's philosophy of ethics, would also have included

the complex of beliefs about the state of world (i.e., the capacities of the environment)and willingness to act to protect the environment. It was judged that this tripartite approach might provide a rich assessment of knowledge and belief systems that are used to form value and moral judgments that taken altogether comprise an environmental ethic. The inclusion of beliefs concerning the willingness to protect the environment provides perspective for evaluating moral beliefs about values and obligations concerning the environment in the context of willingness to act on these beliefs.

With this philosophical approach to ethics in mind, the techniques of pragmatically-oriented ethicists such as Rosen, who employ traditional methods of ethical analysis, were employed. Chapter One showed the development of the Continuum of Environmental Entities, which identified the criterion that were used to identify six morally relevant types, or categories, of entities. The heuristic for considering environmental values and ethics suggested that a person consider what entities were in each category on the Continuum of Environmental Entities. This suggestion arose from the method of seeking to be as specific as possible when considering environmental values and ethics. This approach to reducing potential ambiguity about the kinds of things being considered (e.g., non-human primates, dolphins, dogs, worms, waterfalls, etc.) improves the ability to clearly identify the moral considerations, values and ethics that a person assigns to an entity. Thus, the exploration of beliefs about the capacities of the environment was considered the first conceptual level variable. We now turn to how this technique for clarifying the type of entity that is being addressed, and its application as a conceptual level variable, was integrated with additional analytical methods from ethics to develop additional variables.

Chapter One also introduced the method of treating complex ethical belief systems as normative ethical theories (NET), and that complete NETs contain a theory of value, a theory of obligation, and the relationship of the two (Rosen, 1993). A complete theory of value provides guidance to determine what is of intrinsic or use value, at minimum. A complete theory of obligation provides guidance to determine what beliefs or actions are morally permissible, impermissible, obligated and forbidden under the NET. Usually, the theory of value that an author sets forth is used by that author to determine the theory of obligation, and the linkage between to two may be set forth or implied. The two theories together provide a picture of what types of entities are due what types of moral considerations (Rosen, 1993). The NET, as the unique combination of the two theories, is a distinct theory. As noted before, there are few complete NETs, as many writers focus upon particular aspects of a theory of value or obligation.

The environmental values and ethics literature is particularly rich because of the attention devoted to developing justificatory arguments for a theory of value and/or obligation and/or the linkage of the two. It should also be noted that while a NET can sometimes be a relatively concisely stated series of assertions about what things are believed to be of value, what are our various obligations towards people or the environment, and how these two are related, the *justificatory arguments* for these conclusions are sometimes extremely difficult to concisely summarize, as these can be very complex and long arguments. Philosophical inquiry into *why* questions, such as *why* it is justified to have a belief in a particular theory of value, is extremely complex, and were not the purpose of this research. During the study, it was realized that the complexity of rationales, and the particular effort expended in pursuit of detailed

rationales in support of theories of intrinsic value, did not appear necessary to explore in order to provide a more in depth tool for exploring the relationship of beliefs about what entities had intrinsic value *for whatever reason*, beliefs about what entities had use value, *for any reason*, and what entities needed strong protection, *for whatever reason*. Thus, while it was considered a potentially interesting project to pursue, development of a conceptual level variable to explore various justifications was not pursued, in order to reduce the potential complexity of the instrument. This study limited its goals to the development of a survey instrument that could help assess in more depth (i.e., more than current research instruments, not more depth than philosophical inquiry) the complexity of beliefs that the public has about what things in the environment *are* of value, and beliefs about what *are* our moral obligations towards the environment. However, the empirical relationship of beliefs about the theories of value (including intrinsic value) and obligation (including willingness to protect) were explored, using the methods described later in the study. Thus, beliefs about the capacities of the environment, the theory of value, theory of obligation, and unique combination of the two for a unified NET were identified as the four very general, initial conceptual level variables, and the justificatory questions about why an entity has value, and the "rules" for the linkage between theory of value and obligation were left aside in this study.

As noted above, a complete theory of value contains subdivisions. While philosophers disagree about the exact number of general types of subvalues there are, four types are identified by Lemos (Cambridge, 1995): intrinsic value, inherent value, instrumental value, and contributory value. Intrinsic value is what is considered to be of value in and of itself, with beliefs about what is of intrinsic value varying widely. One

example of an intrinsic value is beauty. Inherent value is closely related to intrinsic value, in that the type of thing, or property, of beauty, is usually considered to require an object in which to inhere for it to be present. For example, while the question of whether or not beauty is in the eye of the beholder (actually, the brain), or in the object that is perceived, is long-standing, this debate suggests that beauty inheres with one or the other object or phenomena. This study sought to distinguish what is believed to be of use value from what is considered to be of value in and of itself, in order to help identify beliefs about the types of obligations humans have towards those entities. With this in mind it was observed that intrinsic value is more closely associated with beliefs in direct obligations to protect, while inherent value was closer to being *useful* for obtaining intrinsic value, an observation that led to inherent value being given short consideration in the instrumentation process, and where it was, it was associated with use value. An entity or phenomenon is considered to have use value when it is necessary for obtaining something of intrinsic value, while contributory value (Lemos (Cambridge, 1995)) is distinguished as contributing to something of use value, and not directly to something of intrinsic value. Contributory and use value both contain the notion that they are not intrinsic value, but contribute, either directly or indirectly to intrinsic value. Thus it was judged that they are sufficiently similar that consolidating them for this study could be justified both philosophically, and on the practical grounds that a survey of public beliefs did not need to, and may be in error to, distinguish between them. Therefore, of the four types of value identified by Lemos, two types emerged: intrinsic value, and the consolidated use value, which included contributory and inherent value. The two types of value had functioned well on the Continua of Beliefs in Intrinsic Value and Use Value,

so they were considered as two additional conceptual level variables that comprise the larger conceptual level variable of a theory of value, bringing the total number of conceptual level variables to four.

As observed above, a complete theory of obligation contains subdivisions. The most basic distinction is that of indirect versus direct obligations, which were explored earlier, and then of the notions of morally permitted, morally forbidden, and morally obligatory actions. In the literature review, the primary distinction, that of indirect versus direct obligations, appeared to be inconsistently maintained, leading the questionable conclusions that direct moral obligations were the only type of obligation that was sufficient to obtain support for environmental protection. The distinctions of permitted, forbidden, and obligatory were considered, for the purposes of this study, to be sublevels of direct and indirect obligations, which were explored in the operationalization of the conceptual level variables in both instruments. Thus, two additional conceptual level variables were derived, that of beliefs in what types of entities are due direct moral considerations, and beliefs in what types of entities are due indirect moral obligations. Again, these two conceptual level variables were considered to comprise the more general conceptual level variable of beliefs in what types of entities are due moral consideration. These three conceptual level variables, in addition to the four previously described, bring the total number to seven.

The Continuum of Environmental Ethics developed twelve ethics along two dimensions to describe a rich diversity of ethics that would be mutually exclusive, theoretically speaking. The Continuum was considered as the eighth conceptual level variable. The operationalization of this variable is described in detail in the next section.

The final conceptual level variable, willingness to legally protect, arose from the pragmatic interest in developing an instrument that measure beliefs about support for environmental policies. The approach of asking if laws should be passed to protect an entity arises from findings in the literature that willingness to protect varies with the costs associated with doing so (Kempton, Boster, and Hartley, 1995). Willingness to protect the environment is explored extensively through contingent valuation, with the understanding that tradeoffs need to be made between competing values and priorities, and testing strength of support vis a vis willingness to pay is considered by many to be an excellent measure of the "true" degree of support. Because this research has a *policy* orientation, in seeking to measure support for policies to protect the environment, the firm version of policy support was considered to be a good indicator of willingness to pass a law for protection. The nine continua for considering environmental values and ethics that were used as the basis for the nine conceptual level variables for the study are shown in Table 9, as are the variables.

Continuum	**Conceptual Level Variables**
Continuum of Environmental Capacities	Beliefs in capacity of entities in the environment
Continuum of Theory of Value	Beliefs in a theory of value
Continuum of Entities with Intrinsic Value	Beliefs regarding which entities have intrinsic value
Continuum of Entities with Use Value	Beliefs regarding which entities have use value
Continuum of Theory of Obligation	Beliefs in a theory of obligation
Continuum of Entities Deserving Direct Moral Obligations	Beliefs regarding which entities deserve direct moral obligations to protect
Continuum of Entities Deserving Indirect Moral Obligations	Beliefs regarding which entities deserve indirect moral obligations to protect
Continuum of Environmental Ethics	Beliefs in an environmental ethic
Continuum of Willingness to Protect	Willingness to protect

Table 9: Nine continua for considering environmental values and ethics, and nine corresponding conceptual level variables for measuring environmental values and ethics

Each of the nine concepts asks a different type of morally relevant question about an entity in the environment, such as: "Do primates have the capacity to suffer?", "Do primates have intrinsic value?", "Do primates have rights?", "Are primates useful to humans?", "Do humans have direct moral obligations to primates?", "Is it morally ok to keep primates in zoos, use them in medical research, eat them, or kill them for food?" (four separate questions in the questionnaire), "Do we need to protect primates for human well-being?", and "Should laws exist to protect primates from suffering?" These nine types of questions can be asked about any entity or groups of entities. The Continuum of Environmental Entities organizes the millions of species of life, and the myriad of inanimate entities and phenomenon, into six categories, depending upon the belief of the respondent for what type of capacity the entity has. The highest capacity that the entity is believed to have is where it is placed onto the continuum. Because a wide range of entities could be mapped onto the Continuum of Environmental Entities, it provided a useful framework for systematically asking all nine questions about one entity, then another, and comparing the answers.

The continua were used as aids in considering each conceptual level variable and how to operationalize them, to organize each scale so they were parallel and therefore facilitate cross comparison of beliefs between continua. Each scale uses the Continuum of Environmental Entities (see Figure 1, Chapter One) as its framework. That continuum ranges from only humans on one end, to the inclusion of everything in the environment, including aesthetic and other phenomenon, at the other end. Mapping the nine conceptual variables onto this same continua provides nine parallel continua. Conceptually, each continua asks logical questions about the moral beliefs towards

entities in the environment, and has an endpoint on one side, and infinity on the other. This, in combination with other techniques for scale and item development, was a necessary but not sufficient condition for the creation of a series of interval level scales that would support advanced statistical analysis of the relationship of complex beliefs. This feature was important to the development of the heuristic, and to the development of the scales, in that it aided the systematic consideration of abstract concepts, so like entities could be compared to like, and like moral judgments compared to like.

Methods from Educational Psychology

The field of educational psychology has developed methods for creating psychometrically based instruments to measure human beliefs. The use of these methods from social sciences to develop psychometric instruments that assess beliefs in moral notions has been conducted by many, including Forsyth (1980), Forsyth & Berger (1982), Forsyth, Nye & Kelly (1984), and Heimlich (1990). Babbie (1995), Miles and Huberman (1994), Rossi and Freeman (1993) and Bourque and Fielder (1995) provide comprehensive guides to developing self-administered surveys, instruments, and provide additional guidance for developing psychometric instruments. They will be used to develop procedures that will maximize the potential for instrument to be found valid and reliable.

The primary steps used to develop valid and reliable instruments include:

1) Identification of an appropriate research problem;

2) Careful identification of valid conceptual level variables to investigate;

3) Identification of the suitable types of scales to develop;

4) Careful operationalization of the variables, and levels of variables to be investigated;

5) Development of a battery of questions, including multiple items for each variable, for testing purposes;

6) Utilization of suitable survey sampling and administration procedures;

7) Identification of appropriate data analysis and item reduction procedures;

8) Use of expert panels and reviewers, and multiple methods for external and internal validity checks;

9) Multiple administration of items to subjects; and

10) Data analysis to identify invalid and unreliable items, and construct scales.

The procedures used in this research are documented throughout this work. Chapters One, Two, and the beginning of Three were the consequence of the effort to review diverse literatures, identify the research problem, develop of the conceptual level variables, and operationalize the questioning routes, and items.

Research Objectives

Chapter One identified the research objectives, which are provided here for reference. To develop a heuristic tool (an algorithm) for systematically disaggregating, and identifying pretheoretical beliefs environmental values and ethics. The heuristic tools should distinguish environmental values so they are mutually exclusive.

2. Develop a more objective, discriminating and inclusive set of environmental ethical categories.

3. Develop a valid, self-administrable survey instrument for educators and practitioners to use to self-identify their environmental ethic. The instrument should include approximately 25 or fewer items.

4. Develop a psychometric survey instrument to measure beliefs about environmental values and ethics. Five primary scales and seven subscales will be incorporated into the instrument. These should include scales to measure beliefs in:

4.1 Environmental capacities;

4.2 Value of the environment, including both intrinsic value and use value;

4.3 Treatment of the environment, incorporating beliefs concerning the direct moral considerability of the environment, the moral acceptability of various common uses of the environment, and the need to protect the environment to ensure human welfare;

4.4 Environmental ethics;

4.5 Willingness to protect the environment.

5. Correlate demographics to beliefs in environmental ethical categories.

The instrument should include approximately 40 to 50 items.

Research Design

As noted earlier, the methods from educational psychology that are used for psychometric instrument design provided the basis for this research design. Selected specific procedures used to develop and administer the survey instruments and analyze data are documented in Table 10. The steps using techniques from philosophy, ethics, and environmental ethics to identify conceptual level variables were documented in previous chapters.

Step Name	Description
1. Identify research problem	Identified through literature review, discussion with educators and researchers. Confirmed by expert panel
2. Explore conceptual level variables	Developed nine continua of beliefs in environmental values and ethics generated from identification of components of normative ethical theory
3. Conduct survey with open ended questions	1) Preliminary survey with 8 open-ended questions on moral beliefs concerning animals, values, and need for protection, plus 6 demographic questions. N = 74. Environmentalists (Sierra Club, natural resources employees), staff (custodial, housekeeping, dining hall employees); undergraduate students (general education courses)
4. Identify conceptual level variables	Identified nine conceptual level variables by identifying components of normative ethical theory important to study of environmental ethic
5. Operationalization of variables	Matrix of types of environmental entities studied or discussed, against nine conceptual level variables developed. Questioning routes and alternative wordings for items to explore different sublevels of the nine conceptual level variables developed.
Development of question bank	Items developed to populate each option in matrix, multiple items for selected, important cells, subject to peer review
6. Testing of question bank	
Conditions of study	
Administration	Researcher administered
Instrument	Written, self-administered paper survey, either take home or administered with researcher in room
Anonymity and Confidentiality	Survey contained no personally identifying information, respondents assured individual responses would not be revealed
Population	N = 191. Environmentalists (Sierra Club, natural resources employees); staff (custodial, housekeeping, dining hall employees); undergraduate students (general education courses)
Sampling method	Intentional diverse group sampling for maximum variation
7. Data Analysis	
Data cleaning	Standard battery of procedures to clean data,
Item reduction, scale creation, testing	Duplicate items tested for no significant difference in response (check for internal consistency) Scale analysis (Cronsbach alpha) to reduce items, balanced with maintaining variability and distribution of response Each scale tested for one factor through factor (validity check) Tests for significance difference between scales (validity check) Multiple regression modeling to test for ability to explain variance in dependent variable (willingness to protect), (internal consistency, interscale consistency, explanatory power, and validity check)
Post Dissertation	Instrument testing with random sample population Incorporate use of another instrument to test for comparability of response (validity check) Compare results to other surveys (validity check) Test scales for internal consistency, reliability across populations

Table 10: Research design

Exploratory Survey

The complexity of concepts in environmental ethics led expert reviewers to advise that the terminology and concepts used to discuss environmental ethical beliefs in environmental education and environmental ethics might not be familiar to potential respondents, which might lead to validity problems with an instrument that directly asked about complex beliefs. As previously noted, it was also observed that that the public tends to have pretheoretical beliefs, in that complex ideas have not been tested for consistency and reconciled into complex theories. In addition, it was noted that the researcher was not certain about what terms and held concepts respondents used when considering beliefs about environmental values and ethics. They suggested, as Babbie (1995) did, that an exploratory survey might be helpful as an initial stage in the development of an instrument, and that the questions in the survey be accessible. Therefore, an exploratory survey was conducted using a sophisticated questioning strategy that presented seemingly simple questions. A strategy of asking respondents a series of open-ended questions about their moral beliefs concerning the environment was used to identify the held concepts and terms respondents used when considering environmental values and ethics, to provide guidance for the development of items for testing in the survey instrument.

Given the complexity of the subject matter, the interest in brevity for the exploratory questionnaire, and the importance of moral beliefs concerning animals, the questions focused upon two types of entities: animals, and the environment in general. Babbie (1995) and Dillman (1978) suggest that questionnaires begin with easy questions, and be kept as brief as possible. The questions about animals were presented first,

because animals are a fairly specific type of entity in the environment to ask questions about, and respondents were thought to be able to identify their beliefs about what actions were right and wrong to do to them, providing an accessible beginning question. The heuristic for considering environmental values and ethics provided guidance for determining the types of questions to ask in the exploratory survey. In the heuristic, four primary types of questions are asked: beliefs concerning capacities, beliefs concerning values (i.e., intrinsic and use values), beliefs concerning the need to protect, (including obligations to protect), and choice among twelve types of ethics. The questionnaire was three pages (six total sides), including the eight open-ended questions that asked what types of actions are ok to do to animals, are wrong to do to animals, what new laws should be passed to protect them, or repealed, and why, and the demographic questions. The same questions were also asked for the environment in general.

The strategy of asking about what types of actions were ok to do to animals, and why, was chosen in order to help elicit answers that would specifically identify the kinds of actions that would be morally permitted or forbidden. This strategy was used with the expectation that the "why?" question would elicit the justificatory arguments and terms for the values that respondents held, and their relationship to beliefs about moral obligations. Questions concerning the laws were asked to focus upon what types of actions the respondent believed were important for the protection of animals and environment. To reduce the number of items in the survey, questions concerning beliefs about capacities were not asked. The survey was written and self-administered in the presence of the researcher. A copy of the survey, which includes the written instructions, is in Appendix A.

Validity Methods for Exploratory Survey

Babbie (1995) defined validity as the " . . . extent to which an empirical measure adequately reflects the *real meaning* of the concept under consideration." Babbie (1995) identified four types of validity as important to address as he gave suggestions for increasing the validity of a survey instrument. These include face validity, content validity, and construct validity, and criterion validity. Addressing criterion-related validity in the traditional sense of the ability of a test to predict external criterion, such as behavior, was beyond the scope of this study. However, statistical tests which predict the results of one scale from another scale are considered to be a measure of criterion related validity, and were conducted for the scales.

Babbie (1995) stated that face validity is the degree to which empirical measures of a concept agree with our common understandings of how the concepts under investigation should relate. Tests for face validity include expert and peer review of the instruments to obtain their assessment of validity. This was done with peer and expert reviewers (Personal communications, b).

Construct validity is closely related to face validity, and refers to the validity of the logical relationship among variables. These relationships are documented in this project through the logical arguments presented to support the conceptualization and operationalization of the variables and scales and subscales. Another form of testing construct validity is to test if data gathered from the instruments meets logical expectations for the results. To obtain peer and expert review of the validity of the conceptual level variables and their posited relationships, the research proposal was presented in a formal and informal discussions held during the North American

Association for Environmental Educations annual conference (Meyers, 1997c). Recurring discussions were also held with peers and experts in subsequent conferences and informal discussions. The proposal was favorably received. The data gathered from the instruments was analyzed for their logical consistency with the expectations of the scales, and is documented in Chapter Five.

Content validity addresses the degree to which a measure includes the range of meanings included within the concept (Babbie, 1995). The exploratory survey developed questions that were open-ended and which would elicit a wide range of views. To reduce threats to validity, Babbie (1995) and Bourque and Felder (1995) each suggested that a careful identification of the research problem be the first step, in order to ensure that the questions being investigated have relevance and meaning. The work of this research to address this recommendation has been documented in the preceding chapters. The careful identification of a research problem that has meaning contributes to the capacity of a researcher to identify the conceptual level variables and operationalize the research question (Pierce, 1878; Dewey, 1916; Rokeach, 1973; Babbie, 1995). It is recommended that experts in the field be consulted on the research problem and question, which was performed as a presentation of proposed research at a continental congress of researchers in the field of environmental education (Meyers, 1997c), via personal communications (Personal communications, 1997a; Personal communications, 2002) , and with an expert panel (dissertation committee).

Bias, or the tendency of a measure to misrepresent what is measured in a given direction, can present serious threats to each type of validity. To reduce bias, the researcher needs to be aware of their own views and how this could lead to a

conceptualization and operationalization of a measure that would have bias. The researcher addressed these concerns through self-reflection of personal beliefs concerning environmental values and ethics, periodic assessment of the potential for introduced bias in the research process, and utilization of expert and peer reviewers to assess for bias.

Validity can be adversely affected by the Hawthorne effect (i.e., respondents try to identify the responses the researcher seeks and agree with those responses) if the researcher provides cues to the respondent about researcher expectations (Babbie, 1995). To reduce the potential for this threat to validity, care was taken to not construct the surveys to indicate researcher expectations, either through the graphics (i.e., pictures or graphical elements on the cover or in the survey), instructions, item wording, or item placement. The written and stated purpose of the survey indicated that it was to not judge responses as "right" or "wrong", but to identify what people really believed to improve environmental policies. This phrasing was judged to be normatively neutral regarding such policies. The survey instruments were reviewed by experts, and their comments incorporated into the survey. The Hawthorne effect can be mediated through the use of anonymous and confidential surveys. Therefore, the verbal and written instructions for both instruments assured respondents that their survey responses were anonymous and confidential.

Internal Consistency Methods for Exploratory Survey

Babbie (1995), Miles & Huberman (1994), and Bourque & Fielder (1995) provided guidelines for increasing internal consistency of surveys. They suggested that questions ask, in clear terms, about things the respondents are likely to have answers for,

in terms that are relevant to the respondents. These recommendations, as well as those to avoid double-barreled questions and make questions mutually exclusive, were followed and are noted below.

Item Development Methods for Exploratory Survey

The questions in the exploratory survey addressed the two major conceptual level variables: beliefs in the theory of value for the environment, and the theory of obligation toward the environment. The questioning strategy was to ask simple questions about which respondents should have consistent opinions, and that might elicit lengthy answers that would reveal complex belief systems about the theory of value and obligation. The eight substantive items used in the exploratory survey are in Table 11.

	Type	Item Text
1.	Theory of obligation	What general kinds of actions, if any, do you believe are ok to do to animals, and why?
2.	Theory of obligation	What general kinds of actions, if any, do you believe are wrong to do to animals, and why?
3.	Theory of value	What rights or interests, if any, do you believe animals have, and why?
4.	Theory of obligation	What new laws, if any, should there be to protect animals, and what laws, if any, protecting animals should be repealed? Please explain why.
5.	Theory of obligation	What general kinds of actions, if any, do you believe are ok to do to the rest of the environment (e.g., the environment other than animals and humans: plants, air, soil, water, ecosystems, etc.), and why?
6.	Theory of obligation	What general kinds of actions, if any, do you believe are wrong to do to the rest of the environment (e.g., the environment other than animals and humans: plants, air, soil, water, ecosystems, etc.), and why?
7.	Theory of value	What rights or interests, if any, do you believe the rest of the environment (e.g., the environment other than animals and humans: plants, air, soil, water, ecosystems, etc.), should have, why?
8.	Theory of obligation	What new laws, if any, should there be to protect the rest of the environment (e.g., the environment other than animals and humans: plants, air, soil, water, ecosystems, etc.),, and what laws, if any, protecting the rest of the environment should be repealed. Please explain why.

Table 11: Items in Exploratory Survey

As shown in Table 11, questions were asked concerning what actions were morally acceptable (ok) or forbidden (wrong) to do to animals, and for the rest of the environment. In addition to questions about animals, questions were asked about the "rest of the environment", in order to assess what types of things in the environment respondents would identify, as well as the types of moral considerations that would be given. The questions concerning "rights or interests" were designed to elicit the theory of value and the second set of questions asked what kinds of laws should be passed to protect the environment, again to determine the types of entities elicited, the kinds of practices that respondents would voluntarily identify, and the language that would be used.

Participant Selection for Exploratory Survey

Intentional group sampling was used identify the maximum variation in subject pools, to increase the capacity of the survey to reliably and validly capture a diversity of opinions that may be present in a population, as recommended by Babbie (1995). Three primary groups for sampling were identified: staff at The Ohio State University in housekeeping and custodial positions, graduate students in the School of Natural Resources at The Ohio State University, attendees at the North American Association for Environmental Education's 2001 Annual Conference in Little Rock, Arkansas, and undergraduate student's in English 110, a first-year general education course. These groups were diverse in terms of their level of education, occupations, and race. The survey was administered to 74 adults: the 20 undergraduates in English 110, 20 housekeeping staff, seven graduate students and 21 environmentalists.

Administration of Exploratory Survey

The exploratory survey was administered in June through August of 2001 to the different groups as follows. In August, the housekeeping staff were offered the opportunity to take the exploratory survey at a voluntary meeting held during work hours. The researcher was known to the staff because his office space was in close proximity to the common meeting area for the housekeeping staff. He was introduced by the housekeeping supervisor as a graduate student at the university, and staff were encouraged to participate. The researcher introduced himself to the staff as a former student member of their staff now pursuing a degree at the university, provided a short summary of the purpose of the research (to better understand what people's environmental ethics and values are), and gave verbal instructions on how to complete the survey. Assurances of confidentiality and anonymity were given, and names were not requested on the exploratory surveys. Respondents were encouraged to be honest and express their opinions, and to ask questions if they did not understand anything in the exploratory survey. Staff spontaneously began several discussions of the questions. After several minutes of discussion, the researcher redirected it with the encouragement to discuss it at length when they were finished and the request to provide their own responses. The average completion time was one and a quarter hours. The wide diversity of responses to the surveys suggests that the limited group discussion did not inhibit their responses.

The exploratory survey was administered to the graduate students in Natural Resources and the English 110 freshman students during a class. The professors briefly introduced the researcher and the purpose of the exploratory survey, and the researcher

introduced himself as a graduate student in the Natural Resources program, and the purpose of the survey. Respondents were encouraged to honestly report their beliefs, to ask questions if they did not understand anything in the survey, and given assurances of anonymity and confidentiality. The researcher was present as the respondents completed and turned in the exploratory survey. Virtually no discussion took place among the respondents. The average completion time was 50 minutes.

The exploratory survey was administered to the undergraduate students in natural resources by their professor, who introduced the purpose of the survey and gave it to the students as a take home assignment, which was turned in at a later date.

The environmental professionals were surveyed via a convenience sample at a table located in a hallway at their annual conference. The researcher asked passerby's if they wished to take a survey on environmental ethics, and provided a copy of the survey to willing participants who completed it at nearby tables. Four respondents mailed in the survey. A significant number of respondents began discussion of the survey after completing it. These conversations were not documented, but were utilized by the researcher in the development of the instrument. The average response time was approximately one hour.

Survey Instrument Development Methods

A self administered survey instrument was developed that included 465 primary items, two questions for respondents to evaluate each item, and 12 demographic questions. The challenging nature of the study of environmental values and ethics led to additional effort to conceptually develop scales that might consistently and validly

measure constructs of interest and value to the field. The next section describes steps taken to further refine the conceptualization and operationalization of the scales.

Conceptualization and Operationalization of Scales and Subscales

Scales and Subscales for Beliefs in Environment's Capacities

Babbie's (1995) recommendation to ask questions in surveys that could be reliably answered by respondents, and to build upon other researchers instruments, led the item development process for the scale of beliefs in the capacity of the environment to modify the types of entities that would be investigated. While the six categories of entities in the Continuum of Environmental Entities were used as the basis for the range of entities that would be explored, twenty categories of entities were identified for testing of items related to beliefs in capacities.

The first twelve categories were based upon Somers (2000) investigation of zoo educators beliefs about animal capacities. Based on her analysis, seven primary groupings of animals were selected for exploration in this study: 10 year-old child; non-human primates; mammals (other than primate, horse, cow, cat or dog); horses; cows; cats or dogs; birds, reptiles and amphibians; and invertebrates. To test if there were differences in beliefs when these categories were disaggregated, the following subcategories were identified: all mammals; mammals (other than a horse cat, or dog); cats; dogs; fish; sharks.

The Continuum of Environmental Entities included three broad types of entities not covered by Somers' work (alive entities, material entities, and phenomenal entities).

Five additional groupings of entities were added so the scale of beliefs in the capacity of the environment would test for the range of beliefs in the entire Continuum of Environmental Entities. To represent the rest of the types of entities not included in Somers' scale, but that were included in the abstract category of "alive entities", the grouping of trees and plants was developed to augment the animals included in Somers' study. The Continuum of Environmental Entities also included the abstract category of "material entities", led to the development of the grouping of the entities "rocks, soil, and water in rivers and lakes". The Continuum of Environmental Entities category "phenomenon" included concepts of interest in the environmental literature such as "wildness and beauty", so these were chosen as the grouping of specific entities to represent that abstract category in the Continuum of Environmental Entities. Significant attention is devoted in the ethics literature to the concept of the whole earth, and "everything in the environment", two grouping of the environment which anchor the most inclusive end of the Continuum of Environmental Entities. Therefore, these two groupings were added to explore beliefs about their capacities.

The scale did not test for beliefs about the conative or sentient capacity of the entity type "beauty and wildness", based on the researcher's judgment that this would result in an adverse reaction to the instrument by respondents. However, given the widespread interest in the literature and popular culture with the writings of Muir (1899), Naess (1989), and Leopold (1949), and these authors' beliefs that the earth is alive, items were developed to explore beliefs about whether or not the earth is alive and, separately, if it can suffer. Thus, ten types of entities that included more specific entities (i.e., primates, plants, rocks, the earth) were explored for two morally relevant subdimensions

- capacity to be sentient and conative. Table 12 contains the comprehensive list of different types and groups of environmental entities that were explored in this study.

Environmental Entity
10 yr old child
All mammals
Mammals (other than a primate, horse, cow, cat, or dog)
Mammal (other than a primate, horse, cat, or dog)
Primates (other than a human)
Horses
Cows
Cats and dogs
Dogs
Cats
Fish and sharks
Fish
Sharks
Birds, reptiles and amphibians
Invertebrates (worms, insects, lobster, etc).
Trees and plants
Rocks, soil, water in rivers and lakes
Wildness and beauty in the environment
The whole earth
Environment (in general)

Table 12: Types of environmental entities studied

Six elements for conativity were identified from combining Somers (2000) work with the literature review. Belief in conativity is defined here as belief in the capacity to be conscious in a way that would permit nonphysical suffering. This strategy of using items that focus on suffering is based upon the literature review, and comments in the exploratory survey, that it is it the capacity to suffer that frequently engenders moral considerability, and the ability to suffer is not restricted to physical suffering. It includes non-physical suffering. The mental capacities that are a necessary condition for the capacity to suffer non-physically are debated in the literature. Therefore, a range of capacities were selected, based upon these diverse views. They are: suffer (not

physically), plan, reason, experience happiness/sadness/loneliness, fear, and experience consciousness. Somers collaborated with this study by conducting a factor analysis of her data to identify a reduced set of animals and capacities with high item internal consistency for the capacities that the theoretical part of this study identified as having some relationship to belief in moral considerability.

Scales and Subscales for Beliefs in Environmental Values and Treatment

The scale and subscales for beliefs in general intrinsic value were built by operationalizing this type of value into three constitutive elements, which, based upon the literature, and the results of the exploratory survey, appear related to belief in intrinsic value: direct questions about intrinsic value, belief in capacity for a soul, and belief in rights.

The subscale for general beliefs in use value of the environment was relatively direct, with multiple items developed to investigate beliefs about the use value of ten different entities.

Scale for Beliefs in Environmental Ethics

The scale for beliefs in an environmental ethic was created by developing multiple items that described the two primary aspects of a normative ethical theory: the theory of value and of the theory obligation. The twelve types of environmental ethics are defined at the end of Chapter One. The subscales for intrinsic value and treatment each asked about their levels of the ethic: either beliefs in intrinsic value or direct obligations, as measured by the moral acceptability of different treatments of the entities.

As explored in Chapter One, one dimension of distinguishing an environmental ethic is the primary distinction that this research project used between the environmental ethics on the upper half of the Continuum of Environmental Ethics, and those in the lower, is whether or not there is a belief in the need to protect the environment. Thus, the third element to measure an environmental ethic is belief in the need to protect the environment. The decision to develop items to measure all three aspects of the ethic was taken with consideration of Babbie's (1995) recommendation that survey items be short and simple. However, the construct of an environmental ethic is a complex one that is a unique combination of these three elements. In part, the choice to include complex statements concerning ethics arose from interest in more deeply exploring complex beliefs, so valid indicators of a complex ethic could be provided. In philosophical discussions of ethics, beliefs about three elements taken together can yield different conclusions than the three elements considered completely separately. Thus, a strategy of asking about two, or all three of the elements, was taken in order to increase validity of response. Therefore, given the experimental nature of the research project, items were developed that included different combinations of two and all three of the elements of an ethic, and statistical analysis for internal consistency of the combinations was performed. The issue of validity is further addressed in the section on validity, while the results of the statistical analyses are in Chapter Five.

Scale for Willingness to Protect the Environment

The scale for beliefs in willingness to protect tested two approaches, each developed as subscales: beliefs in willingness to protect from suffering, and beliefs in willingness to protect. The two approaches provided complimentary but not duplicative approaches to measuring support for environmental protection. Kempton, Boster and Hartley (1995) found that the degree of stated support for environmental protection declined as economic costs associated with protection were made more explicit, and as governmental regulation was involved. Therefore, asking about support for environmental protection by asking about support for laws was seen as a relatively "hard" measure of support. The distinction also supported the ability to track responses which address concerns with animal suffering and the legal response to this concern, a long standing subject of interest to those concerned with use of animals in animal husbandry, zoos, and medical experimentation. The scales and subscales developed through this research are in Table 13.

Number	Scale or Subscale Name
1	Scale of Beliefs in Environment's Capacity (general)
1.1	Subscale of Beliefs in Environment 's Capacities for Conativity (general)
1.2	Subscale of Beliefs in Environment 's Capacities for Conativity (general)
2	Scale of Beliefs in Value of the Environment (general)
2.1	Subscale of Beliefs in Rights of Animals and the Environment (general)
2.2	Subscale of Beliefs in Use Value of the Environment (general)
3	Scale of Beliefs in Moral Need to Protect the Environment (general)
3.2	Subscale of Beliefs in Moral Acceptability of Four Uses of Environment (general)
3.3	Subscale of Beliefs in Need to Protect Environment (general) for Human Well-being
4	SCALE OF BELIEFS IN ENVIRONMENTAL ETHIC
5	Scale of Willingness to Protect Environment (general), Legally

Table 13: Five scales and seven subscales developed to measure beliefs in environmental values and ethics

Methods to Address Validity for Survey Instrument

As noted in the previous section on validity, Babbie (1995) identified methods for increasing the validity of survey instruments. The methods that were used to increase validity for the exploratory survey were also used for the development of the survey instrument, and were then extended, as is noted in the scale development sections below. The exploratory survey was developed to contribute to the validity of the survey instrument by identifying the terms and concepts that had meaning to respondents, and could be reasonably expected to engender reliable responses. Expert panel review of the instrument was done with experts in the field (Personal communications, b, 2002).

Construct validity can be assessed through empirically measuring the relationships among variables, and assessing the degree to which there are logical relationships among the variables. Babbie stated that the data can offer, " . . . a weight of evidence that your measure either does or doesn't tap the quality you want it to measure, without providing definitive proof" (p. 134). Chapter Five documents the results of the data analysis.

Recommendations to avoid double-barreled questions were followed, given that the purpose of the project was to explore values and ethics more deeply, while reducing conflation of similar but distinct concepts. However, this recommendation can be set aside if the researcher has a research purpose that can only be met by knowingly and intentionally constructing items that appear to be double or triple barreled for testing purposes. For this research, a number of items to measure the complex constructs of an environmental ethic were intentionally constructed as double or triple barreled. It was the judgment of the researcher that the challenge of measuring the complex construct of an

environmental ethic might be more valid if the entire construct were directly asked in a single item, rather than using traditional methods of asking about only one element of a complex construct per item, then reconstructing the complex construct using statistical methods of aggregating answers. The researcher speculated that the complex construct, taken in its entirety, might have a different meaning than that of the individual elements taken separately, given that the complex construct is a unique concept based upon the interrelationships of the subconcepts. The answers to open-ended questions in the Exploratory Survey suggested that respondents desired questions with significant subtlety and complexity to express their complex views concerning environmental values and ethics. This suggested that the approach of asking complex questions might be in agreement with Babbie's (1995) suggestion that question be asked in ways that are relevant to respondents. The validity of this approach was empirically tested by developing items for each subconcept, and items with them aggregated into apparently double and triple barreled questions, and running statistical tests for no significant difference in responses. The results are reported in Chapter Five.

Threats to content validity were engaged early in the research process by developing the continuums of values, obligations and ethics to increase the likelihood that the broadest conceivable range of these beliefs would be assessed during the operationalization of these constructs. To ensure that the wide range of beliefs were tested, a matrix of potential items was constructed. It included the thirteen specific types of environmental entities (i.e., human child, primate, etc.) on the x axis, as well as the six types of environmental entities on the Continuum of Environmental Entities (i.e., humans only, conative entities, etc) also on the x axis. The y axis included the nine conceptual

level variables, and different questioning strategies that could be used within each of the conceptual level variables. The resulting matrix was carefully organized to provide the researcher with guidance for ensuring that items were developed for each potential combination of entity, each type of belief concerning that entity, and each questioning route for the type of belief. Multiple items were sometimes developed to assess the internal consistency of different items for scale-development purposes. These strategies were employed while maintaining consideration of the need to provide items that did not indicate the researcher's bias to respondents. This provides some explanation for the large number of items that were developed, and how their conflation and duplication were avoided. The item number of each question in the instrument was documented in the matrix.

The threat of introducing researcher bias into the instrument through the items or the instrument construction was addressed through researcher monitoring for potential bias in the items and instrument, and utilization of expert and peer reviewers to assess bias. The methods used in the exploratory survey for reducing the Hawthorne effect were employed for the survey instrument. Comments from peer and expert review resulted in minor revisions that met their concerns.

Methods to Address Internal Consistency for Survey Instrument

The recommendations of Babbie (1995), Miles & Huberman (1994), and Bourque & Fielder (1995) to increase internal consistency were applied to the development of the survey instrument. In addition to the methods described above, a number of techniques were used. Duplicate items were included in the survey so a statistical analysis of the

internal consistency of responses could be performed. The information gathered from the exploratory instrument was utilized, in conjunction with the theoretical work that was done to develop the conceptual level variables, and to form questions that were relevant, clear, and answerable by respondents. A few exceptions to these general recommendations were made, and are explained below.

The shortest and most direct questioning method for ascertaining a number of the beliefs about values and moral considerability involve the use of somewhat technical terms from philosophy, such as "direct moral obligation", intrinsic value, etc. Expert review of this research project suggested a lack of certainty about whether or not people without training in philosophy could validly and reliably answer questions concerning environmental values, if terms were regarded as too technical. Responses to the exploratory questionnaire indicated that people had a diversity of strong opinions regarding the moral considerability of animals and other environmental entities. This suggested that respondents may have well formed opinions that could be elicited, perhaps with somewhat technical terms. Therefore, items which included the technical terms were developed, as well as items that included the terms using more colloquial language, and their internal consistency assessed.

Babbie (1995) noted that the order of questions on a survey can influence respondents, and recommended randomization of the order of questions in small surveys. For larger surveys, he recommended that the survey be broken into sections of similar questions, to aid in the orientation of respondents to questions, and the sections randomized within themselves. For this instrument, four sections of substantive questions were developed. They addressed beliefs about: environmental capacities;

intrinsic value of the environment and ethical beliefs; moral considerability of and moral obligations towards the environment; and use value of and willingness to protect the environment. A final section included demographic questions.

The 465 items in the survey instrument were randomized as follows. The four sections included, respectively 141 items, 97 items, 133 items, and 97 items. Microsoft Excel, Windows 98 version 6.01 was used to generate a list of random numbers between 1 and 141 (141 was the highest number of items in any of the three sections). This method resulted in each of the four sections using the same list of random numbers, but the duplication was judged to be of minimal impact, given that the randomization was conducted to reduce bias in question order, and was not conducted for the purpose of sample selection. The list of randomly ordered items was sorted into its new order, then renumbered so it appeared sequential. The instrument provided to respondents included four lists of sequentially numbered items. A key for the originally numbered items and the randomized order was developed and kept by the researcher. For coding purposes, the items on the final instrument were numbered 1 - 465. The item numbers used in the dissertation reflect the coded numbering system of 1 - 465. Appendix B includes the full text of the survey instrument, reduced in size.

The format of the questionnaire, in terms of the layout, and response options can also affect the internal consistency of responses. The format was developed to be clear for respondents. Comic sans typeface was used, and instructions provided at the top of each page. Seven-interval Likert-type scales were used due their high internal consistency, with anchors, to support the develop of ratio level scales.

Participant Selection for Survey Instrument

Similar to the exploratory survey, intentional group sampling for maximum variation was conducted, and three primary groups were surveyed. However, different groups were selected, in order to increase the variation. Thirty three staff in housekeeping, food service and custodial positions responded, from different work sites at the university. The environmentalist group included ten respondents: four Sierra Club members, three attendees at the Wild Ones annual meeting (a non-profit organization to increase native habitat), and five environmental professionals from the Columbus area. One hundred forty three students in introductory and advanced general education courses in biology and political science responded. These groups were diverse in terms of their age, level of education, occupations, race, and even distributed by sex. While no questions on the demographics explored their socio-economic status, the diverse demographic characteristics of respondents suggests that their socio-economic status was also diverse.

Administration of Survey Instrument

The written survey was administered to 191 people in July and August, 2002, and provided 187 usable responses. Several methods of administering the surveys were used, depending upon the type of group. Staff at The Ohio State University dining halls were asked by supervisors to take the survey during work hours. Volunteers met at their workplace. The researcher was a former worker at each work site, and was introduced as a student who was a former worker. The researcher introduced the research project as an effort to develop a survey that could be used for adults, to find out what people really

thought, and not to judge their beliefs. Anonymity and confidentiality of responses was assured. Neither the researcher nor the survey instrument requested personal identification, and no record exists of who completed instruments.

The survey was administered at a Central Ohio Sierra Club meeting, where the researcher introduced the purpose of the study, and asked for volunteers to take the survey at the meeting. Twenty subjects requested the survey. Two provided completed surveys at that time, with three surveys returned via mail. Two surveys were completed by attendees at the Wild Ones conference, and two additional returned via mail.

Surveys were administered after class to students in Political Science, as extra credit. The researcher was introduced by the class instructor as a Ph.D. student working on a research project. The researcher then introduced himself, the purpose of the study, and the interest in obtaining the honest opinions of students. One hundred and ten students in an introductory Biology class were given extra credit if they took the survey. These students were introduced to the researcher in class, who provided the short introductory comments, and then distributed the surveys to students who requested it. The surveys were returned by students three days later to departmental mailboxes.

Data Analysis

Data Coding, Entry and Cleaning

Multiple methods for data cleaning were employed, given the large number of items, respondents, and the hand entering of data. The data were coded and entered into SPSS version 11.0. Data cleaning included the use of simple checks to determine if all

data fields were entered, and if data were entered outside of proper data fields. Outliers of data were found by checking for data outside coded ranges. Random sampling of data was conducted, with randomly picked data points compared with original surveys. A limited number of surveys with high error rates (1-5%) were found. Every entry in the dataset for these surveys was rechecked and corrected against the original survey. Error rates for remaining cases ranged from 0.0001% to 0.05 %. Four cases (32, 34, 110, 189) were eliminated due to poor completion rates.

Item Reduction Procedures

Duplicate items included in the test instrument were eliminated after testing for statistical difference in responses. A 2-item (paired) related samples test for significant difference (Wilcoxon Signed Ranks Test), alpha set at 0.05 was used, and found no significant difference in means. The lack of significant difference in means for responses for the same items shows that there was internal consistency of responses to the same items.

Items were also reduced during scale analysis. Three primary considerations were used in selecting the items to remain in a scale: as a group, the items needed to have high internal consistency, high variability, and, where feasible, be worded consistently with items in parallel scales. Using SPSS, scale internal consistency analysis was performed for each scale, eliminating items that did not meet the criterion.

Statistical Testing Summary

As noted previously, the statistical analyses conducted for the study included assessments of internal consistency of responses to duplicate items. It also included development and reporting of descriptive data for the population that took the survey instrument. The steps to identify the items to be included in the final scales and subscales required scale internal consistency analysis to identify and eliminate items that did contribute to a set of items that could reliably elicit a broad range of responses. Descriptive statistics were performed on the population responses to the scales and subscales, and for population mean responses to the items in the scale to assess if the scales provided sufficiently high internal consistency and variability of response. A coefficient of internal consistency exceeding an alpha of 0.62 was sought for each scale. A principal components factor analysis was run to identify if the scales had internal consistency, and to assess if the factors identified through the statistical procedures met expectations for relationships that were logically expected. This tested for a "soft" triangular measure of internal validity. Cross tabular analysis was run for demographic data against the scales to explore their adequacy across these characteristics. Regression analysis of each scale against the other was run to assess their relationship and determine if the scales had construct validity. The results of the data analysis are presented in Chapter Five.

CHAPTER 5

RESULTS

The documentation of results are provided in the order of the research objectives set forth in Chapter One. In sum, the results found scales with coefficients of internal consistency that exceeded 0.73, good distributions of scores, with high capacity to predict willingness to protect (adjusted $r^2 = 0.73$) from 69 items in four scales that measured belief in environmental capacity, value, treatment, and ethic. Use of the forty-seven items from the three scales for environmental capacity, value and treatment also provided good ability to predict belief in willingness to protect (adjusted $r^2 = 0.68$). Empirical evidence was found that the conceptualized set of twelve environmental ethics, as measured using twenty-two items, formed a scale with fine reliability (0.73). The twelve categories of environmental ethics were inversely correlated across both posited dimensions: of increasing inclusivity of environmental entities, and whether or not there was belief in the need to protect the environment. The finding that the set of six ecological ethics were strongly preferred to the non-ecological ethics, and that the ecological ethics which included more environmental entities were preferred more strongly, indicated that for this population, the belief in the need to protect the environment was strong, as were beliefs in the strongest ecological ethics of ecological

Biocentrism and Ecological Phenomenalism. The series of ANOVAS run for each scale to predict Belief in Willingness to Protect the Environment (general) found that Belief in Intrinsic Value of the Environment (general), was a moderately weak (adjusted $r^2 = 0.29$) predictor. The strongest predictor was Belief in Rights of the Environment (general) (adjusted $r^2 = 0.69$), then Belief in Need to Protect the Environment (general) for Human Well Being (adjusted $r^2 = 0.54$), then Belief in Use Value of the Environment (general) (adjusted $r^2 = 0.38$). This finding provides evidence that, in this population, challenges assertions that beliefs in intrinsic value are necessary or related to support for environmental protection: belief in assigning rights to the environment, use value, and need to protect for human well being were strong predictors of willingness to protect the environment.

Research Objective 1: Develop a Heuristic Tool for Systematically Considering Environmental Values and Ethics

Chapter Three described the heuristic which was developed to meet this objective, and Chapter Four demonstrated its utility for the development of the conceptual level variables and their operationalization into the survey instrument. Chapter Five showed that the approach, when operationalized using the methods of this study, provided high internal consistency of response, elicited a broad range of beliefs concerning environmental values and ethics, provided for scales with good interscale correlations and strong ability to correlate scores on the Willingness to Protect Scale from the four major scales that were developed.

Research Objective 2: Develop a More Objective, Discriminating and Inclusive Set of Environmental Ethical Categories

Chapter Three showed the conceptual development of the Continuum of Environmental Ethics that included twelve posited ethics. These ethics, clearly defined in Chapter One, are mutually exclusive (for the purposes of exploring pretheoretical beliefs, but not for rigorous philosophical work) and appear to be capable of categorizing a wide range of ethical beliefs. Thus, the set of twelve provides a range of ethics which support a higher degree of discrimination between ethical beliefs, and is more inclusive, in supporting the inclusion of a broader array of potential beliefs.

Research Objective 3: Develop a Self-Administrable Survey Instrument for Environmental Ethics

The development of the items for this instrument was conducted as part of the development of Scale 4: Beliefs in Environmental Ethics of the research instrument. The instrument needs to be tested with additional populations to characterize its reliability with additional populations.

Research Objective 4: Develop a Psychometric Instrument to Measure Adult Beliefs about Environmental Values and Ethics

The development of the five scales and seven subscales is documented below, by each scale and subscale, with the stage of the results of the exploratory survey presented first.

Exploratory Survey

The purpose of the exploratory survey was to provide an initial assessment of the language and concepts respondents use when considering environmental values and ethics, information that would be used to guide the development of items to be tested in the survey. Since the purpose was neither to characterize the beliefs of the population, nor to conduct an in depth analysis of their beliefs, a simple content analysis was performed, without use of techniques for counting or exhaustively categorizing the terms or concepts that were used. The responses in the exploratory survey contained a rich variety of views concerning the beliefs in the value of different parts of the environment. Specific environmental resources were identified as important, including forests, clean water, wilderness, wildlife, and ecosystems. Respondents indicated that these were valuable to humans for a variety of reasons, including lumber for homes, clean air and water for health, natural areas for recreational and spiritual experiences. The importance of not letting the environment be exploited or destroyed was noted by many, and expressions about the importance of sustainable development were noted. A related concept, that of not destroying the environment for our children, was strongly expressed, and that it was morally wrong for people to pollute the environment and take it away from our children. Respondents identified the preservation of the environment as important to the animals who live in it, sometimes indicating that the freely expressed moral beliefs concerning the relationship of humans and the environment.

Considerations of the intrinsic importance of the environment included notions that animals had the right to live there just as much as people, and/or that nature, animals, or the earth has the right to live, and expressed concerns that humans were wrong to take

it away from them. This moral sense that the environment was to be considered in and of itself, or of the direct moral considerability of the environment, was expressed in a number of ways.

"It is wrong if it makes it howl", was a quote that nicely summarized a variety of passages that strongly indicated that making animals suffer was morally wrong. As would be expected from prior research on what human actions towards animals are considered morally wrong (Gallup & Beckstead, 1988; Galvin & Herzog, 1992), a number of people volunteered that hunting was permitted, as long as it was done without making the animal suffer, while others indicated that it was wrong. Several respondents indicated that medical experimentation was permitted, because of the value it provided to humans, but that suffering should be reduced where possible, while others were strongly against it.

Respondents frequently noted a sense of frustration that environmental problems were caused by ". . . politicians who are bought off by corporations." The questions concerning whether or not laws should be passed or increased to protect the environment yielded responses similar to the findings of Kempton, Boster, and Hartley (1995), although statistical analysis was not performed to quantify the types of responses. It appeared that the majority of respondents supported stronger environmental policies to protect the environment, some in quite vivid language. And, remarkable numbers of responses indicated high frustration with the lack of enforcement of existing laws. Several respondents indicated that they did not know if laws already existed, so were hesitant to respond.

The degree of sophistication of language in the writing varied from the quote provided above, to more academic writing, but an important observation emerged: almost all respondents provided clear moral judgments concerning the treatment of animals and the environment. They varied in the types of judgments made, and the sophistication of the arguments, but they were similar in key respects: specific activities were identified as prohibited or permitted, and little confusion in responses was exhibited. However, a number of comments were provided, under the question for comments about the survey, that indicated that the subject itself was very challenging and interesting, and that answering the survey was not easy. The open ended nature of the questions was noted by some of making it difficult to answer, while others indicated that it provided a nice opportunity to answer the questions. Several respondents asked to complete the next survey, and provided names and addresses with a request to send it to them.

These responses indicated that the subject matter contained sufficient interest to respondents that they could reasonably be expected to complete a long survey to test items, a finding that was used to support the experiment of using a lengthy survey. The ease with which respondents engaged moral questions about animals and the environment provided confirmation that the subject matter was of sufficient familiarity to respondents to warrant the conclusion that it would seem reasonable to expect reliable answers to similar questions on a survey. The respondents' distinctions between the need to protect the environment for human uses, and the need and moral obligation to protect it because the environment itself deserves it was an important finding. It affirmed that survey questions which distinguished between intrinsic and use value, and direct and indirect

obligations might, if worded properly, would be familiar concepts for which respondents provide reliable answers. This finding was important, in that expert advisors to the project were somewhat skeptical that the lay public, with pretheoretical ethical belief systems, could make and use such distinctions. The terms that were employed by respondents, such as “right” and “wrong”, were used to develop items for testing. However, given the degree of conceptual sophistication that was found in the responses to the exploratory survey, technical terms from ethics, such as intrinsic value and morally obligatory or forbidden, were included in survey items, and terms that were parallel to the simpler constructions of "right" and "wrong", and "should" were also developed for testing in the survey instrument.

Responses concerning the types of actions that were morally forbidden, or permitted, such as it being wrong to experiment on animals, or that it was ok to do so if they were not caused pain, or that it was wrong or right to keep animals in zoos, or that it was ok to hunt as long as the animals did not suffer, helped the operationalization of the conceptual variable of beliefs in direct moral obligations to the environment. The operationalization of this concept was challenging, and the responses suggested that that items be developed which used an approach of investigating beliefs about whether or not specific actions (i.e., using in medical research, keeping in zoos, killing to eat, eating) were morally permitted, forbidden, or obligatory. This approach provided a means for investigating beliefs about obligations by asking about the morality of various types of actions. This approach, of making a research problem clear by identifying the choices and action alternatives available to people, was also suggested by Pierce (1868).

Psychometric Instrumentation Survey

The question bank developed and administered through the processes previously described process included 465 substantive items. To examine for internal consistency, duplicated items in the questionnaire were tested to determine if there was statistically different responses. There were no significant differences, with an alpha set at 0.05 and $p < 0.01$. Instrument testing and subsequent application will provide data to more rigorously test the internal consistency of the instruments. The demographic characteristics of the population that was sampled are described below.

Demographics

The population sampled (N=191) was characterized using eight demographic questions. Table 14 summarizes the demographic characteristics. Two of the demographic questions, those inquiring about political affiliation and spiritual affiliation, were included to provide a richer characterization of the population. The demographics of the population that responded to the instrument indicate a good degree of variability of respondents, in terms of age (17 - 77 years), educational level (some high school through doctorate), ethnicity (42.7% are non-white), political ideology, political affiliation, and religious and spiritual affiliations. The methods of the study were to intentionally sample diverse groups, which appears to have been accomplished, but not to identify a population that was similar to the general adult population of the United States. The methods for instrument development would have a random sample of the target population for the instrument identified and surveyed during the instrument testing phase, which was not conducted during this research.

Characteristic	Valid N	% Population
Sex	184	
Female	93	50.5
Male	91	49.5
Age	173	
17-20	48	25.7
21-40	105	56.1
41-60	15	8.0
61-77	5	2.9
Educational Level	181	
Some High School	4	2.1
HS Diploma/GED	13	7
Some College	132	70.6
4 - Yr Degree	19	10.2
Some Graduate Work	5	2.7
Masters Degree	7	3.7
Doctoral Degree	1	0.5
Researcher Group	186	
OSU Staff	33	17.6
OSU GEC Students	143	76.5
Environmentalists	10	5.3
Political Ideology (Choose one)	168	
Conservative	65	34.8
Liberal	84	44.9
Socialist	20	10.7
Political Affiliation (Choose one)	175	
Democratic Socialist	8	4.3
Green Party	4	2.1
Democrat	80	42.8
Independent	39	20.9
Republican	39	20.9
Libertarian	1	0.5
Ethnicity (Choose one)	182	
Asian/Islander	15	8.0
Black/African Am.	40	21.4
Hisp/MexAm/Latino	4	2.1
Native Am/Nat Ind/Nat Alaskan	1	0.5
White/Caucasian	104	55.6
Multiracial	5	2.7
Other	13	7.0
Religious Affiliation (Choose one)	174	
Christian/Catholic	123	65.8
Jewish	5	2.7
Hindu	6	3.2
Muslim	4	2.1
Agnostic/Atheist	10	5.3
Other	25	13.4
Spiritual Affiliation (Choose any)	175	
Sum of "earth " spiritualities	32	8.0
Eco Spirituality	21	1.3
Gaist	1	0.5
Native Am. Spirituality	10	5.3
Other	31	13.6
None	98	52.4

Table 14: Respondent demographics

The literature engaging environmental ethics and values is frequently laced with discussion of the need to replace "anthropocentric" religious and spiritual beliefs with those that are "ecocentric". The latter part of the twentieth century saw a rise in a variety of such belief systems, as Native American spirituality, paganism, and various types of ecospirituality appeared to be more widely discussed and practiced, and a "greening" of mainstream religion occurred. The paucity of data exploring the prevalence of such beliefs and their relationship to environmental values and ethics and support for environmental policy, led to the inclusion in the instrument of a number of items designed to explore these spiritual beliefs. In addition to standard questions on religious affiliation, these were included. One respondent indicated that their spiritual belief was "Gaist", and two indicated both "Ecospirituality and Native American Spirituality", so they are not displayed in the bar charts.

The development of the scales and subscales required substantial reduction of these items. Table 15 shows how many items were tested for each conceptually developed scale, the number of items reduced through various steps, the final number of items that were found for each scale and subscale, and the coefficient or internal reliability.

	Scale or Subscale Name	Orig. Items	Eliminated - Duplicates	Eliminated Low alpha or variability	No. Items	alpha	mean
1	Beliefs in the Environment's Capacities (general)	96	23	15	11	.85	5.0
1.1	Beliefs in the Environment's Capacity for Conativity (general)	87	23	65	5	.84	4.2
1.2	Beliefs in the Environment's Capacity for Sentience (general)	9	0	0	6	.79	5.6
2	Beliefs in Value of the Environment (general)	190	25	139	22	.91	5.1
2.1	Beliefs in Intrinsic Value of Environment (general)	60	18	34	8	.84	4.6
2.2	Beliefs in Rights of Environment (general)	118	7	106	7	.90	5.1
2.3	Beliefs in Use Value of Environment (general) to Humans	12	0	5	7	.90	5.5
3	Beliefs in Moral Need to Protect Environment (general)				13	.84	4.9
3.1	Beliefs in Moral Acceptability of Four Uses of Environment (general)				6	.89	4.8
3.2	Need to Protect Environment (general) for Human Well-being				6	.89	5.1
4	Beliefs in Environmental Ethics	74	0	52	22	.83	-
5	Beliefs in Willingness to Protect the Environment (general), Legally	23	1	18	4	.83	5.2
		465			73	.91	-

Table 15: Summary of alphas and means for fives scales and seven subscales to measure beliefs in environmental values and ethics

As is noted below in more detail in the sections addressing the individual scales and subscales, the relationships of the mean scores for the populations on each of the scales make logical sense when compared with each other, and are in the range of similar research related to each scale. A summary of these relationships is that scores for Scale 1 show that scores for the Subscale 1.2, belief in the capacity of the environment to suffer mentally are lower than for Subscale 1.1, Belief in the Environment's Capacity for Conativity, which accords with the logical expectation that belief in the capacity of the environment for feeling things physically would be lower than belief in the presence of sufficient mind for it to be able to suffer mentally. That population mean scores for Belief in the Use Value of the Environment (general) (Subscale 2.3) are higher than for Belief in Intrinsic Value of the Environment (general) (Subscale 2.1) meets the

expectation that belief in use value could be generated from any type of belief that the environment is useful for any wide range of purposes, while belief in intrinsic value depends upon some special type of belief that the environment has unusual properties that are valuable in and of themselves, independent of their usefulness to people, a category of value that is more restrictive, and expected to have fewer eligible entrees, than the less restrictive category.

Research Objective 4.1: Development of Scale 1: Beliefs in the Environment's Capacities (general)

A general scale to measure overall belief in the capacity of the environment to experience sentience and conativity was developed. The scale is the sum of two subscales, one each for sentience and conativity. Using the methods identified in Chapter Four, 96 items were tested for inclusion in this scale. These items investigated beliefs about the seven different aspects of conative and sentient capacities for ten different types of entities. Eleven items that provided a balance of variability and internal consistency of response were selected for the scale, and are listed in Table 16. The figures below document the differentiation capacity of the scale, which reflects the construct validity and internal consistency of responses for the eleven items when used as a scale.

Item Number	Item
VAR0067	Cows can experience physical pain
VAR0056	Horses can experience physical pain
VAR0120	Cats and dogs can experience physical pain
VAR0117	Invertebrates (worms, insects, lobsters, etc.) can experience physical pain
VAR0104	Trees and plants can feel physical p
VAR0127	Fish and sharks can experience physical pain
VAR0088	Cows can reason (i.e., are able to solve problems)
VAR0061	Horses can reason (i.e., are able to solve problems)
VAR0042	Fish and sharks can experience consciousness
VAR0038	Invertebrates (worms, insects, lobsters, etc,) can experience physical pain
VAR0053	The earth can consciously plan for events in the future

Table 16: Items in Scale 1: Beliefs in the Environment's Capacities (general)

The internal consistency analysis for the Scale for Beliefs in Environmental Capacities (general), showed that it has a high coefficient of internal consistency (0.85), good variability of response, and a mean population score of 5.0.

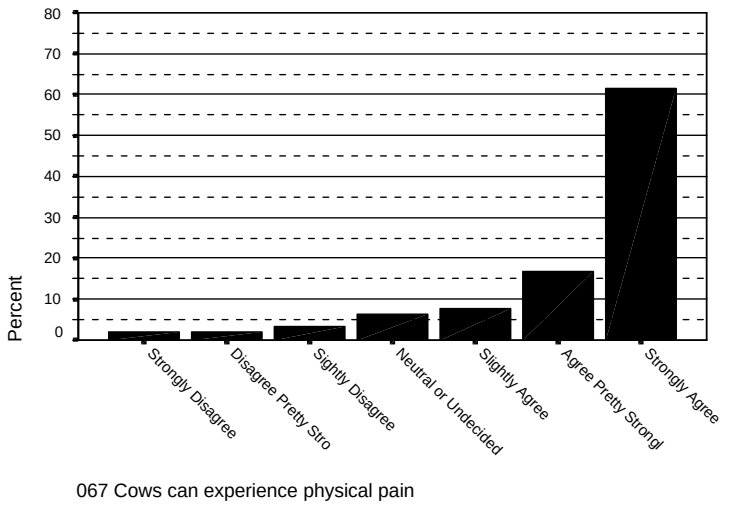

Figure 6: Population responses to item 067 in Scale 1: Beliefs in the Environment's Capacities (general)

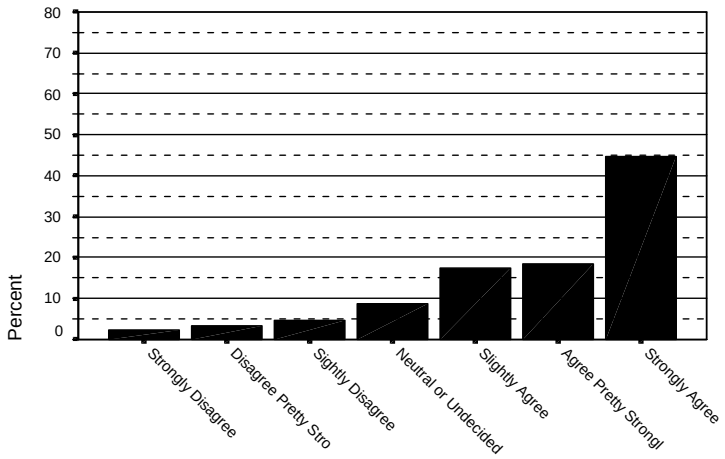

Figure 7: Population responses to item 127 in Scale 1: Beliefs in the Environment's Capacities (general)

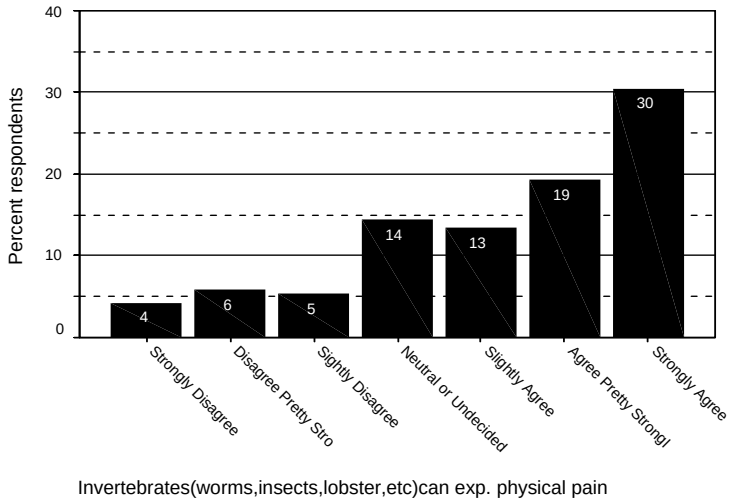

Figure 8: Population responses to item 117 in Scale 1: Beliefs in the Environment's Capacities (general)

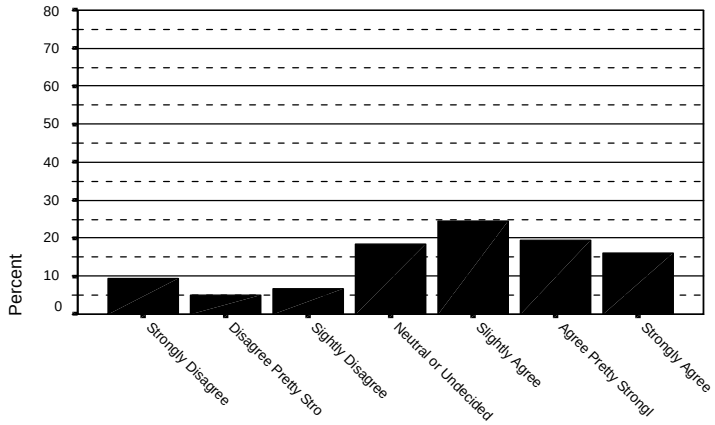

Figure 9: Population responses to item 061 in Scale 1: Beliefs in the Environment's Capacities (general)

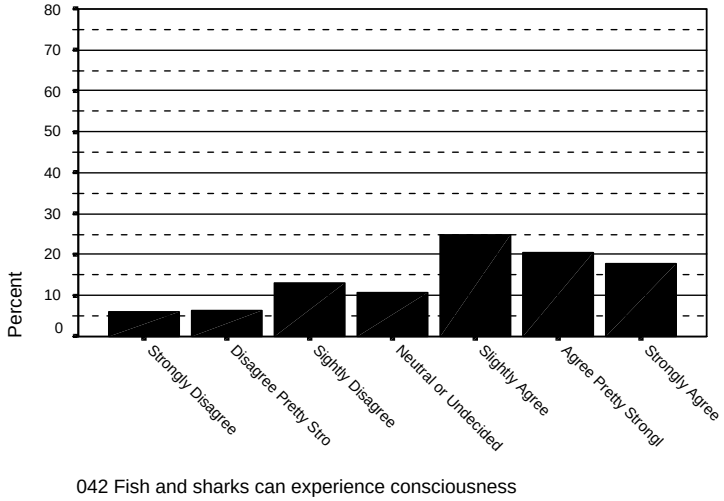

Figure 10: Population responses to item 042 in Scale 1: Beliefs in the Environment's Capacities (general)

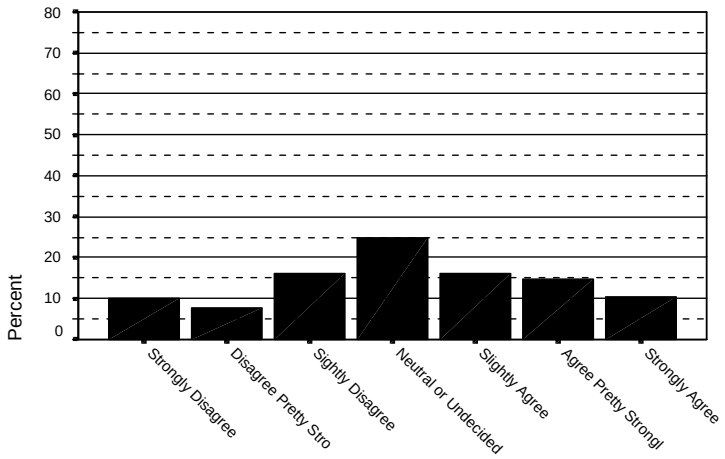

Figure 11: Population responses to item 038 in Scale 1: Beliefs in the Environment's Capacities (general)

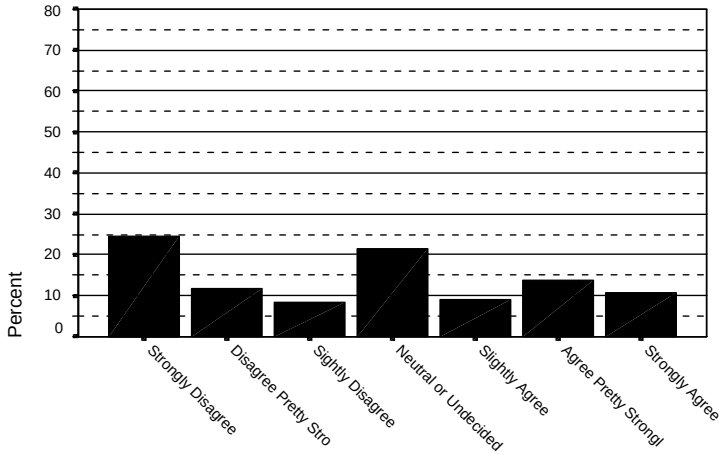

Figure 12: Population responses to item 104 in Scale 1: Beliefs in the Environment's Capacities (general)

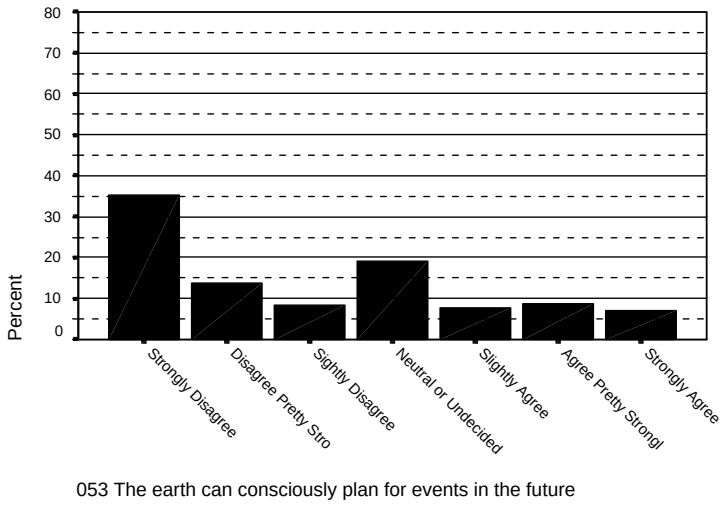

Figure 13: Population responses to item 053 in Scale 1: Beliefs in the Environment's Capacities (general)

A principal components factor analysis for the eight items in Scale 1 was conducted, shown in Figure 14. Eigen values above 1.0 were selected, and missing items were replaced to the mean. Two factors were identified, accounting for 60% of the variance. The two components reflect the two beliefs measured in the subscales of sentience and conativity, suggesting that the scale does measure these two concepts.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.228	40.351	40.351	3.228	40.351	40.351
2	1.575	19.690	60.042	1.575	19.690	60.042
3	.851	10.637	70.679			
4	.650	8.124	78.803			
5	.514	6.419	85.222			
6	.435	5.437	90.659			
7	.386	4.827	95.486			
8	.361	4.514	100.000			

Extraction Method: Principal Component Analysis.

Figure 14: Scale of Beliefs in Environment'sCapacities (general) principal components analysis

The scale internal consistency (alpha = 0.80) for the eight items, with $p<0.001$ (within a case, but between measures) suggested that the items in the scale of Beliefs in Environmental Capacities (general) does measure a construct with high internal consistency and low probability of occurring from random chance. The grand mean of the eight items was 5.0. The distribution of mean scores for the population is shown below in Figure 15. They appear to fit a bell curve slightly above a central mean. These results showed that the scale provides an suitable measure for the broad concept of beliefs in general capacities of the environment.

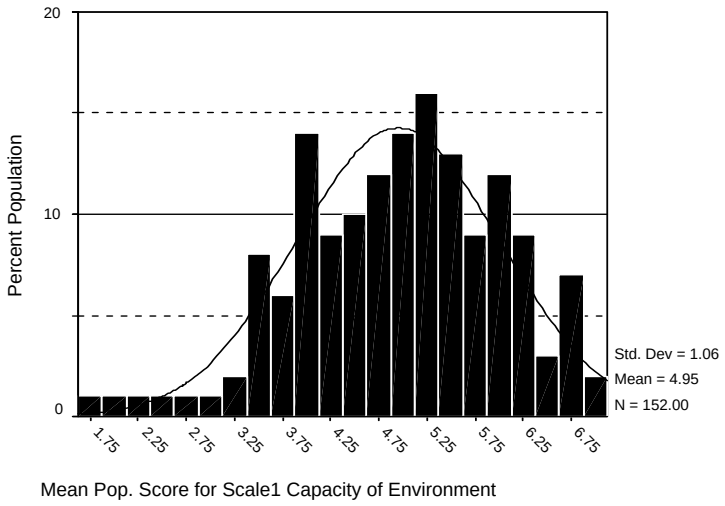

Figure 15: Distribution of mean population scores for Scale 1: Beliefs in the Environment's Capacities (general)

Subscale 1.1: Beliefs in Environment's Capacity for Conativity (General)

The Subscale of Beliefs in Environment's Capacity for Conativity (general) tested 87 items measuring seven aspects of conativity for ten types of entities. Five items with high internal consistency and variability were selected, and are shown in Table 17.

Item Number	Item
VAR0088A	Cows can reason (i.e., are able to solve problems)
VAR0061A	Horses can reason (i.e., are able to solve problems)
VAR0042A	Fish and sharks can experience consciousness
VAR0038A	Invertebrates (worms, insects, lobsters, etc) can reason (i.e., are able to solve problems)
VAR0053A	The earth can consciously plan for events in the future

Table 17: Items in Subscale 1.1: Beliefs in Environment's Capacity for Conativity (general)

The internal consistency analysis for items in the Subscale of Beliefs in Environmental Conative Capacity (general) found a coefficient of internal reliability alpha of 0.84 with six items, a high internal consistency. The Subscale of Beliefs in the Environment's Capacity for Conativity (general) showed highly satisfactory internal consistency and variability: the five items have a summated grand mean of 4.2, an internal consistency of 0.84, a variance of 0.52, and $p < 0.0001$. The distribution of population responses to the Subscale is shown in Figure 16. The mean of 4.2 on a seven point scale is slightly skewed to the positive, with a modal score of 4.0. The broad distribution of scores shows a remarkably consistent distribution, albeit slightly skewed to the positive, given the small population sampled (N=191). These two measures, in conjunction with the high alpha, provide empirical evidence that the scale is sound.

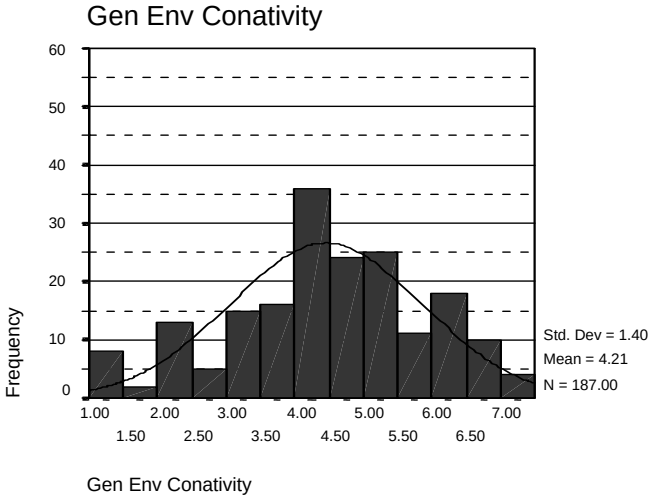

Figure 16: Distribution of mean population scores for Subscale 1.1: Beliefs in Environment's Capacity for Conativity (general)

Subscale 1.2: Beliefs in Environment's Capacity for Sentience (general)

The Subscale of Beliefs in Environment's Capacity for Sentience (general) tested nine items measuring sentience for nine types of entities. Given Somers (2000) findings of high internal consistency of items which ask about the capacity to feel pain, and the exploratory survey's finding that respondents were familiar with considering the capacity of animals and the environment to feel pain, only one form of the question was asked for nine different entities in the environment. Five items with a high internal consistency and variability were selected. Table 18 documents the six items selected for the subscale.

Item Number	Item
VAR0067	Cows can experience physical pain
VAR0056	Horses can experience physical pain
VAR0120	Cats and dogs can experience physical
VAR0117	Invertebrates (worms, insects, lobsters, etc) can experience physical pain
VAR0104	Trees and plants can feel physical pain
VAR0127	Fish and sharks can experience physical pain

Table 18: Items in Subscale 1.2: Beliefs in Environment's Capacity for Sentience (general)

The subscale's alpha of .78, with a probability <0.0001, shows a sufficiently high degree of internal consistency, one that exceeds the research minimum standards. The distribution of population means scores for the items in the subscale are in Figure 17.

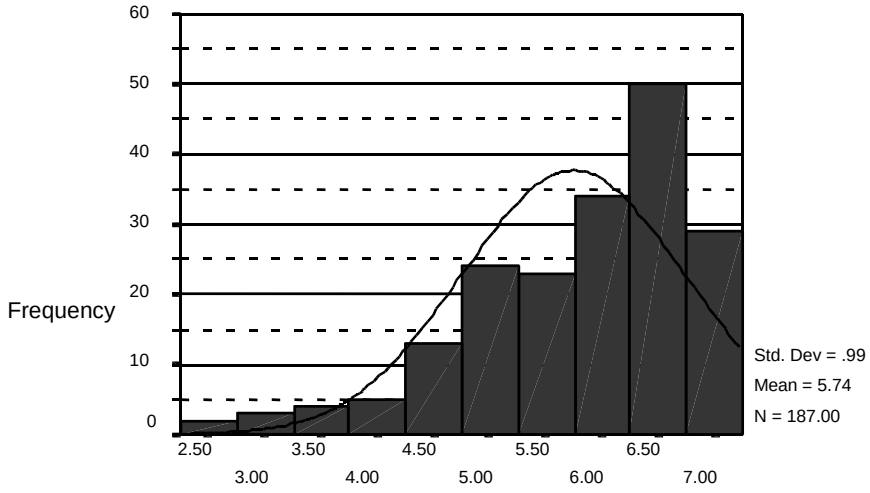

Figure 17: Distribution of mean population scores for Subscale of Beliefs in Environment's Capacity for Sentience (general)

The population mean score for the subscale for sentience is 5.74, which is higher than the scores for the subscale for conativity. This meets a logical expectation that beliefs in the capacity of the environment to physically suffer would be higher than beliefs that the environment could suffer mentally. Kellert (1980), Plous (1983), Herzog and Galvin (1997), and Somers (2000), report similar relationships in beliefs about animal capacities, which provided external confirmation of subscale validity. The positively skewed distribution, and high mean, provide evidence that the scale meets logical tests for construct measurement validity, that it is measuring as expected. The shape and range of the distribution, and the internal consistency, variability, and distribution of scores, demonstrate that the subscale is acceptable.

Research interest in differences in environmental attitudes, among different population demographics, provided impetus to explore these relationships for beliefs in

the capacity of the environment. Tests for no significant difference were conducted for the population mean scores for scale 1 by age group, sex, respondent group, ethnicity, and political affiliation were explored, finding no significant differences (alpha set at 0.05 and a probability of 0.01) with one exception: political affiliation.

Given the research interest in the relationship of age and environmental attitudes, an ANOVA was run for these characteristics, with the results shown in Figure 18. The results do not indicate the presence of a significant difference in beliefs. Given the results, the small sample size relationship may not have given the test sufficient statistical power to observe a stronger relationship.

Multiple Comparisons

Dependent Variable: SCALE1 Gen Env Capacity

LSD

(I) VAR0478B Researcher Assigned Groups - 3	(J) VAR0478B Researcher Assigned Groups - 3	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1 OSU Staff	2 OSU GEC Students	.57*	.206	.006	.17	.98
	3 Environmentalists	-.48	.386	.210	-1.25	.28
2 OSU GEC Students	1 OSU Staff	-.57*	.206	.006	-.98	-.17
	3 Environmentalists	-1.06*	.350	.003	-1.75	-.37
3 Environmentalists	1 OSU Staff	.48	.386	.210	-.28	1.25
	2 OSU GEC Students	1.06*	.350	.003	.37	1.75

*. The mean difference is significant at the .05 level.

Figure 18: ANOVA for beliefs in Environment's Capacities (general), by three groups

Research Objective 4.2: Development of Scale 2: Beliefs in Value of the Environment (General)

These scales were designed to measure beliefs at the center of a normative ethical theory, those that concern the theory of value, theory of obligation, and how the two relate. The operationalization of the measurement included the development of three subscales, two to measure intrinsic value using two different approaches, and one which addresses the theory of obligation by asking about what behavior, or treatment of the environment, is morally permitted or forbidden. Table 19 showed the twenty-two items that were selected for the scale.

Item Number	Item
VAR0051A	Fish, including sharks have a soul or spirit
VAR0074A	Mammals have a soul or spirit
VAR0076A	Horses have a soul or spirit
VAR0124A	Cats and dogs have a soul or spirit
VAR0137A	Rocks, soil, water in rivers and lakes have a soul
VAR0211A	Everything in the environment is valuable in and of itself and deserves direct moral consideration.
VAR0379A	Wildness and beauty in the environment has inherent value
VAR0381A	Trees and plants should have some rights
VAR0386A	Horses can be useful or valuable to humans
VAR0388A	Primates (other than humans) should have some rights
VAR0390A	Mammals can be useful or valuable to humans
VAR0393A	Dogs and cats should have some rights
VAR0402A	Mammals should have some rights
VAR0405A	Horses should have some rights
VAR0424A	Invertebrates (worms, insects, lobsters, etc) can be useful to humans
VAR0429A	Primates (other than humans) can be useful or valuable to humans
VAR0433A	Primates (other than humans) have inherent value
VAR0435A	Wildness and beauty in the environment should have some rights
VAR0442A	Birds, reptiles and amphibians can be useful or valuable to humans
VAR0451A	Dogs and cats can be useful or valuable top humans
VAR0452A	Trees and plants can be useful to humans
VAR0460A	Birds, reptiles and amphibians should have some rights

Table 19: Items in Scale 2: Beliefs in Value of the Environment (general)

The items yielded a population mean score of 5.0, and the test for internal consistency found an alpha of .92, an acceptably high alpha. Figure 19 below shows the distribution of population scores for the scale.

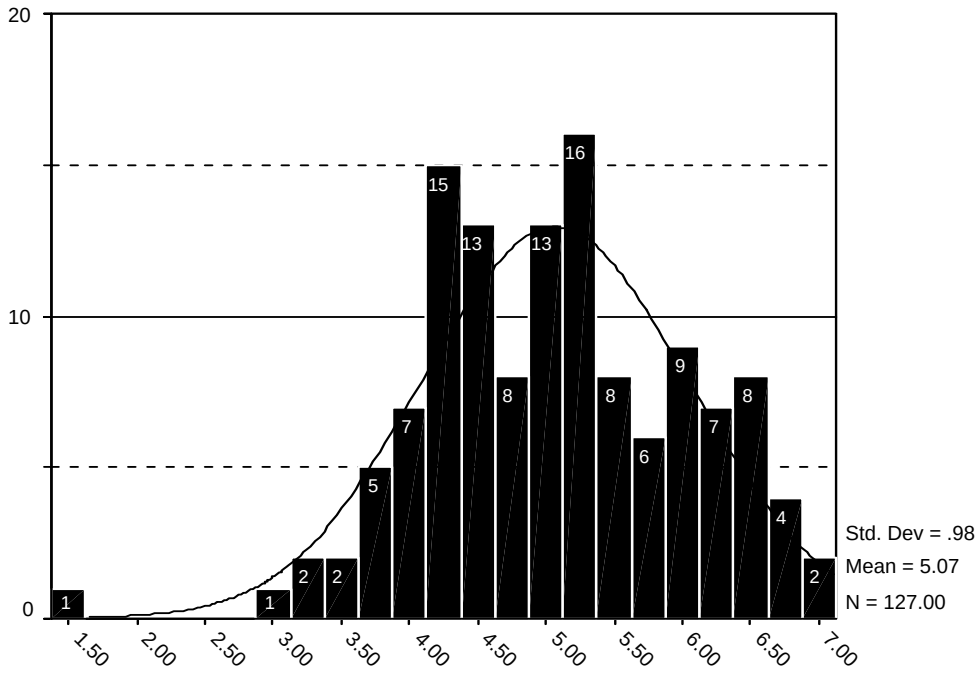

Figure 19: Distribution of mean population scores for Scale 2: Beliefs in Value of the Environment (general)

The distribution of population responses to the scale shown in Figure 19 are moderately well distributed around a normal curve, with the mean score for the population above the midpoint of the scale. A factor analysis was performed for the scale to test if the scale contained the three factors that are represented in the three subscales. A principal components factor analysis was performed, using varimax rotation, and replacement of missing values with the mean. Three factors emerged with Eigen values

above one: the strongest factor was use value, followed by rights, then intrinsic value. The high internal consistency, broad and well distributed range of population scores, and the results of the factor analysis provide confirmatory evidence that the scale is a good measure the broad construct of environmental values for this population. Figure 20 below shows the results of the factor analysis.

Rotated Component Matrix

Item	Component		
	1	2	3
VAR452 Trees and plants can be useful to humans	.798	7.226E-02	.117
VAR451 Dogs and cats can be useful or valuable to humans	.768	.196	1.958E-02
VAR442 Birds, reptiles and amphibians can be useful or valuable to humans	.756	.129	.115
VAR390 Mammals can be useful or valuable to human	.755	.341	7.522E-02
VAR429 Primates (other than humans) can be useful or valuable to humans	.745	.257	8.951E-03
VAR386 Horses can be useful or valuable to humans	.710	.177	-.122
VAR424 Invertebrates (worms, insects, lobster, etc.) can be useful or valuable to humans	.709	5.665E-02	9.633E-02
VAR433 Primates (other than humans) have inherent value	.640	.307	.262
VAR379 Wildness and beauty in the environment has inherent value	.626	.311	.137
VAR405 Horses should have some rights	.219	.805	.199
VAR435 Wildness and beauty in the environment should be have some rights	.101	.784	.188
VAR388 Primates (other than humans) should have some rights	.317	.769	.104
VAR460 Birds, reptiles and amphibians should have some rights	.199	.749	.187
VAR381 Trees and plants should have some rights	6.491E-02	.735	7.215E-02
VAR402 Mammals should have some rights	.415	.641	9.984E-02
VAR393 Dogs and cats should have some rights	.449	.600	.187
VAR211 Everything in the environment is valuable in and of itself, and deserves direct moral consideration.	.392	.441	.134
VAR076 Horses have a soul or spirit	.184	.158	.881
VAR124 Cats and dogs have a soul or spirit	6.445E-02	.176	.876
VAR051 Fish, including sharks have a soul or spirit	8.634E-02	.110	.867
VAR074 Mammals have a soul or spirit	.144	.102	.781
VAR137 Rocks, soil, water in rivers and lakes have a soul	-.193	.224	.563

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a Rotation converged in 5 iterations.

Figure 20: Principal component analysis for Scale 2: Beliefs In Value of the Environment (general)

Subscale 2.1: Beliefs in Intrinsic Value of the Environment (General)

This subscale included eight items regarding beliefs in intrinsic values, including beliefs about whether or not various entities had a spirit or soul. The items for spirit or soul were suggested by the interpretation of responses to the exploratory survey, where such beliefs were volunteered and associated with various moral beliefs conceptually similar to intrinsic value, and obligations, such as the need to protect the entity. Thus, the items were developed as a questioning route to identify belief in intrinsic items for subscale 2.1 The methods for reducing the initial set of items to the final eight were the same as have been described in previous sections, involving the inclusion of a set of items that balanced high internal consistency with high variability. The final set of eight items had a mean of 3.38, and a coefficient of internal consistency alpha of 0.84. The items for the subscale are shown in Table 20.

Item Number	Item
VAR0433	Primates (other than humans) have inherent value
VAR 0074	Mammals have a soul or spirit
VAR 0076	Horses have a soul or spirit
VAR 0124	Cats and dogs have a soul or spirit
VAR 0051	Fish, including sharks, have a soul or spirit
VAR 0137	Rocks, soil, and water in rivers or lakes, have a soul
VAR 0379	Wilderness and beauty in the environment have inherent value
VAR 0211	Everything in the environment is valuable in and of itself, and deserves direct moral consideration

Table 20: Items in Subscale 2.1: Beliefs in Intrinsic Value of the Environment (general)

The distribution of mean scores for responses to the subscale for the population that was surveyed is shown in Figure 21, which shows a somewhat well distributed range of responses.

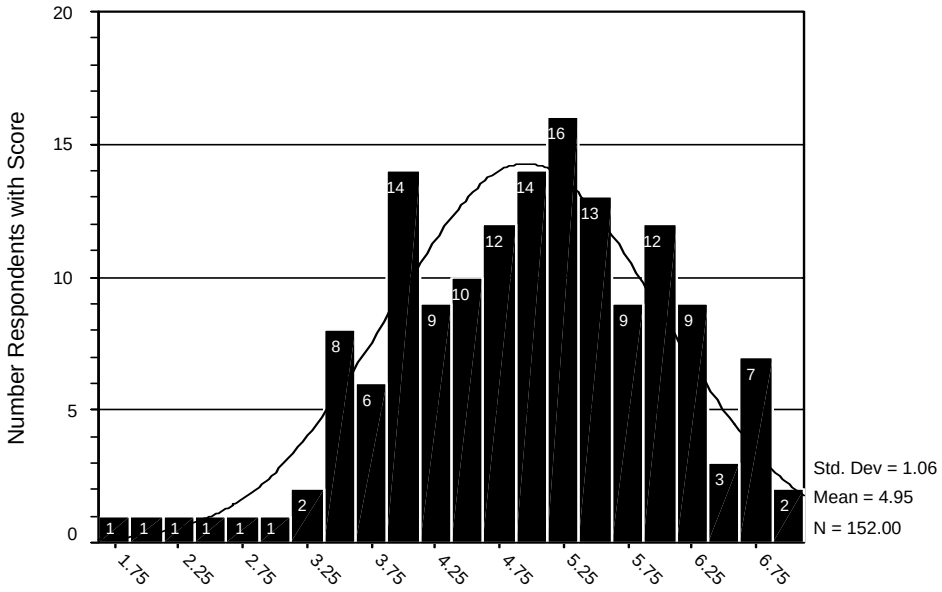

Figure 21: Distribution of population mean scores for Subscale 2.1: Beliefs in Intrinsic Value of the Environment (general)

To test for the relationship of belief in intrinsic value and willingness to protect the environment, an ANOVA was run with Scale 2.1, intrinsic value (set as the independent variable), against Scale 5, willingness to protect the environment, legally (set as the dependent variable), with cases excluded listwise (no substitution of the mean for missing cases). The results showed a significant but moderately weak relationship (adjusted $r^2 = .294$, $p < 0.001$) between level of belief in the intrinsic value of the environment and the willingness to protect. This finding suggests that there is a weak relationship of belief in intrinsic value and support for environmental protection.

This weak relationship suggests a potentially significant finding may have emerged from the data analysis. It had been speculated early in the research process that beliefs in intrinsic value were not necessary for there to be a belief in the need to protect the environment. This hypothesis was founded on the results of polling work and research by Kempton, Boster and Hartley (1995), and Norton (1995), that strong public support for environmental protection exists even when the public appeared to have a diversity of beliefs about the intrinsic value of the environment, and on the ethical work of Rosen (1995) and others who argue that indirect obligations to protect the environment can be generated from direct obligations to other humans to provide for an environment that supports human well-being. The conceptual analysis of environmental values and ethics conducted in Chapter One showed that indirect moral obligations to protect the environment can exist independent of beliefs in the intrinsic value of the environment. Empirical work by Kempton, et al (1995) reported that a significant portion of the population believed that humans are obligated to protect the environment because of obligations to future generations, or for religious reasons (i.e., biblically based conservationism or stewardship).

Given the strong interest by researchers and others concerned with environmental values in the relationship of belief in intrinsic value and support for environmental protection, these results warrants further examination with larger population samples to better characterize the relationship.

Subscale 2.2: Beliefs in Rights of Animals and the Environment (General)

This subscale measures general beliefs in whether or not the environment deserves rights, as a measure of beliefs in the direct obligations to the environment. The subscale has a coefficient of internal reliability of 0.90 (standardized alpha). The seven items that were selected for this subscale are in Table 21.

Item Number	Item
VAR0402	Mammals should have some rights
VAR 0388	Primates (other than humans) should have some rights
VAR 0405	Horses should have some rights
VAR 0393	Dogs and cats should have some rights
VAR 0460	Birds, reptiles and amphibians should have some rights
VAR 0381	Trees and plants should have some rights
VAR 0435	Wildness and beauty in the environment should have some rights

Table 21: Items in Subscale 2.2: Beliefs in Rights of Animals and the Environment (general)

Figure 22 shows the distribution of mean scores for the subscale. The population mean scores show a moderately good distribution around the curve, which given the sampling method of intentional diverse group sampling, is a reasonably normal distribution.

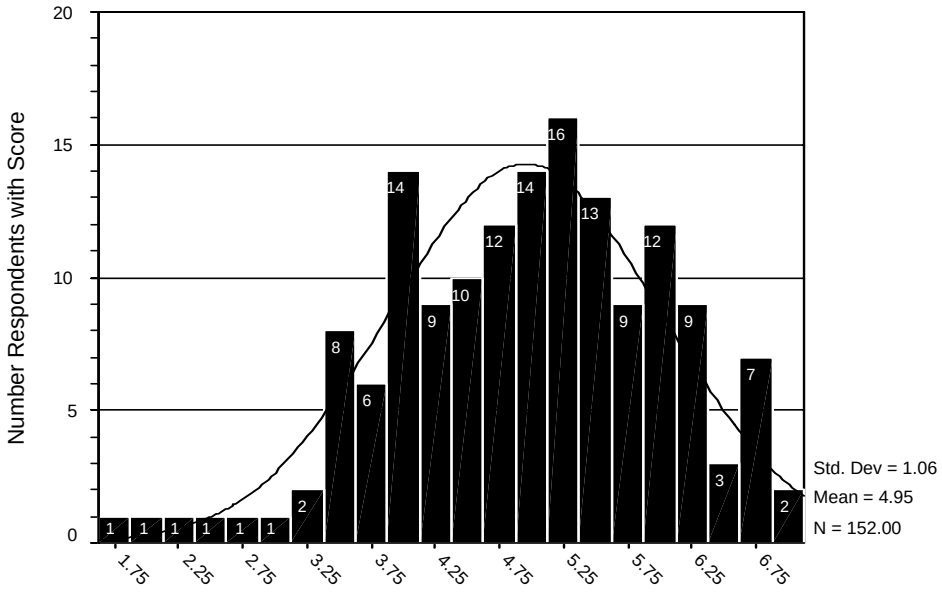

Figure 22: Distribution of population mean scores for Subscale2.2: Beliefs in Rights of Animals and the Environment (general)

The distribution of scores in Figure 22 show a mean of 4.95, and are slightly skewed above the mean.

Subscale 2.3: Subscale of Beliefs in Use Value of Environment (General) to Humans

The subscale to measure beliefs in the usefulness of the environment to humans was developed as described in the methods section. The items for the scale asked about usefulness very directly, based upon statements found in the exploratory survey. The results: a mean population score of 5.45, an internal consistency of .90 for 7 items (alpha set at 0.05, $p < 0.001$), and a normal distribution that is skewed slightly above the mean. The items for the scale are in Table 22.

Item Number	Item
VAR 0390	Mammals can be useful or valuable to humans
VAR 0429	Primates (other than humans) can be useful or valuable to humans
VAR 0386	Horses can be useful or valuable to humans
VAR 0451	Dogs and cats can be useful or valuable to humans
VAR 0442	Birds, reptiles and amphibians can be useful or valuable to humans
VAR 0424	Invertebrates (worms, insects, lobsters, etc) can be useful or valuable to humans
VAR 0452	Trees and plants can be useful to humans

Table 22: Items in Subscale 2.3: Beliefs in Use Value of the Environment (general)

The distribution of population responses to the items in the scale is shown in Figure 23.

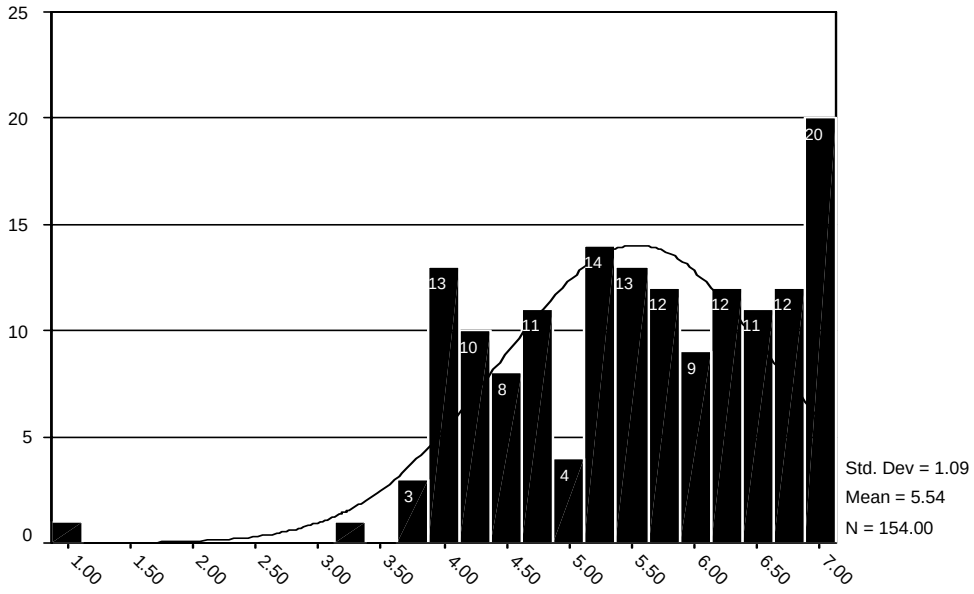

Figure 23: Distribution of responses to items for Subscale 2.3: Beliefs in Use Value of the Environment (general)

Research Objective 4.3: Development of Scale 3: Beliefs in Moral Need to Protect Environment (General)

Table 23 shows the thirteen items that were selected for Scale 3: Beliefs in Moral Need to Protect Environment (general). The population mean score for the scale was 5.0, and an alpha of 0.84 for internal consistency was found.

Item Number	Item
VAR0244A	It is morally permitted to use a cow in medical research, if it is done without causing it to suffer
VAR0295A	It is morally permitted to kill a cow for food, if it is done without causing it pain
VAR0296A	It is morally permitted to kill a bird, reptile or amphibian for food, if it is done without causing it pain
VAR0326A	It is morally permitted to kill a mammal that is not a primate, horse, cow, cat or dog for food, if it done without causing it pain
VAR0335A	It is morally permitted to use a bird, reptile or amphibian in medical research, if it is done without causing it to suffer
VAR0338A	It is morally permitted to use a fish in medical research, if it is done without causing it to suffer
VAR0366A	It is morally permitted to a cow in medical research
VAR0374A	Humans will be better off if laws exist to protect mammals
VAR0394A	Humans will be better off if laws exist to protect primates (other than humans)
VAR0407A	Humans will be better off if laws exist to protect fish, including sharks
VAR0408A	Humans will be better off if laws exist to protect trees and plants
VAR0414A	Humans will be better off if laws exist to protect wildness and beauty in the environment
VAR0423A	Humans will be better off if laws exist to protect rocks, soil, water in rivers and lakes

Table 23: Items in Scale 3: Beliefs in Moral Need to Protect Environment (general)

Subscale 3.1: Beliefs in Moral Acceptability of Four Treatments of Environment (general)

This subscale operationalized the measure of the moral considerability of the environment, beliefs concerning direct obligations to the environment, by asking a series of questions concerning what actions towards specific environmental entities were permitted or forbidden. Responses to items inquiring about "forbidden" actions were reverse recoded, so unidirectionality of response was obtained for analysis. However, the analysis found that items which used the word "forbidden" had too low internal consistency to be included in the final subscale, so no such items were included. The subscale for the six items that were selected for the scale had a mean population score of 4.8, an alpha of internal consistency of 0.89. Table 24 shows the items that were in the scale for Beliefs in Treatment of Environment (general)

Item Number	Item
VAR0326A	It is morally permitted to kill a mammal that is not a primate, horse, cow, cat or dog, if it is done without causing it pain
VAR0244A	It is morally permitted to use a cow in medical research, if it is done without causing it to suffer
VAR0295A	It is morally permitted to kill a cow for food, if it is done without causing it pain
VAR0366A	It is morally permitted to use a cow in medical research
VAR0296A	It is morally permitted to kill a bird, reptile, or amphibian if it is done without causing it pain
VAR0335A	It is morally permitted to use a bird, reptile, or amphibian in medical research if it is done without causing it to suffer
VAR0338A	It is morally permitted to use a fish in medical research, if it is done without causing it to suffer

Table 24: Items in Subscale 3.1: Beliefs in Moral Acceptability of Four Treatments of Environment (general)

The distribution of scores for the population responses to the items in the subscale of Beliefs in Moral Acceptability of Treatment of the Environment are shown below.

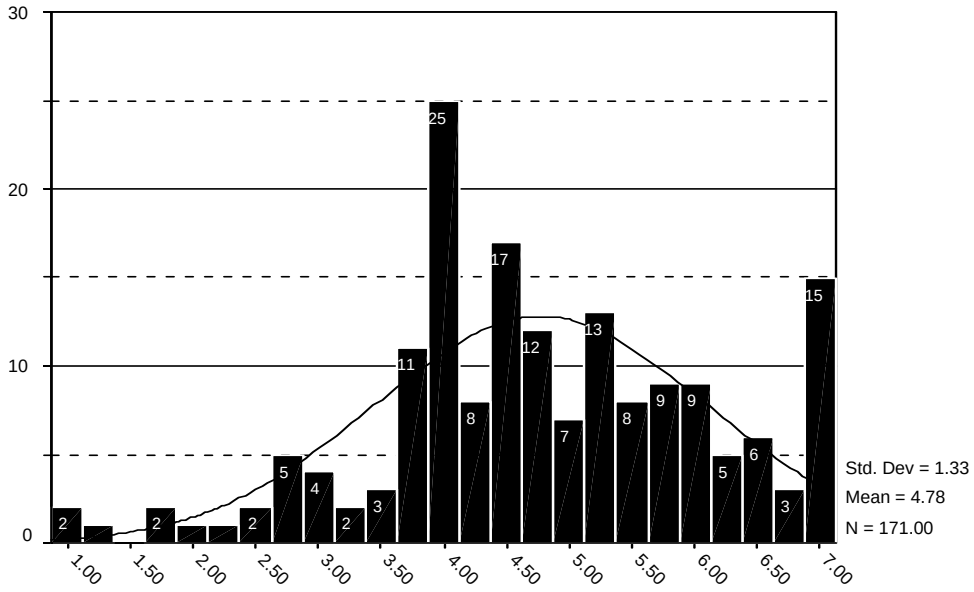

Figure 24: Distribution of population mean scores for items in Subscale 3.1: Beliefs in Moral Acceptability of Four Treatments of Environment (general)

The results are in general accord with attitudinal research of psychologists by Plous (1994) and broader random sample research by Herzog (1995) that shows strong support, (estimated 65% - 80%) for use of animals for human uses, such as medical research, zoos, and, with some species, as food, if the animals are protected from unnecessary suffering.

Subscale 3.2: Beliefs in the Need to Protect Environment (general) for Human Well-Being

This subscale supported a distinction between two closely related concepts: belief in the importance on the environment to human welfare, (which is measured in this subscale) versus belief in support for laws to protect the environment (measured in scale 5, Belief in Willingness to Protect the Environment). This subtle distinction provided the ability to measure understanding of human dependency of the environment versus willingess to take action to protect the environment (as represented by belief in support for legal protection for the environment). This subscale had a mean population score of 5.54 and an alpha for internal consistency of 0.89. Table 25 shows the six items selected for the subscale.

Item Number	Item
VAR0374A	Humans will be better off if laws exist to protect mammals
VAR0394A	Humans will be better off if laws exist to protect primates (other than people)
VAR0407A	Humans will be better off if laws exist to protect fish, including sharks
VAR0408A	Humans will be better off if laws exist to protect trees and plants
VAR0414A	Humans will be better off if laws exist to protect wildness and beauty
VAR0423A	Humans will be better off if laws exist to protect rocks, soil, water in rivers and lakes

Table 25: Items in Subscale 3.2: Beliefs in Need to Protect Environment (general) for Human Well Being

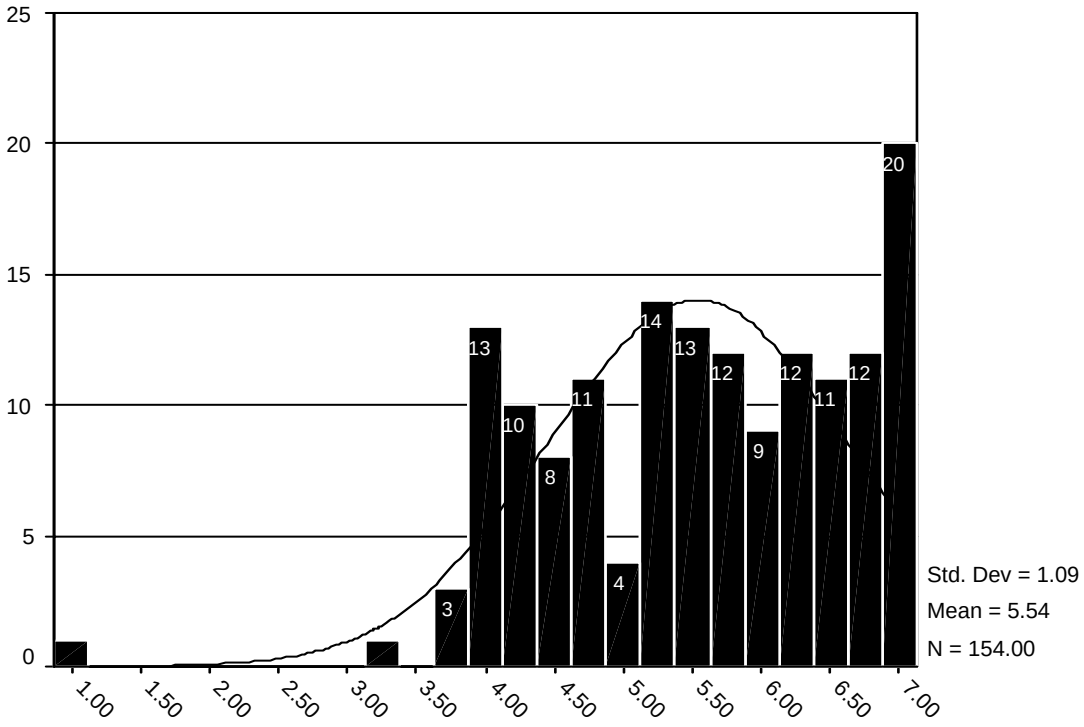

Figure 25: Distribution of population mean scores on Subscale 3.2: Beliefs in Need to Protect Environment (general) for Human Well-Being

The distribution of mean population scores shown in Figure 25 demonstrate that the subscale measures a range of responses. The population mean of 5.54 and high number of "7" responses show a positively skewed distribution. The responses to this subscale, of a strong beliefs in the need to protect the environment, reflects the finding of many researchers (Kempton, Boster and Hartley, 1995; NEETF, 2000; NEETF 2001) that the public strongly supports environmental protection as important to human welfare, providing external validation that the scale is measuring a construct and doing so with an acceptable degree of commensurability to other instruments.

Research Objective 4.4: Development of Scale 4: Beliefs in Environmental Ethics

The scale for beliefs in environmental ethics included 22 items for the twelve categories. Two items were intended to be developed for each category, but error in the development of the items for the instrument led to the development of four items for the category "Ecological Ecocentrism" (Ethic 11), and no items for the category "Ecocentrism" (Ethic 5). A number of statistical methods were used to characterize responses, judge the consistency of response, and the relationships of responses, in order to document and evaluate the responses to the scale. Table 26, lists the items and ethics that were tested.

Ethic Number, Name	Item Number and Text
1. Anthropocentrism	0157A Only humans deserve direct moral consideration. There is little need to protect the environment to ensure human welfare 0203A Only humans are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare
2. Conativism	0189A All things that are self aware deserve direct moral consideration, and we don't need to protect the environment 0191A Only those things that are self aware deserve direct moral consideration, and we don't need to protect the environment
3. Sentientism	0163A All things that can suffer deserve direct moral consideration, and we don't need to protect the environment 0159A Only those things that can suffer are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare
4. Biocentrism	0226A Everything that is alive deserves some rights. There is little need to protect the environment 0168A All living entities are valuable in and of themselves, and deserve direct moral consideration. We do not need to protect the environment to ensure human welfare
5. Ecocentrism	Items missing
6. Ecocentric Phenomenalism	0193A Everything deserves direct moral consideration, and we don't need to protect the environment to ensure human welfare 0173A Everything in the environment is valuable in and of itself, and deserves direct moral consideration. There is little need to protect the environment to ensure human welfare
7. Ecological Anthropocentrism	0164A Only humans deserve direct moral consideration, but we need to protect the environment to ensure human welfare 0187A Only humans deserve direct moral consideration, but we need to protect the environment
8. Ecological Conativism	0209A All things that are self aware are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare 0214A Everything that is self aware deserves rights, and we need to protect the environment
9. Ecological Sentientism	0188A All things that can suffer are valuable in and of themselves, and deserve direct moral consideration, and we need to protect the environment to ensure human welfare 0147A All things that can suffer deserve some rights, and we need to protect environment
10. Ecological Biocentrism	0171A All things that are alive are valuable in and of themselves, and deserves direct moral consideration, and we need to protect the environment to ensure human welfare 0170A Everything that is alive deserves some rights, and we need to protect the environment
11. Ecological Ecocentrism	0151A Everything in the environment, except for beauty and wildness, is valuable in and of itself, and deserves direct moral consideration, and we need to protect the environment to ensure human welfare 0178A Everything in the environment, except for beauty and wildness, deserves rights, and we need to protect the environment
12. Ecological Phenomenalism	0219A Everything in the environment is valuable in and of themselves, and deserves direct moral consideration, and we need to protect the environment to ensure human welfare 0162A Everything in the environment deserves rights, and we need to protect the environment

Table 26: Items in Scale 4: Beliefs in Environmental Ethics

Paired sample tests were run to statistically test if the population mean responses were different for the ethics. Each of the 11 categories of ethics was tested against each other. Forty nine of the 55 pairs of ethics that were tested had a significant difference between the two variables ($p<0.05$, two tailed test). The pairs which did not have statistically different population means were: ethics 1 and 2, ethics 2 and 4, ethics 2 and 6, ethics 4 and 6, ethics 8 and 9, and ethics 10 and 12. Five of these six pairs which did not have statistically different results were in ethical categories that were only two ethical categories distant on the twelve category scale. This demonstrated that there were a sufficient number of statistically significant differences in the population mean scores for the twelve ethics to conclude that the scale differentiated among population level beliefs.

To test for internal consistency of response, an internal consistency analysis was run and found an alpha of .83 ($p < 0.0001$), a satisfactorily high alpha for the twelve broad constructs of ethics that were included in the scale. This provided empirical evidence that the twenty two items formed a scale.

Scale 4: Tests for Item Capacity to Elicit Range of Beliefs

As noted before, an important measure of the capacity of a scale to measure a construct is the degree to which it can elicit a variety of responses. To assess for this capacity, a series of frequency analyses were run to test if the items in the scales obtained different responses from the population. The data were graphed as the distribution of population mean scores for each response option to the items that were used in the scale. According to the central limit theorem, the scores should be distributed along a bell curve, if a sufficiently high number of responses are obtained from a random sample. The previously described sampling methods indicated that three intentional groups were sampled, with a relatively small sample (N = 191), which suggested that well-distributed responses might not be obtained from this sample type. The distribution of scores were of a broad range as shown in Figures 26 through 35.

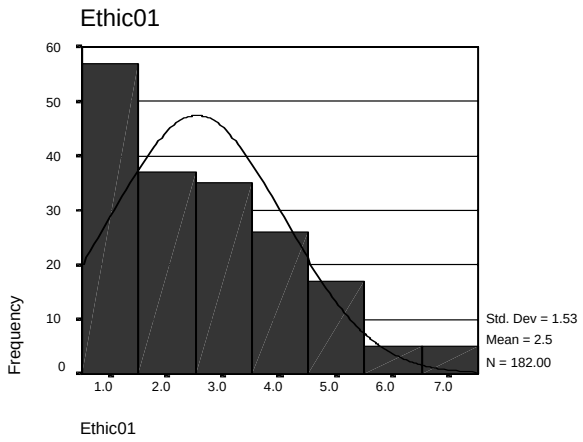

Figure 26: Distribution of population scores for two items for beliefs in environmental ethic 1, Anthropocentrism

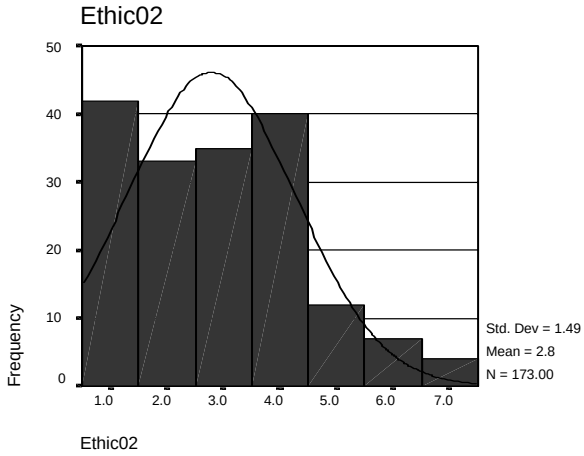

Figure 27: Distribution of population scores for items for beliefs in environmental ethic 2, Conativism

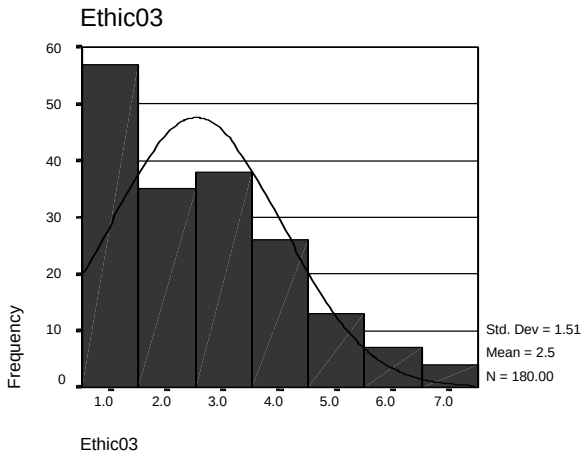

Figure 28: Distribution of population scores for items for beliefs in environmental ethic 3, Sentientism

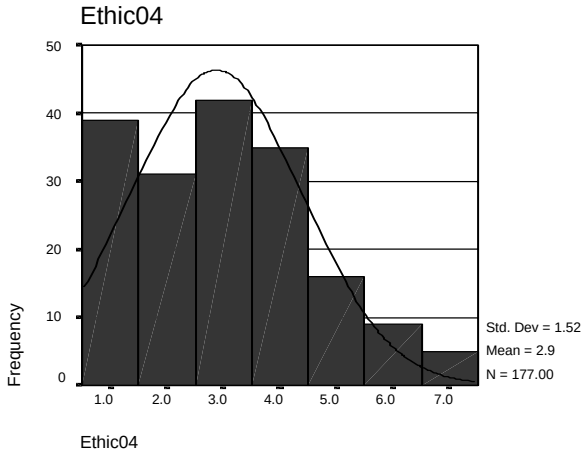

Figure 29: Distribution of population scores for items for beliefs in environmental ethic 4, Biocentrism

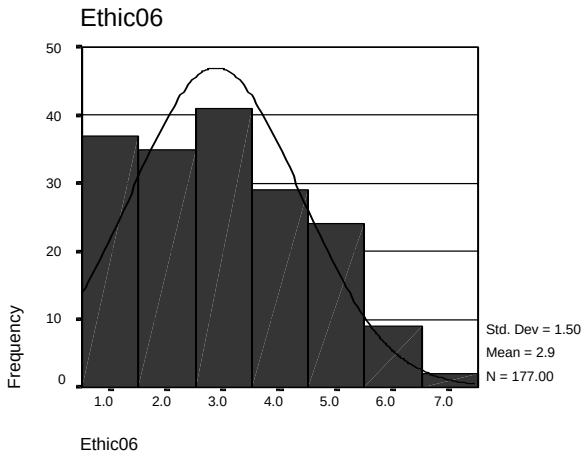

Figure 30: Distribution of population scores for items for beliefs in environmental ethic 6, ecocentric phenomenalism

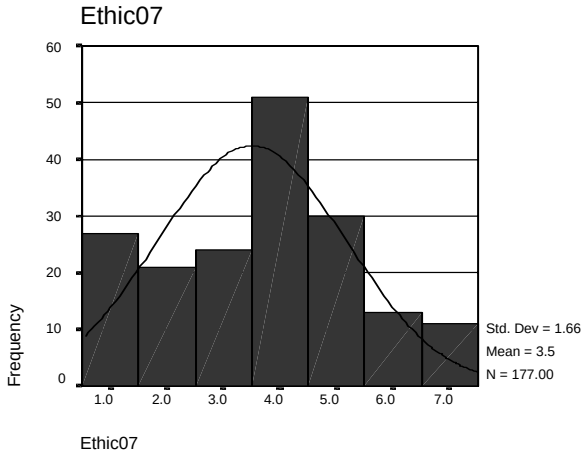

Figure 31: Distribution of population scores for items for beliefs in environmental ethic 7, ecological Anthropocentrism

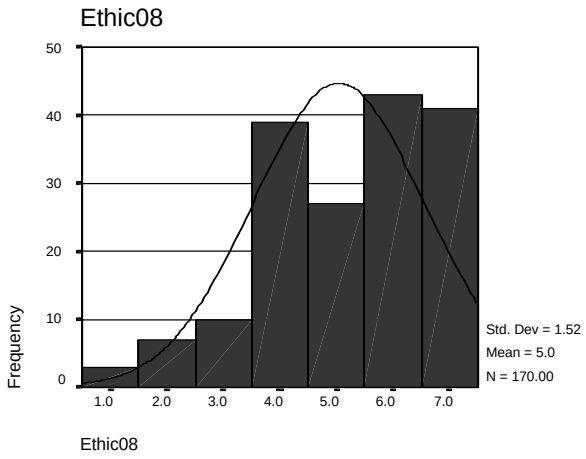

Figure 32: Distribution of population scores for items for beliefs in environmental ethic 8, Ecological Conativism

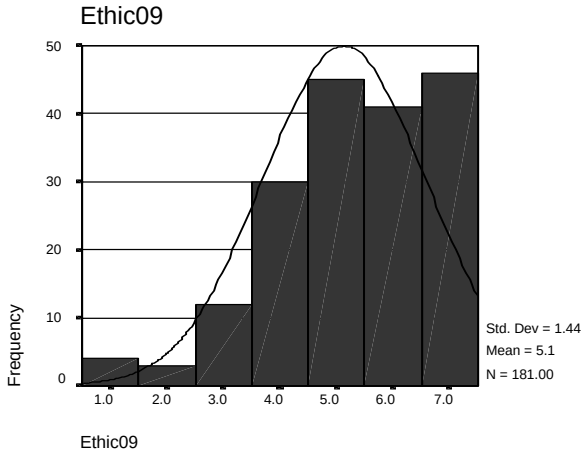

Figure 33: Distribution of population scores for items for beliefs in environmental ethic 9, Ecological Sentientism

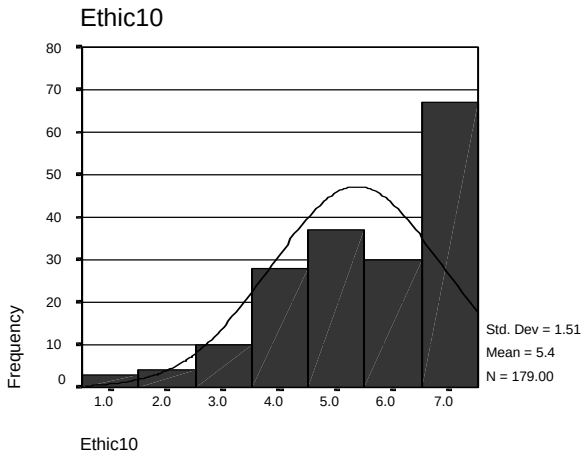

Figure 34: Distribution of population scores for items for beliefs in environmental ethic 10, Ecological Biocentrism

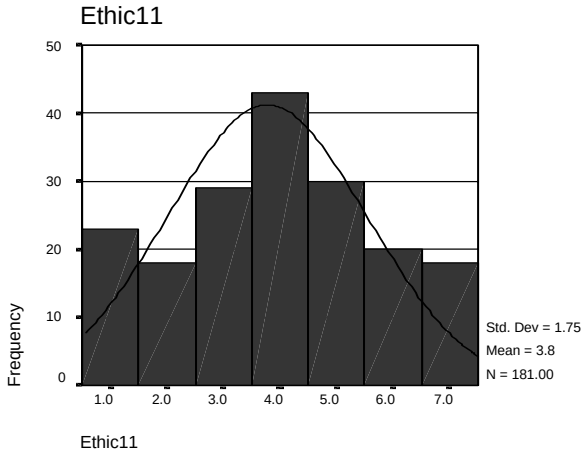

Figure 35: Distribution of population scores for items for beliefs in environmental ethic 11, Ecological Ecocentrism

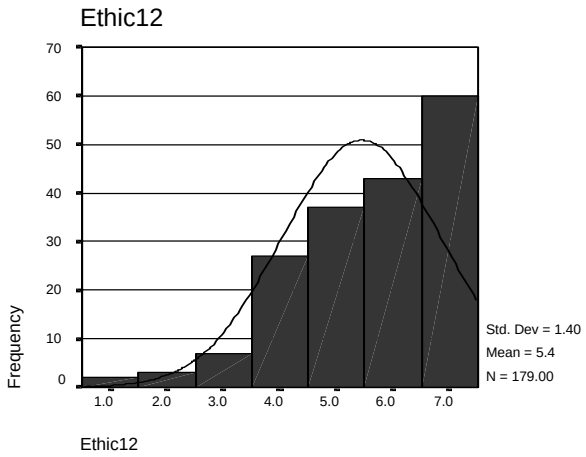

Figure 36: Distribution of population mean scores for items for beliefs in environmental ethic 12, Ecological Phenomenalism

Figures 26 through 36 showed that the respondents provided a range of responses to the twenty two items used to test for eleven ethics, demonstrated that the scale provided good differentiation of population response to items testing for beliefs in different ethical categories, and provided additional empirical evidence to support these items as a valid measure of a construct. The distribution of responses to the different ethics showed a pattern that reflected the findings documented in the next section, which showed consistently higher population mean scores (i.e. stronger agreement) for the ethics that were in the ecological group, and stronger support for the ethics on the end of the Continuum of Environmental Ethics that gave intrinsic value to more of the environment. In addition to the need to document that the items provide for internal consistency of response, and a well distributed range of responses (shown above) the relationship of the responses was tested to determine if those relationships met theoretical expectations. These tests are described in the next section.

Scale 4: Tests for Relationship of Responses Between Ethical Categories

Scale four included twelve categories of ethics, and, as shown in Figure 5, the Continuum of Environmental Ethics, these twelve categories are conceptualized as two groups of six ethics, and upper group of non-ecological ethics, and a lower group of ecological ethics. The pairs of ethics found above and below each other on the Continuum, which have the same beliefs in intrinsic value, but different beliefs in the need to protect the environment, were called pairs of ethics. The ethics of Anthropocentrism and Ecological Anthropocentrism anchor one end of the continuum, the end which includes only humans as morally considerable. The other end of the continuum is anchored by the ethics Phenomenalism and Ecocentric Phenomenalism. As noted earlier, the twelve ethics are designed to provide mutually exclusive categories of beliefs. The operationalization of the measurement of a beliefs in an ethic was conducted by developing, testing, and then selecting two items that stated the ethic and asked respondents how much they agreed or disagreed with the items, giving them seven response options (strongly disagree to strongly agree). Therefore, an individual who agrees strongly with the items measuring beliefs in an Anthropocentric ethic would not be expected to agree strongly with items that measured ethics at the other end of the Continuum of Environmental Ethics, such as Ecocentric Phenomenalism. It was expected that the strength of response of an individual to the items for the ethics on the opposite anchors of the Continuum of Environmental Ethics would be inversely related, given that they are mutually exclusive beliefs. The sum of the scores for the population were expected to show this inverse relationship, and were tested as follows, beginning with selected descriptive data.

To explore which ethic received the strongest positive response, the least, and if there were relationships among them, the mean population scores for each category were ranked. The ethics, " Ecological Phenomenalism" and "Ecological Biocentrism" received the highest scores, and all six ethics on the "lower" continuum received higher scores than any on the "upper" continuum, showing that the population mean for respondents indicated stronger and consistent beliefs that humans need to protect the environment, and gave stronger responses to the ethical categories that gave direct moral consideration and/or intrinsic value to the entire environment. The population responses also demonstrated, for both the "upper" and "lower" continua of ethics, a stronger favorable response to those ethical beliefs that provided stronger moral consideration and value to an increasingly wide array of environmental entities.

Ethic Number and Name	N	Mean	Std. Dev
Ethic12 Ecological Phenomenalism	179	5.44	1.40
Ethic10 Ecological Biocentrism	179	5.36	1.51
Ethic09 Ecological Sentientism	181	5.13	1.44
Ethic08 Ecological Conativism	170	5.04	1.52
Ethic11 Ecological Ecocentrism	181	3.77	1.75
Ethic07 Ecological Anthropocentrism	177	3.50	1.66
Ethic04 Biocentrism	177	2.87	1.52
Ethic06 Phenomenalism	177	2.87	1.50
Ethic02 Conativism	173	2.78	1.49
Ethic01 Anthropocentrism	182	2.53	1.53
Ethic03 Sentientism	180	2.52	1.51

Figure 36: Ranked mean population scores for each environmental ethic

As noted before, the scale included two hypothesized groups of ethics, a non-ecological group (ethics 1-6), and an ecological group (7-12), and it was predicted that the population mean scores for the ethics on the anchors of the Continuum of

Environmental Ethics would be inversely related. The population mean scores for each ethic were graphed to test for this relationship, as shown in Figure 37.

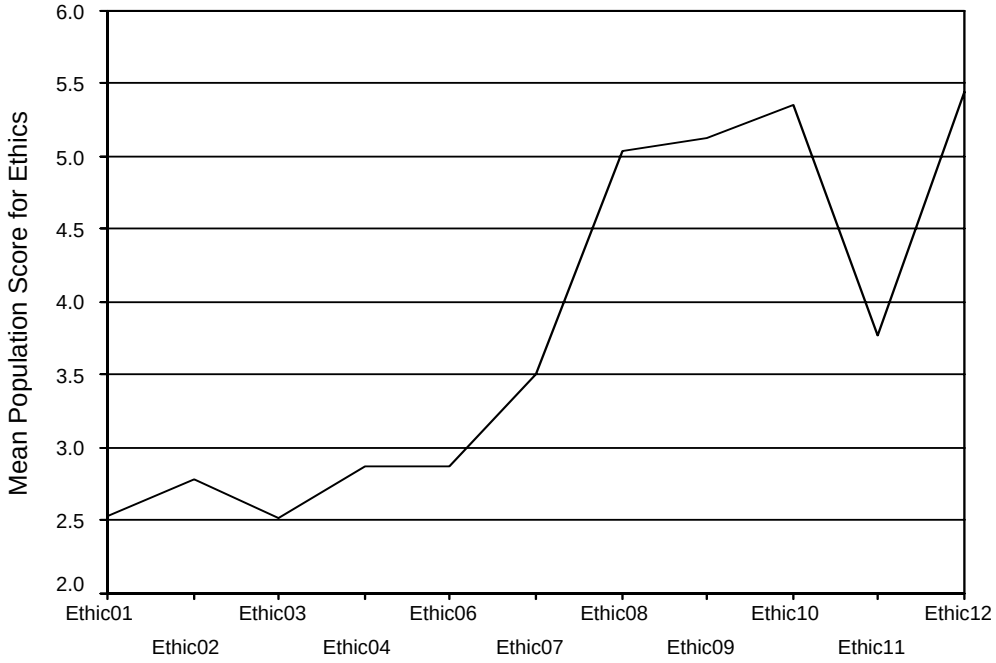

Figure 37: Graph of mean population scores to Scale 4: Beliefs in Environmental Ethics, by consecutive ethic

The results in Figure 37 show a strong trend for increasingly favorable responses from lowest response for Anthropocentrism ethic, to the highest response for the Ecological Phenomenalism ethic, except for Ethic 11. The low favorable response to the ethic "Anthropocentrism" (mean of 2.5) increased to a mean of nearly 5.5 for the ethic "Ecological Phenomenalism", in two distinct slopes, with one notable exception. The population score for the ethic, "Ecological Ecocentrism" declined about 1.7 points from the average score of nearly 5.45 for the two ethics closest to it (Ecological

Phenomenalism and Ecological Biocentrism). However, it did not reduce the score significantly enough to place it as low as the scores for the non-ecological ethics. This sharp decline was investigated. It was observed that the wording for both the items used to generate the score for the ecological ecocentric ethic contained the phrase, "except for beauty and wildness", a phrase that was intended to allow respondents to discriminate between an ethic that would include everything in the environment, including phenomenon such as beauty and wildness, and an ethic that would not include phenomenal elements such as beauty and wildness. The testing of the instrument will address this finding and seek to find wording that provides for such a distinction, but which does not engender such strong response. The graph demonstrated that the beliefs varied as predicted,

The analysis of population mean responses also explored the difference between scores for the ethics that were in the "upper" and "lower" dimensions of the Continuum of Environmental Entities, with interesting results, as shown in Figure 38.

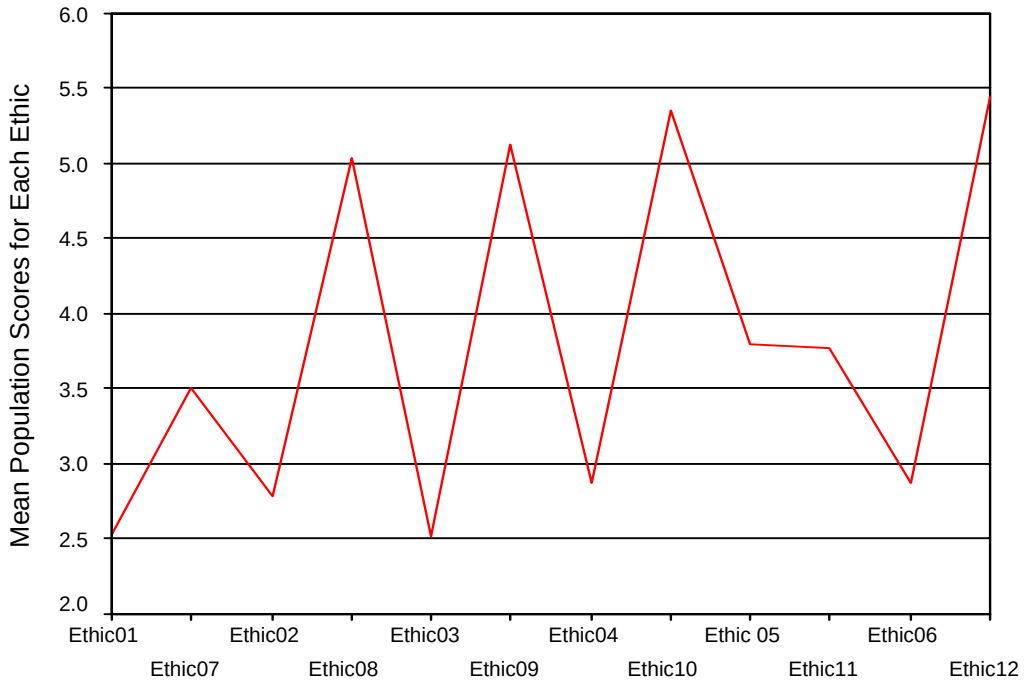

Figure 38: Graph of mean population scores for Scale 4: Environmental Ethics, contrasting each "pair" of ethics

The graph showed a remarkable "zigzag" line, again demonstrating a consistent trend for stronger responses to ethics in the "upper" dimension, those which give intrinsic value to more entities in the environment. This graph provided a clear graphical demonstration of two complex relationships. The twelve ethics include two sets each of the six types of entities on the Continuum of Environmental Entities - the six "upper" ethics do not attach value to protecting the environment, while the "lower" six ethics all termed "ecological" do attach value to protecting the environment. It should be noted that nowhere in the items, the questionnaire, or the verbal or written instructions was the term "ecological" used. The graph shows that within each of the two dimensions of ethics, there is a

generally upward trend as more things in the environment are considered for value and protection. The sum of the population mean scores for each of the six ethics in the "upper", non-ecological, and the "lower" ecological dimensions of the ethics were calculated. The non-ecological ethics (ethics 1-6) had a mean score of 2.7, while the ecological ethics (ethics 7-12) had a mean score or 4.7, for a difference of 2.0, with the scores ranging from a 1.0 to a 2.5 difference. The population mean scores for each ethic appear to be a function of the sum of the scores for beliefs in the value and moral considerability of each type of entity (which steadily increase as more entities are included in the ethic), and the scores for the need to protect the environment, which are steady.

The results of these tests showed that this population had low scores on anthropocentric and non-ecological ethics, and high scores on the ecological ethics.

In addition to the characterization and interpretation of the data provided above, the data were subjected to logical and statistical testing. The testing for the scale included a series of tests to assess if responses to the different ethics met expectations for logical relationships that were expected, based on the conceptual work that created the scales. The following hypotheses were developed to test for these relationships in the categories of ethics that comprise the scale.

1. Ethic 1 will be negatively correlated with Ethic 12.
2. Ethic 1 will be less negatively correlated with Ethic 11 than with Ethic 12, less negatively correlated with Ethic 11 than 10, less negatively correlated with 10 than 9, less negatively correlated with 9 than 8, and less

negatively correlated with 8 than 7. At some point in those relationships, the correlation will be positive.

3. Ethic 1 will be less negatively correlated with Ethic 6 than with Ethic 5, less negatively correlated with Ethic 5 than 4, less negatively correlated with 4 than 3, less negatively correlated with 3 than 2. At some point in those relationships, the correlation will be positive.

To test these hypotheses, a Pearson's correlation was run for the scores for each of the ethics, to test for relationships. To assess if there was an inverse relationship in the population mean scores between the ethical categories, the Pearson's correlation's that were found for each category were graphed and are shown in Figure 39. Ethic 11 was excluded from the analysis, due to the unusual responses to the items.

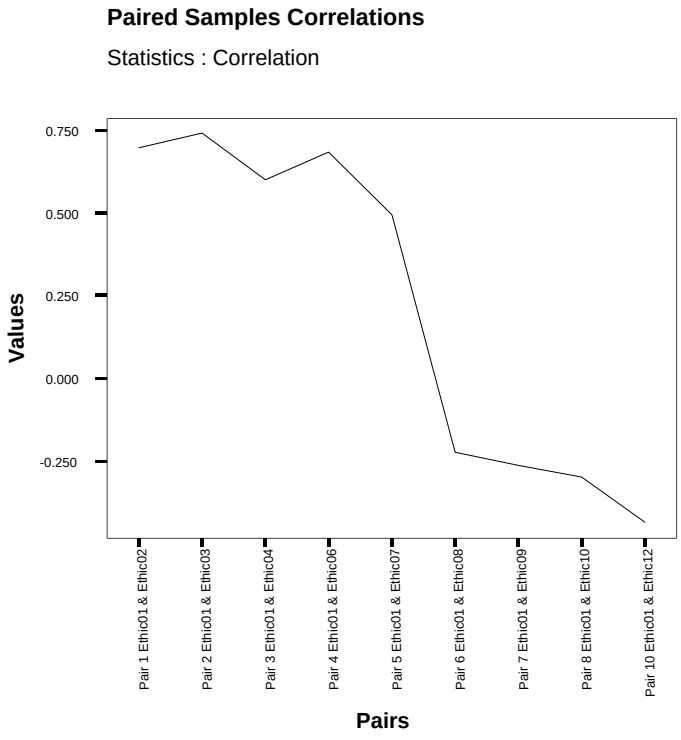

Figure 39: Graph of correlational relationships between environmental ethics

The graph showed a clear inverse relationship between the correlations for ethics 1 and 2, and ethics 1 and 12, confirming the three hypothesized relationships. This provided credible evidence that the ethical scale not only distinguished between eleven of the twelve categories that were tested, but showed inverse relationships between the hypothesized anchors of the Continuum of Environmental Ethics, and the two dimensions of environmental ethics.

Scale 4: Factor Analysis

A principal components factor analysis was conducted, using varimax rotation, (Eigen values above one) to explore if the items in the scale had one factor, which would provide empirical evidence that the scale measured one construct. The results are shown in Table 27.

Ethic	Component	
	1	2
Ethic 03 Sentientism	.840	-.167
Ethic 06 Ecocentric Phenomenalism	.834	-.233
Ethic 02 Conativism	.801	-.169
Ethic 01 Anthropocentrism	.797	-.359
Ethic 04 Biocentrism	.779	-.189
Ethic 07 Ecological Anthropocentrism	.703	5.135E-02
Ethic 11 Ecological Ecocentrism	.547	.389
Ethic 05 Ecocentrism	.423	.147
Ethic 12 Ecological Phenomenalism	-.207	.818
Ethic 09 Ecological Sentientism	-3.620E-02	.815
Ethic 10 Ecological Biocentrism	-8.568E-02	.807
Ethic 08 Ecological Conativism	-2.877E-02	.781

Table 27: Principal components analysis for Scale 4: Beliefs in Environmental Ethics

The analysis converged in three rotations, finding two factors that explained 60% of the variance: the first for the "upper" non-ecological ethics, and the second for the "lower" ecological ethics. Ethic 11 cross-loaded on both scales, but was considered to be acceptable for inclusion into one factor, given the problematic nature of the wording. Ethic 7, Ecological Anthropocentrism, loaded onto factor one. Though it had the lowest loading weight, it remained an anomalous result.

To explain the results, a brief synopsis of the conceptualized relationship of the ethical categories is provided, before being applied to interpret the results. The

Continuum of Environmental Entities, shown in Figure 1, identified six categories of entities in the environment. Figure 5 showed the twelve types of conceptualized environmental ethics, organized into two dimensions. Six of the categories (1- 6) were ordered along a horizontal continuum of increasing inclusivity of moral considerability of the environmental entities, from only humans to everything in the environment. Thus, in the Anthropocentrism category, only humans have moral considerability. The vertical dimension of the continuum distinguishes beliefs about whether or not the environment needs protecting. The upper dimension is for beliefs that the environment does not need protecting, while the lower dimension is for beliefs that the environment does need protecting. As noted before, this allowed beliefs about intrinsic value of entities to be assessed independently of beliefs in the need to protect the environment. Thus, in the upper dimension of the Continuum of Environmental Ethics (categories 1 - 6), no category included beliefs that the environment needs protecting, while categories (7 - 12) in the lower dimension of the continuum, were for beliefs that the environment needs protecting. With this arrangement, beliefs about intrinsic value of the an entity in the environment could be held constant, while beliefs about the need to protect the environment could vary. And beliefs about intrinsic value could be allowed to vary while beliefs about the need to protect the environment were be held constant. The design of the survey allowed each of these beliefs to be held constant and used as the dependent or independent variable as the statistical analyses required.

The results of the goodness of fit tests suggested that the scale did not meet factor analytic statistical tests for performance as one scale with Eigen values set at one. These results were contemplated in light of the originally theorized Continuum of

Environmental Ethics. Upon reflection, it was observed that the Continuum was originally theorized to have two dimensions: an "upper" dimension that measured beliefs in intrinsic value, and a "lower" dimension that measured both intrinsic value and the importance of protecting the environment. The twelve categories provide a framework for distinguishing twelve types of environmental ethics, by reducing an environmental normative ethical theory into two dimensions.

Given the findings of scale internal consistency alpha of 0.83 for the twenty items in Scale 4, the factor analysis that identified two factors in it, the five pairs of items an internal consistency test was conducted for the ten items used to test for the five ethics in the "upper" dimension of the ethic. An alpha of 0.90 was found. Given the small population, this coefficient of internal consistency is good. The six pairs of items comprising the six ethics in the lower scale were also tested, with an alpha of 0.69 found. The items for Ethic 11, Ecological Ecocentrism, have been shown to provide responses that were unexpected, and may be due to the unusual wording of the items (inclusion of the phrase, "except for wildness and beauty"). When Ethic 11was removed from the scale, the alpha remained at 0.69. The scale was tested without Ethic 7, Ecological Anthropocentrism, and yielded the remarkable results of an increase in the alpha to 0.85 for eight items which measure four categories of environmental ethics using complexly worded items. Scale internal consistency was run for Ethic scale taken as a whole, using the 11 pairs of items, and found an alpha of .072 for the twenty items, and an alpha of 0.68 if the items for Ethics 7 and 11 were eliminated. This alpha exceeds the research goal of standardized coefficient of internal consistency of 0.62 for the scale.

Given the complex nature of the constructs in the ethics scale, and the compound items used to measure those constructs, a series of maximum likelihood goodness of fit tests were run. The results showed that the data did not fit the tests for 1, 2, 3 and 4 factors.

One of the original research questions was to assess how beliefs in the need to protect the environment (the dependent variable) varied with beliefs in environmental values and ethics. The beliefs in environmental values and ethics were organized into a number of scales, but the critical scale is beliefs in intrinsic value, as it is the foundation of various environmental ethics in the literature, and the belief in intrinsic value was used to define the six categories of an environmental ethic, with most inclusive beliefs about intrinsic value at one end of the continuum of ethics, in categories 6 and 12, and the least inclusive in categories 1 and 7.

It was predicted that the items measuring ethical categories that were on opposite ends of the continuum would have an opposite linear relationship, and that the slope of the relationship would decline as the categories in the continuum reached the middle of the continuum. The correlations showed a generally inverse relationship between responses to the ethics 1 and 6, and 7 and 12, the ethics that are the farthest apart, anchoring ends of the Continuum of Environmental Ethics, and a lesser degree of such relationships for the ethics in the middle of the Continuum of Environmental Ethics, empirically confirming that the items represent different ethics across the hypothesized continuum.

The distribution of population mean scores for the 11 ethics were tested, and are shown in Figure 40. It moderately fits the normal distribution curve, with the total number of mean scores of 3.80 slightly above the middle of the scale.

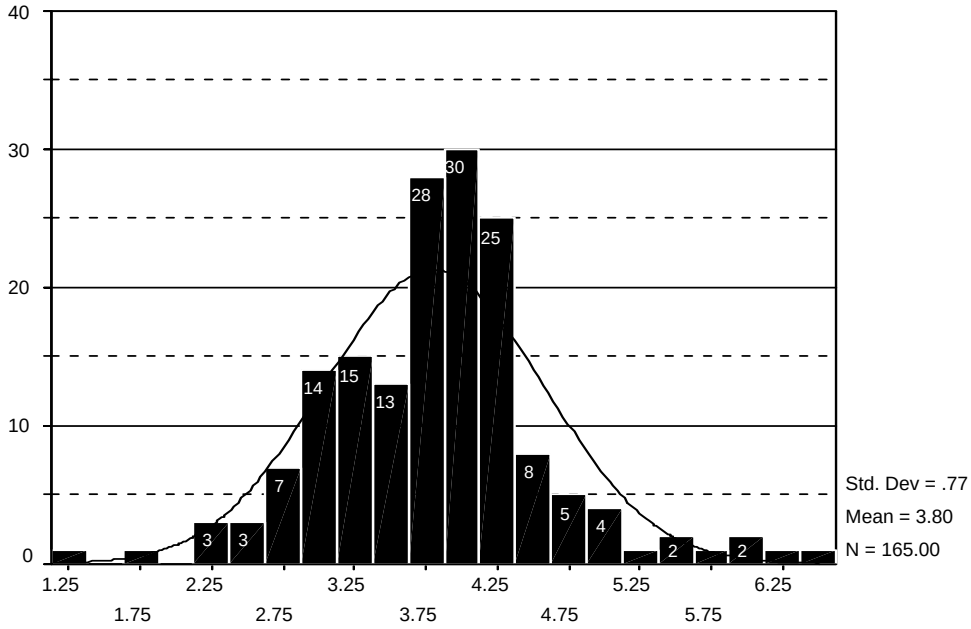

Figure 40: Distribution of population mean scores for twelve types of ethics in Scale 4: Environmental Ethic

The results of the data analysis for scores to the conceptualized scale for environmental show a satisfactory coefficient of internal consistency (.73) for the twenty two items tested for the scale, particularly when the complexity of the eleven ethics that were tested for inclusion into a single scale is taken into account. The good variability of response to the items in the scale, and the normal distribution of population mean scores suggests that Scale 4 be considered as one scale. However, the factor analysis finding of two factors, and the statistically insignificant correlations between the "upper" and

"lower" portions of the scale led to the reconsideration of the scale of environmental ethics as potentially comprising two scales: one for beliefs in the intrinsic value of the environment, which is Subscale 2.1, a scale with high internal consistency and with one factor. The second scale would be beliefs in the need to protect the environment, which closely matches Subscale 3.2, beliefs in the need to protect the environment for human well-being. The scale development phase of the research found that the complex construct of an environmental ethic appeared to best measured as the combination of two scales that independently measured two distinct concepts that comprise an ethic: beliefs in intrinsic value, and beliefs in the need to protect the environment, which can be considered together in the formation of the complex construct of an environmental ethic.

Scale 4: Tests for Ability to Categorize Respondents into Ethical Categories

A research goal was to develop an instrument that could categorize respondents into types of ethical beliefs. Respondents strength of agreement with the two statements concerning each ethic were identified for several levels of agreement. The high levels of agreement to both of the items used to measure belief in the environmental ethic are in Table 28, which documents the percent of respondents who had average scores of 4.5, 5, 6, 6.5 and 7. If respondents had given the score of "7" for only one ethic, this could reasonably have been used to represent the distribution of respondents indicating belief in that ethic.

Ethic	Percent Scoring >4.5	Percent Scoring >5.0	Percent Scoring >5.5	Percent Scoring>6.0	Percent Scoring>6.5	Percent Scoring>7
Ethic 1	14.4	9.6	5.3	3.7	2.7	1.6
Ethic 2	12.3	9.1	5.9	3.7	2.1	1.6
Ethic 3	12.8	8.6	5.9	4.3	2.1	0.5
Ethic 4	16	11.8	7.5	4.8	2.7	0.5
Ethic 5	missing					
Ethic 6	18.7	10.7	5.9	4.8	1.1	0.5
Ethic 7	28.9	20.3	12.8	9.1	5.9	4.3
Ethic 8	59.4	53.5	44.9	33.2	21.9	17.1
Ethic 9	70.6	61.5	46.5	34.8	24.6	18.7
Ethic 10	71.7	64.7	51.9	43.3	35.8	27.3
Ethic 11	36.4	29.9	20.3	13.9	9.6	5.3
Ethic 12	74.9	67.4	55.1	47.6	32.1	25.7
	360.6	308	237.4	186.7	131	98.9

Table 28: Percent respondents by levels of agreement with ethical categories

Further analysis was conducted to identify if respondents gave a "7" score to more than one ethic, the results, found that 56.1% of respondents did not have an average score of "7" for any ethic, that 17.1% averaged "7" for only one ethic, and that 26% gave a pair of "7"'s to the two items measuring the environmental ethic for two or more ethics.

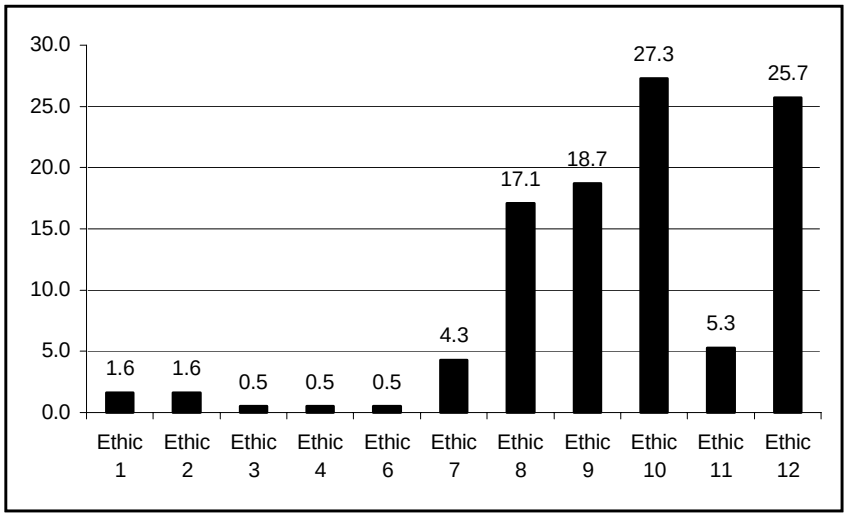

Figure 41: Bar chart of percent respondents indicating "Strongly Agree" to both items in environmental ethic.

The mean population scores for environmental ethics showed stronger support for ethics that were more inclusive, those that included beliefs about intrinsic value for more environmental entities, and the strongest support for the ecological set of ethics, those that included both beliefs in intrinsic value and beliefs in the need to protect the environment, shown in Figure 41.

These results indicate that the initial research interest in developing a system of ethics that is more inclusive of the complexity of beliefs that appear to be present was well justified. The population means indicate that at least six types of ethics are strongly supported. An analysis of individual responses showed that respondents tended to provide strongest responses to the ethics that were closest to each other on the Continuum of Environmental Ethics, a response pattern that meets with logical expectations for consistency of response, and provides additional evidence that the scale is reliably measuring the constructs of an environmental ethic. It also suggests that the initial research goal of identifying a system of environmental ethics that are mutually exclusive may have been achieved for logically exclusive categories, but that respondents will indicate strong agreement with more than one category if give opportunity to do so. This suggests that people may hold multiple values at the same time, a view amply supported by the literature, and it may speak to the complexity of beliefs regarding environmental values. Either of these suggestions indicates that there is a need for further exploration of the complexity of beliefs, and that instruments which provide the opportunity to measure only two ethics or worldviews may significantly oversimplify held beliefs.

Research Objective 4.5: Development of Scale 5: Belief in Willingness to Protect the Environment (General), Legally

This scale was developed to measure belief in willingness to protect the environment, and was operationalized to have a strong measure of belief, by asking about belief in the need to legally protect the environment, on the judgment that beliefs in the need to protect by having laws would have less support than beliefs that the environment needed protection. Items were tested of the form, "Laws should exist to protect x", as well as "Laws should exist to protect x from suffering." The scale internal consistency analysis showed that items which included the phrase "from suffering" had higher internal consistency of response and also provided good variability of response. The mean population score was 5.2, with a high internal consistency (alpha = 0.83) for four items, shown in Table 29.

Item Number	Item
VAR0382A	Laws should exist to protect mammals from suffering
VAR0449A	Laws should exist to protect primates (other than people) from suffering
VAR0389A	Laws should exist to protect horses from suffering
VAR0446A	Laws should exist to protect dogs and cats from suffering

Table 29: Items in Scale 5: Beliefs in Willingness to Protect the Environment (general), Legally

The distribution of responses to the scale is shown below in Figure 42.

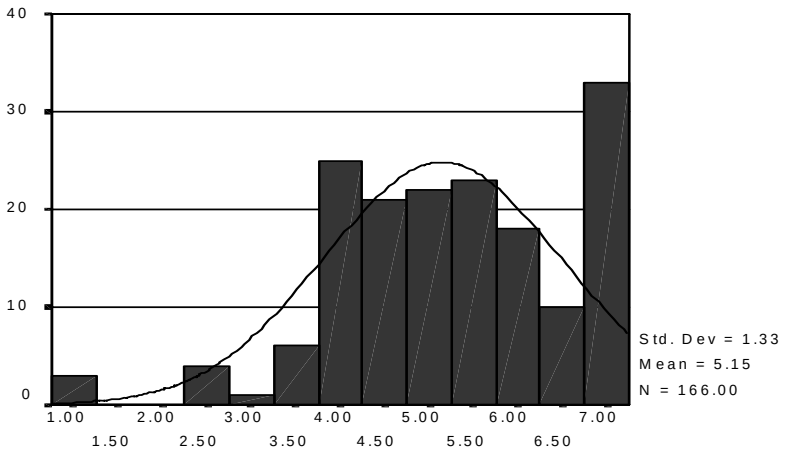

Figure 42: Distribution of population mean scores to Scale for Beliefs in Willingness to Protect the Environment (general), Legally

A principal components factor analysis was conducted, and is shown in Table 30.

Total Variance Explained

Component	Initial Eigen Values Total	% of Variance	Cumulative %
1 382 Laws should exist to protect mammals from suffering	2.626	65.7	65.7
2 389 Laws should exist to protect horses from suffering	.635	15.7	81.5
3 446 Laws should exist to protect dogs and cats from suffering	.379	9.7	91.0
4 449 Laws should exist to protect primates (other than people) from suffering	.361	9.0	100.000

Extraction Method: Principal Component Analysis.

Table 30: Principal Component Analysis for Scale 5: Belief in Willingness to Protect Environment (general), Legally

The analysis found one factor among the four items that accounted for 100% of the variance of response, and each had a communality of 1.0. The items in Scale 5, Willingness to Protect the Environment (general), Legally, provided a level of internal consistency that exceeded the research goal, while providing good variability of response.

Interscale Data Analysis

Predictive Capacity of Scales for Willingness to Protect the Environment (General), Legally

To assess the contribution of each scale and subscale to the dependent variable of willingness to protect, an ANOVA was run for all the scales, and then with each scale and subscale as an independent variable. Table 31 reports the results, which show a remarkably strong capacity of the scales to predict willingness to protect to Protect environment (general), Legally.

	Scale or Subscale Name	No. Items	R (predictor Scale 5)	Adj. R^2 (predictor Scale 5)
1.	Beliefs in the Environment's Capacities (general)	11	.4	.15
1.1	Beliefs in the Environment's Capacity for Conativity (general)	5	.31	.09
1.2	Beliefs in the Environment's Capacity for Sentience (general)	6	.43	.18
2.	Beliefs in Value of the Environment (general)	22	.83	.69
2.1	Beliefs in Intrinsic Value of Environment (general)	8	.55	.29
2.2	Beliefs in Rights of Environment (general)	7	.83	.69
2.3	Beliefs in Use Value of Environment (general) to Humans	7	.62	.38
3.	Beliefs in Moral Need to Protect Environment (general)	13	.59	.34
3.1	Beliefs in Moral Acceptability of Four Uses of Environment (general)	6	.17	.02
3.2	Need to Protect Environment (general) for Human Well-being	6	.74	.54
4.	Beliefs in Environmental Ethics	22	.67	.40
5.	Beliefs in Willingness to Protect the Environment (general), Legally	4	-	-
	ANOVA of Scales 1, 2, 3 for Scale 5		.83	.68
	ANOVA of all Scales (including 11 ethics) for Scale 5	73	.88	.73

Table 31: ANOVA's for scales 1 - 4 to predict Scale 5: Beliefs in Willingness to Protect the Environment (general), Legally

Figure 43. below, shows a plot that provides a visual test of the capacity of the independent variable of the three scales (scales 1, 2, and 3) to predict the dependent variable of the scale willingness to protect. The errors in the regression model are the residuals, and if the error is high, then the plot does not follow the plot line for a normal distribution. The standardized residuals are the residual difference between the observed value of the dependent variable (willingness to protect) and the value predicted by the model (the error). The plot graphs the predicted values (standardized to have mean 0 and standard deviation of 1) divided by the values in the data (standardized to have mean of 0 and standard deviation of 1). If the model fits the data and the error is low, the difference between them is low and residuals are normally distributed and follow the line for normal distribution. The results show that the residuals are closely distributed about the line, demonstrating that the four scales were able to predict the values for willingness to protect the environment.

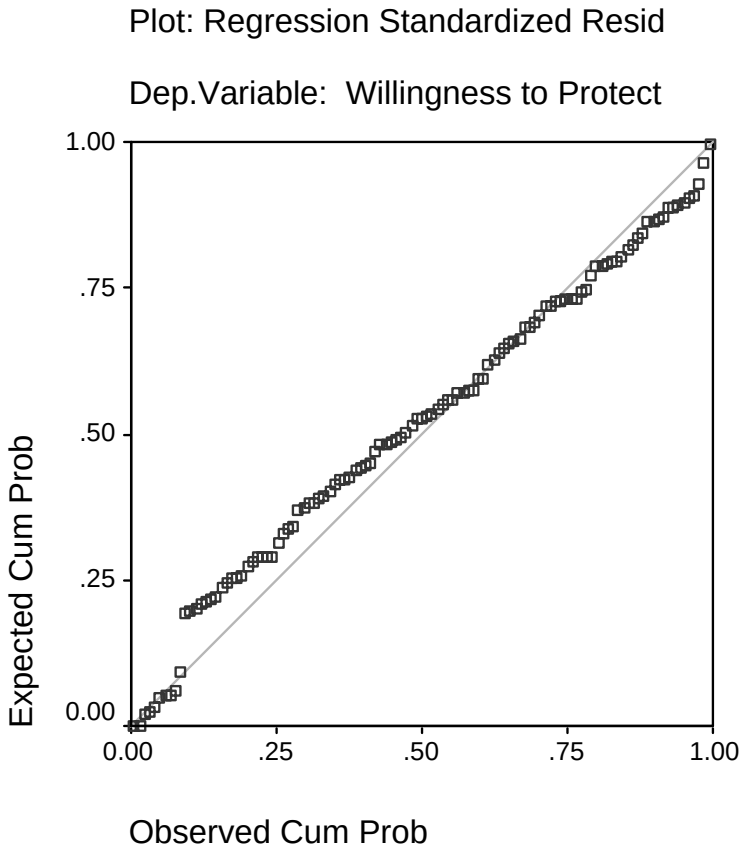

Figure 43: Plot of standardized residual error for ANOVA (Scales 1, 2, 3 independent, Scale 5 dependent)

Research Objective 5: Correlate Population Demographics to Beliefs in Environmental Ethics

As noted in the section that described the findings for Scale 4, Belief in Environmental Ethics (the unexpectedly strong responses to multiple categories of ecological ethics scale) the identification of a single ethic for each respondent was not found. Therefore, a demographic analysis that involved the cross tabulation of a single individuals' ethic to their demographic characteristics could not be performed. It is recommended that use of the scale include a single additional item that has respondents

indicate which item statement describing an ethic they most prefer, which would permit the self-identification of their ethic. At this stage of the research, the items have not and should not contain the name of the ethic, to reduce potential for measurement error that would result from responses that conflated beliefs concerning the name of the ethic with beliefs about the concept indicated by the statement in the item.

Summary

Five scales and seven subscales were developed to measure beliefs in environmental values and ethics. The face validity, construct validity, and internal consistency for these scales have been documented through a variety of measures, including extensive conceptual development and operationalization of the measures, external expert review, systematic development of a large item bank, and administration of a survey instrument to collect data on the items that supported statistical analyses to reduce the items into scales and subscales that demonstrated high internal consistency and logically expected population mean scores. The instrumentation process supported, within this population, the ability to measure in-depth three covariants of interest to the field: beliefs in environmental capacities, beliefs in environmental values and ethics, and beliefs in willingness to protect the environment.

The heuristic is helpful for systematically considering complex beliefs in environmental values and ethics, and doing so in ways that facilitate discussion and clarification of shared values, and differences in values.

The twelve types of environmental ethics provide a set of clearly defined and tested statements that provide the field with working definitions of complex ethical beliefs that respondents were able to consistently distinguish between, and provided variability of response. The population sampled was able to distinguish and provide variability of response for complex beliefs concerning environmental values and ethics, including indirect versus direct moral obligations, and intrinsic and use values.

The five scales work well together to measure a range of moral notions concerning the environment, and when used together provide a tool with the capacity to distinguish between beliefs that were previously conflated in research or interpretation. The environmental ethics scale distinguished beliefs in anthropocentrism versus Biocentrism versus Ecocentrism, etc.

The mean scores for the population on the scale meet logical expectations for their relationships, and are in accord with similar measures in the literature. Respondents had moderately strong belief in the Capacity of the Environment (general) (mean = 5.0) and lower scores on beliefs in Intrinsic Value of the Environment (general (mean = 4.6), high scores on the Use Value of the Environment (general) to Humans (mean = 5.5), much lower scores on the Moral Acceptability of Four Uses of Environment (general) (mean = 4.8), and high scores on the Willingness to Protect the Environment (general), Legally scale (x = 5.2). The most remarkable finding: 95% of respondents, gave responses that indicated that they were in the group of six "ecological ethics" that indicated that "we needed to protect the environment". Respondents were not given the names of any of the ethics at any point in the administration of the instrument.

The high correlations between the scales, and strong ability to predict willingness to protect (adjusted $r^2 = 0.73$), demonstrated a stronger capacity of the scales to measure complex beliefs than was anticipated, providing the field with a new tool for more systematically measuring these beliefs.

CHAPTER 6

RECOMMENDATIONS AND CONCLUSIONS

This research project developed a heuristic for consideration of the complex topic of environmental values and ethics, a 22-item instrument to measure environmental ethics, and a longer instrument to measure beliefs in environmental capacities, beliefs concerning treatment of the environment, beliefs concerning human need for the environment, willingness to protect the environment, and the environmental ethics scale.

Heuristic for Considering Diversity of Environmental Values and Ethics

The field of environmental education includes a wide range of volunteers and professionals committed to improving the environment. Many dedicated educators have sought to engage students and the public in discussions on environmental values and ethics, which has generated interest in obtaining additional tools addressing values and ethics. Given the importance of self-knowledge, educators have sought tools to increase awareness and understanding of their environmental values and ethics, and to increase insight into the values of others. To meet these needs, the heuristic for considering environmental values and ethics was developed. It provides a flexible method for considering the multidimensionality of environmental values and ethics, and was a vital

tool in the development of the research question, literature review, and the methods used in this research. It is recommended that the heuristic be developed and tested for use as a free-standing tool for educators to use to consider their environmental values and ethics, and that a curriculum component be developed for use as desired by environmental educators with adults, and secondary students.

The concerns of Norton (1995) that environmentalists embrace value pluralism in their efforts to build coalitions to address environmental issues led to this project's interest in identifying shared values as well as carefully identifying differences. It is recommended that the heuristic be further developed to aid environmentalists and those involved in environmental issues with identifying their common values, so they can better identify their commonalities, and to make clearer where differences lie.

Scale for Beliefs in Environmental Ethics

The strong interest in environmental education in environmental ethics suggested that a non-judgmental tool for quickly identifying beliefs in environmental ethics might be of value to the field. The environmental ethics scale provides the deepest and broadest measure of beliefs in ethics to date, and may be of use to others interested in exploring the relationship of environmental ethics and values to other variables of interest.

Therefore, it is recommended that the ethics scale be tested with randomly selected populations, and in conjunction with other instruments, to test for internal consistency with, reliability across, and validity with different populations. Confirmation of these characteristics of the scale will increase its utility to educators and others interested in using the heuristic and the ethics scale. To increase the resolution of the

scale for environmental ethics, an item should be added to allow respondents to identify which ethic they most prefer.

The growing animal rights movement and national interest concerning animal treatment suggested that the ethics scale, as a scale that measures what entities (including animals) deserve direct moral consideration and rights, be incorporated into longitudinal surveys to that will help track public opinion concerning this salient issue.

Research Scales

The research scales provide a comprehensive and systematic method for measuring complex environmental values and ethics. It is recommended that the set of scales be tested with a randomly selected population, and with various populations, to check for internal consistency and reliability with different groups. It is also suggested that demographic questions be adjusted to match standard items used in political science survey research. The five scales and seven subscales that were developed appear to provide educators with a set of tools that could be used to assess learners beliefs and values for use in developing educational programs or strategies, and for assessing the impacts of educational interventions.

The development of the scales and subscales involved significant reductions in the number of items used in order to obtain an efficient research instrument with few items. The process of item reduction identified the potential for scales and subscales to be developed for individual species of animals. It is recommended that scales be developed for primates, horses, cows, and dogs, and other species of particular interest to educators, to support measurement of beliefs concerning the capacity of these entities to

suffer, to identify the acceptability of various treatments of these animals, as well as willingness to protect them, legally. Given the widespread concern for animal rights expressed in the exploratory survey, and addressed in the literature, it is recommended that the scales be used to create a longitudinal survey to track public opinion on the capacity of several animals, beliefs in the acceptability of various human uses, and support for protection laws.

Educators, administrators, and researchers in the field are also committed to providing excellence in teaching, and in evaluating the impact of educational and experiential programming. It is also recommended that the scales be utilized as part of evaluation efforts to determine their utility for this application. Pre and post testing to determine if educational interventions change beliefs about the capacities, intrinsic value, use value, beliefs about the acceptability of animal use in research, zoos, or as food, and their ethics, or willingness to protect, may provide educators with evidence of the impacts of their programming, if conducted as part of more comprehensive evaluations.

The development of the scales with the intentional population suggests that the instruments be tested with larger populations. Beliefs in the ecological ethics were higher than expected with the population tested.

As suggested above, the instrument should be tested with a large, random sample to determine its internal consistency with, and reliability across, diverse populations. If it is determined to have adequate internal consistency and reliability, then the instrument should be considered in longitudinal studies of environmental values and ethics. No present research projects provides longitudinal data on moral values and beliefs concerning the environment, a data gap that presents serious challenges to the

understanding of the relationship of human moral beliefs concerning the environment and support for environmental protection.

Given the strong interest in the literature in the relationship of beliefs in environmental ethics and values to support environmental protection, data gathered from the testing phase of the instrumentation process should be analyzed to identify the prevalence of various environmental ethics, and their relationship to support for environmental policy.

The ability of the instrument to measure, for the selected population, this set of complex beliefs that are related to support for environmental policies to protect animals and the environment suggests that, subsequent to testing and validation of the instruments, these instruments may have usefulness for researchers interested in assessing these beliefs in the general population, or with groups of individuals with whom they interact. It is recommended that the scales be incorporated into other research instruments that seek to identify the relationship of environmental knowledge, attitudes, values and ethics, to support for environmental protection

Finally, given the widespread interest in animal treatment, it is suggested that a reduced instrument be developed to assess beliefs in animal capacities, treatment, and willingness to protect, suitable for use in national surveys, to develop a refined set of baseline and trend data for this issue.

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APPENDIX A

EXPLORATORY SURVEY

Humans Subjects Review Board Exemption
Approved: May 18, 2000
Protocol number: O1E0133

Exploring environmental ethics

While almost everyone cares about the environment to some degree, people have different ideas about how much to protect the environment, and why. Please help a student at OSU develop a new survey by carefully answering the following questions. It may take about 25 minutes to complete.

Ethics is the study of morality, or what people believe is right and wrong. For each question, please write what ***you*** think is morally right or wrong. The purpose of these questions is not to judge if your ethics are "good" or "right", but to help me understand the very diverse ethical beliefs of people. Your answers will be kept anonymous, so please answer as thoroughly as you can. Feel free to add additional pages if you wish. Enjoy the thought provoking questions!

Ron Meyers, Ph.D. Candidate,
Joe Heimlich, Assistant Professor,
The Ohio State University School of Natural Resources

1. What general kinds of actions, if any, do you believe are ok to do to animals, and why?

2. What general kinds of actions, if any, do you believe are wrong to do to animals, and why?

3. What rights or interests, if any, do you believe animals have, and why?

4. What new laws, if any, should there be to protect animals, and what laws, if any, protecting animals should be repealed? Please explain why.

5. What general kinds of actions, if any, do you believe are ok to do to the rest of the environment (e.g., the environment other than animals and humans: i.e., plants, air, soil, water, ecosystems, etc.), and why?

6. What general kinds of actions, if any, do you believe are wrong to do to the rest of the environment (e.g., the environment other than animals and humans, i.e., plants, air, soil, water, ecosystems, etc.), and why?

7. What rights, if any, do you believe the rest of the environment (e.g., the environment other than animals and humans, i.e., plants, air, soil, water, ecosystems, etc.) should have, and why?

8. What new laws, if any, should there be to protect the rest of the environment (e.g., the environment other than animals and humans, i.e., plants, air, soil, water, ecosystems, etc.), and what laws, if any, protecting the rest of the environment should be repealed? Please explain why.

9. Personal characteristics. Please indicate the following:

Your occupation? _____

Education? ☐ Some H.S. ☐ Some College ☐ Ph.D. et al student
☐ H.S. Diploma/GED ☐ Masters' student ☐ Ph.D. et al
☐ B.S/BA. ☐M.S/MA./et al.

Your area of study? _____

Your age? ____

Your sex? ☐ Female ☐ Male

Your ethnicity? ☐ Black/African Am.
☐ Hispanic/Mexican American/Latino
☐ Native American/American Indian/Native Alaskan
☐ White/Caucasian
☐ Asian/Islander
☐ MultiRacial
☐ Other (Please specify) _____

10. Please feel free to write additional comments or information below concerning this questionnaire.

Thanks for helping! If you want to discuss this further, please contact Ron Meyers at meyers.87@osu.edu

APPENDIX B

INSTRUMENTATION SURVEY INSTRUMENT

The instrument was reformatted to fit the page.

The Environment and You:
A survey on environmental ethics

What to do about environmental issues is a challenging question in society. Some people believe that we protect the environment too much, while other believe that we protect it too little. To improve environmental policies, we need to know a lot more about what people believe. To know more, we need to develop new surveys. You can help by filling out this "long-form" of a survey: it contains much variation on the same questions, to find out which questions work the best. Your responses will be used to develop a much shorter survey for public use. (You might even find it interesting to do!)

This survey asks what ***you*** believe are the right and wrong ways to treat the environment. The purpose is not to judge if your ethics are "good" or "right". Your answers will be kept anonymous. It will take you about 45 minutes to complete. Enjoy the questions, and thank you for doing this!

Ron Meyers, Ph.D. Candidate
Joe Heimlich, Assistant Professor,
School of Natural Resources
The Ohio State University
614-292-8436

1. These questions ask about *your beliefs* about the capacities of animals to have different types of mental experiences. These questions are in random order.

   Please indicate how much you agree or disagree with what each statement says, using a range from one (1) to seven (7), where "1" stands for "strongly disagree", and "7" stands for "strongly agree. Please circle your response and use the following scale:

   1 = strongly disagree
   2 = disagree pretty strongly
   3 = slightly disagree
   4 = neutral or undecided
   5 = slightly agree
   6 = agree pretty strongly
   7 = strongly agree

   To help us identify which questions to include in the shorter survey, please indicate whether or you not you like the question by circling Yes (Y) or No (No) in the last column on the right. If you like the question, please rank how much you like it from one (1) to (ten), with 1 the lowest, and 10 the highest.

	Strongly Disagree			Neutral			Strongly Agree	Like Question?	How much? (1-10)
001. A 10 yr old child can experience fear	1	2	3	4	5	6	7	Y / N	
002 Cats and dogs have a spirit	1	2	3	4	5	6	7	Y / N	
003 Mammals have some type of spirit	1	2	3	4	5	6	7	Y / N	
004 Invertebrates (worms, insects, lobster, etc.) can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
005 Birds, reptiles and amphibians can reason (i.e., are able to solve problems)	1	2	3	4	5	6	7	Y / N	
006 Cats and dogs can reason (i.e., are able to solve problems)	1	2	3	4	5	6	7	Y / N	
007 Cows have some type of spirit	1	2	3	4	5	6	7	Y / N	
008 Trees and plants have a soul	1	2	3	4	5	6	7	Y / N	
009 Invertebrates (worms, insects, lobster, etc.) can experience consciousness (e.g., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
010 Fish, including sharks have some type of spirit	1	2	3	4	5	6	7	Y / N	
011. Mammals can make plans for the future	1	2	3	4	5	6	7	Y / N	
012 Invertebrates (worms, insects, lobster, etc.) have a spirit	1	2	3	4	5	6	7	Y / N	
013 Fish and sharks can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
014 Cats and dogs can experience consciousness	1	2	3	4	5	6	7	Y / N	
015 Cows can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
016. A 10 yr old child can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
017. A 10 yr old child can consciously plan for events in the future	1	2	3	4	5	6	7	Y / N	
018 Cows have a soul	1	2	3	4	5	6	7	Y / N	
019 Mammals can experience loneliness	1	2	3	4	5	6	7	Y / N	
020. Mammals can experience consciousness	1	2	3	4	5	6	7	Y / N	
021 The earth can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
022 Horses can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
023 A 10 yr old child has a soul	1	2	3	4	5	6	7	Y / N	
024 A 10 yr old child can reason	1	2	3	4	5	6	7	Y / N	
025. A 10 yr old child can experience loneliness	1	2	3	4	5	6	7	Y / N	
026 Horses can experience loneliness	1	2	3	4	5	6	7	Y / N	
027 Cats and dogs can consciously plan for events in the future	1	2	3	4	5	6	7	Y / N	
028 Cats and dogs have a soul	1	2	3	4	5	6	7	Y / N	
029 Birds, reptiles and amphibians can experience physical pain	1	2	3	4	5	6	7	Y / N	
030 Birds, reptiles and amphibians can experience boredom	1	2	3	4	5	6	7	Y / N	
031 Mammals can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
032 Birds, reptiles and amphibians have a spirit	1	2	3	4	5	6	7	Y / N	
033 Horses can experience fear	1	2	3	4	5	6	7	Y / N	
034 Cows have a spirit	1	2	3	4	5	6	7	Y / N	
035 A 10 yr old child can experience consciousness (i.e., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
036 Birds, reptiles and amphibians can experience consciousness	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
037 Invertebrates (worms, insects, lobster, etc.) can experience fear	1	2	3	4	5	6	7	Y / N	
038 Invertebrates (worms, insects, lobster, etc.) can reason (i.e., are able to solve problems)	1	2	3	4	5	6	7	Y / N	
039 Cats and dogs can suffer anguish or frustration(different from physical pain)	1	2	3	4	5	6	7	Y / N	
040 Cows can experience consciousness	1	2	3	4	5	6	7	Y / N	
041 Invertebrates (worms, insects, lobster, etc.) have a soul or spirit	1	2	3	4	5	6	7	Y / N	
042 Fish and sharks can experience consciousness	1	2	3	4	5	6	7	Y / N	
043 The whole earth is a living organism	1	2	3	4	5	6	7	Y / N	
044 Rocks, soil, water in rivers and lakes have some type of spirit	1	2	3	4	5	6	7	Y / N	
045 Cats and dogs can experience fear	1	2	3	4	5	6	7	Y / N	
046 Mammals can reason (i.e., is able to solve problems)	1	2	3	4	5	6	7	Y / N	
047 Horses have a spirit	1	2	3	4	5	6	7	Y / N	
048 Cows can reason	1	2	3	4	5	6	7	Y / N	
049 Invertebrates (worms, insects, lobster, etc.) have a soul	1	2	3	4	5	6	7	Y / N	
050 Mammals have a soul	1	2	3	4	5	6	7	Y / N	
051 Fish, including sharks have a soul or spirit	1	2	3	4	5	6	7	Y / N	
052 Invertebrates (worms, insects, lobster, etc.) have some type of spirit	1	2	3	4	5	6	7	Y / N	
053 The earth can consciously plan for events in the future	1	2	3	4	5	6	7	Y / N	
055 Birds, reptiles and amphibians can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
056 Horses can experience physical pain	1	2	3	4	5	6	7	Y / N	
057 Cows can experience loneliness	1	2	3	4	5	6	7	Y / N	
058 Cows can experience consciousness (e.g., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
059 Invertebrates (worms, insects, lobster, etc.) can consciously plan for events in the future	1	2	3	4	5	6	7	Y / N	
060 A 10 yr old child can experience physical pain	1	2	3	4	5	6	7	Y / N	
061 Horses can reason (i.e., are able to solve problems)	1	2	3	4	5	6	7	Y / N	
062 A 10 yr old child has some type of spirit	1	2	3	4	5	6	7	Y / N	
063 Birds, reptiles and amphibians have a soul	1	2	3	4	5	6	7	Y / N	
064 A 10 yr old child can experience consciousness	1	2	3	4	5	6	7	Y / N	
065 A 10 yr old child can reason (i.e., is able to solve problems)	1	2	3	4	5	6	7	Y / N	
066 Trees and plants can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
067 Cows can experience physical pain	1	2	3	4	5	6	7	Y / N	
068 Cows can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
069 Birds, reptiles and amphibians can experience loneliness	1	2	3	4	5	6	7	Y / N	
070 Fish and sharks can reason	1	2	3	4	5	6	7	Y / N	
071 Invertebrates (worms, insects, lobster, etc.) can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
072 Fish and sharks can experience boredom	1	2	3	4	5	6	7	Y / N	
073 Cats and dogs can experience loneliness	1	2	3	4	5	6	7	Y / N	
074 Mammals have a soul or spirit	1	2	3	4	5	6	7	Y / N	
075 Fish and sharks can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
076 Horses have a soul or spirit	1	2	3	4	5	6	7	Y / N	
077 Horses have some type of spirit	1	2	3	4	5	6	7	Y / N	
078 Rocks, soil, water in rivers and lakes have a spirit or soul	1	2	3	4	5	6	7	Y / N	
079 Fish, including sharks can consciously plan something in the future	1	2	3	4	5	6	7	Y / N	
080 A 10 yr old child has a spirit or soul	1	2	3	4	5	6	7	Y / N	
081 Birds, reptiles and amphibians can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
082 Horses can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
083 Fish and sharks can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
084 Birds, reptiles and amphibians can experience consciousness (e.g., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
085 Birds, reptiles and amphibians can experience fear	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
086 Cows have a soul or spirit	1	2	3	4	5	6	7	Y / N	
087 Mammals can experience physical pain	1	2	3	4	5	6	7	Y / N	
088 Cows can reason (i.e., are able to solve problems)	1	2	3	4	5	6	7	Y / N	
089 Horses can experience consciousness (e.g., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
090 Invertebrates (worms, insects, lobster, etc.) can experience loneliness	1	2	3	4	5	6	7	Y / N	
091 Cats and dogs can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
092 The whole earth can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
093 Fish, including sharks have a spirit	1	2	3	4	5	6	7	Y / N	
094 Cows can consciously plan for events in the future	1	2	3	4	5	6	7	Y / N	
095 Mammals can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
096 Birds, reptiles and amphibians can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
097 Cats and dogs can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
098 A 10 yr old child can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
099 Fish and sharks can experience loneliness	1	2	3	4	5	6	7	Y / N	
100 Cats and dogs can experience boredom	1	2	3	4	5	6	7	Y / N	
101. Mammals can experience happiness or sadness	1	2	3	4	5	6	7	Y / N	
102 Rocks, soil, water in rivers and lakes have a spirit	1	2	3	4	5	6	7	Y / N	
103. Mammals can reason	1	2	3	4	5	6	7	Y / N	
104 Trees and plants can feel physical pain	1	2	3	4	5	6	7	Y / N	
105 Fish and sharks can reason (i.e., are able to solve problems)	1	2	3	4	5	6	7	Y / N	
106 Cows can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
107 Horses can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
108. A 10 yr old child can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
109 The earth is a living organism	1	2	3	4	5	6	7	Y / N	
110 Fish and sharks can experience fear	1	2	3	4	5	6	7	Y / N	
111 Mammals can experience boredom	1	2	3	4	5	6	7	Y / N	
112 Trees and plants have a spirit or soul	1	2	3	4	5	6	7	Y / N	
113 Invertebrates (worms, insects, lobster, etc.) can experience boredom	1	2	3	4	5	6	7	Y / N	
114 Birds, reptiles and amphibians can reason	1	2	3	4	5	6	7	Y / N	
115 Mammals have a spirit	1	2	3	4	5	6	7	Y / N	
116 Mammals have some type of spirit	1	2	3	4	5	6	7	Y / N	
117 Invertebrates (worms, insects, lobster, etc.) can experience physical pain	1	2	3	4	5	6	7	Y / N	
118 Cats and dogs can experience fear	1	2	3	4	5	6	7	Y / N	
119 Mammals can experience consciousness (e.g., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
120 Cats and dogs can experience physical pain	1	2	3	4	5	6	7	Y / N	
121 Fish and sharks can experience consciousness (e.g., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
122 Horses can experience boredom	1	2	3	4	5	6	7	Y / N	
123 Cows can experience boredom	1	2	3	4	5	6	7	Y / N	
124 Cats and dogs have a soul or spirit	1	2	3	4	5	6	7	Y / N	
125 Birds, reptiles and amphibians have a spirit or soul	1	2	3	4	5	6	7	Y / N	
126 Fish, including sharks have a soul	1	2	3	4	5	6	7	Y / N	
127 Fish and sharks can experience physical pain	1	2	3	4	5	6	7	Y / N	
128 Cats and dogs can reason	1	2	3	4	5	6	7	Y / N	
129 Mammals can experience fear	1	2	3	4	5	6	7	Y / N	
130 Horses can reason	1	2	3	4	5	6	7	Y / N	
131 Invertebrates (worms, insects, lobster, etc.) can suffer (different from physical pain)	1	2	3	4	5	6	7	Y / N	
132 A 10 yr old child can experience boredom	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
133 Cats and dogs can experience consciousness (e.g., can be aware of what is happening)	1	2	3	4	5	6	7	Y / N	
134 Birds, reptiles and amphibians can consciously plan for events in the future	1	2	3	4	5	6	7	Y / N	
135 Horses can experience consciousness	1	2	3	4	5	6	7	Y / N	
136 A 10 yr old child has a spirit	1	2	3	4	5	6	7	Y / N	
137 Rocks, soil, water in rivers and lakes have a soul	1	2	3	4	5	6	7	Y / N	
138 Trees and plants can suffer anguish or frustration (different from physical pain)	1	2	3	4	5	6	7	Y / N	
139 Cats and dogs have some type of spirit	1	2	3	4	5	6	7	Y / N	
140 Cows can experience fear	1	2	3	4	5	6	7	Y / N	
141 Horses have a soul	1	2	3	4	5	6	7	Y / N	

2. These questions ask about *your beliefs* in an environmental ethic. Please indicate how much you agree or disagree with each statement, using a range from one (1) to seven (7), where "1" stands for "strongly disagree", and "7" stands for "strongly agree". Please circle your response and use the following scale:

1 = strongly disagree
2 = disagree pretty strongly
3 = slightly disagree
4 = neutral or undecided
5 = slightly agree
6 = agree pretty strongly
7 = strongly agree

To help us identify which questions to include in the shorter survey, please indicate whether or you not you like the question by circling Yes (Y) or No (No) in the last column on the right. If you like the question, rank how much you like it from one (1) to (ten), with 1 the lowest, and 10 the highest.

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
001 Only humans are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
002 Only things that are alive are valuable in and of themselves. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
003 Only those things that are self aware are valuable in and of themselves, and deserve direct moral consideration.	1	2	3	4	5	6	7	Y / N	_____
004 Everything in the environment, except for beauty and wildness, deserves direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
005 Everything that is alive is valuable in and of itself, and deserves direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
006 All things that can suffer deserve some rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	_____
007 Only those things that have the capacity to be self aware deserve direct moral consideration	1	2	3	4	5	6	7	Y / N	_____
008 Everything in the environment is valuable in and of itself, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
thing, including beauty, is valuable in and of itself, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
010 Everything in the environment, except for beauty and wildness, is valuable in and of itself, and deserve direct moral consideration, and we need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
									_____
011 All things that are self aware are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
012 Everything deserves direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	_____
013 Everything in the environment deserve direct moral consideration, and we don't need to protect the environment to ensure human welfare	1	2	3	4	5	6	7	Y / N	_____
014 Only those things that have the capacity to be self aware deserve direct moral consideration	1	2	3	4	5	6	7	Y / N	_____
015 Everything is self aware deserve rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	_____
016 Only humans deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
017 The environment does not need protecting to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
018 Only those things that can suffer are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	_____
019 We need to protect the environment in order to ensure human welfare	1	2	3	4	5	6	7	Y / N	_____
020 We need to protect the environment in order to have a decent life	1	2	3	4	5	6	7	Y / N	_____

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
021 Everything in the environment deserves rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
022 All things that can suffer deserve direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
023 Only humans deserve direct moral consideration, but we need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
024 Only humans deserve rights, and there is little need to protect the environment.	1	2	3	4	5	6	7	Y / N	
025 Only humans deserve direct moral consideration.	1	2	3	4	5	6	7	Y / N	
026 Only those things that can suffer are valuable in and of themselves, and deserve direct moral consideration.	1	2	3	4	5	6	7	Y / N	
027 All living entities are valuable in and of themselves, and deserve direct moral consideration. We do not need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
thing that is alive is valuable in and of itself. There is little need to protect the environment.	1	2	3	4	5	6	7	Y / N	
029 Everything that is alive deserves some rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
030 All things that are alive are valuable in and of themselves, and deserve direct moral consideration, and we need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
031 We need to protect the environment in order to have a better chance to have a good life	1	2	3	4	5	6	7	Y / N	
032 Everything in the environment is valuable in and of itself, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
033 Only those things that can suffer are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
034 Only those things that are sentient are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
035 The environment does not need protecting.	1	2	3	4	5	6	7	Y / N	
036 All things that are alive are valuable in and of themselves, and deserve direct moral consideration, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
037 Everything in the environment, except for beauty and wildness, deserves rights, and we need to protect the environment	1	2	3	4	5	6	7	Y / N	
038 Everything in the environment, except for beauty and wildness, deserve direct moral consideration	1	2	3	4	5	6	7	Y / N	
039 Only those things that are sentient entities deserve direct moral consideration.	1	2	3	4	5	6	7	Y / N	
040 All things that are self aware deserve some rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
041 Everything deserves direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
042 Everything in the environment deserve rights, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
043 Everything in the environment deserves some rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
044 Everything in the environment is valuable in and of itself, and deserve direct moral consideration, and we need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
045 Only things that are alive are valuable in and of themselves, and deserve direct moral consideration. We do not need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
046 Only humans deserve direct moral consideration, but we need to protect the environment.	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
047 All things that can suffer are valuable in and of themselves, and deserve direct moral consideration, and we need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
048 All things that are self aware deserve direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
049 Everything deserve rights, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
hose things that are self aware deserve direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
051 Everything in the environment, except for beauty and wildness, deserves some rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
052 Everything deserves direct moral consideration, and we don't need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
053 Everything deserves direct moral consideration	1	2	3	4	5	6	7	Y / N	
054 Everything in the environment deserves direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
055 Only those things that are sentient are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
056 Only those things that can suffer deserve direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
057 Only those things that are self aware are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
058 All things that are self aware are valuable in and of themselves, and deserve direct moral consideration, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
059 Everything is valuable in and of itself, and deserves direct moral consideration.	1	2	3	4	5	6	7	Y / N	
060 Humans are the only things that deserve moral consideration	1	2	3	4	5	6	7	Y / N	
061 All things that can suffer are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
062 Only humans are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare	1	2	3	4	5	6	7	Y / N	
063 Everything in the environment is valuable in and of itself, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
064 There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
065 Only humans are valuable in and of themselves, and deserve direct moral consideration.	1	2	3	4	5	6	7	Y / N	
066 Everything in the environment is valuable in and of itself, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
067 All things that are self aware are valuable in and of themselves, and deserve direct moral consideration, and we need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
068 All things that are self aware are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
069 Everything that is alive deserves direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
070 Everything in the environment is valuable in and of itself, and deserves direct moral consideration.	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
071 Everything is valuable in and of itself, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
072 Everything in the environment deserve direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
073 Everything is self aware deserve rights, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
074 Only those things that are self aware deserve direct moral consideration, and we don't need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
075 Everything in the environment, except for beauty and wildness, is valuable in and of itself, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
076 All things that can suffer are valuable in and of themselves, and deserve direct moral consideration, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
077 All things that can suffer are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
078 Everything in the environment is valuable in and of itself, and deserve direct moral consideration, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
079 Everything in the environment, except for beauty and wildness, is valuable in and of itself, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
080 Only humans deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
081 Everything that is alive deserves direct moral consideration, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
hose things that can suffer deserve direct moral consideration, and we don't need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
083 Everything in the environment deserve direct moral consideration, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
hose things that are alive deserve direct moral consideration	1	2	3	4	5	6	7	Y / N	
thing that is alive deserve some rights. There is little need to protect the environment.	1	2	3	4	5	6	7	Y / N	
hose things that are sentient entities deserve direct moral consideration.	1	2	3	4	5	6	7	Y / N	
ed to protect the environment in order to have a good life	1	2	3	4	5	6	7	Y / N	
hose things that are self aware deserve rights, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
hose things that can suffer deserve rights, and we don't need to protect the environment.	1	2	3	4	5	6	7	Y / N	
thing in the environment, except for beauty and wildness, deserves direct moral consideration	1	2	3	4	5	6	7	Y / N	
hose things that are sentient are valuable in and of themselves, and deserve direct moral consideration. We need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
thing in the environment deserves direct moral consideration	1	2	3	4	5	6	7	Y / N	
thing in the environment, except for beauty and wildness, is valuable in and of itself, and deserve direct moral consideration, and we need to protect the environment.	1	2	3	4	5	6	7	Y / N	
hose things that are self aware deserve direct moral consideration	1	2	3	4	5	6	7	Y / N	
hose things that are self aware are valuable in and of themselves, and deserve direct moral consideration. There is little need to protect the environment to ensure human welfare.	1	2	3	4	5	6	7	Y / N	
hose things that are sentient entities deserve direct moral consideration.	1	2	3	4	5	6	7	Y / N	
hose things that can suffer deserve direct moral consideration	1	2	3	4	5	6	7	Y / N	

3. This set of questions asks you about your beliefs about the capability of animals to have a variety of mental experiences. These questions are in random order.

Please indicate how much you agree or disagree with each statement, using a range from one (1) to seven (7), where "1" stands for "Strongly Disagree", and "7" stands for "Strongly Agree". Please circle your response and use the following scale:

1 = strongly disagree
2 = disagree pretty strongly
3 = slightly disagree
4 = neutral or undecided
5 = slightly agree
6 = agree pretty strongly
7 = strongly agree

To help us identify which questions to include in the shorter survey, please indicate whether or you not you like the question by circling Yes (Y) or No (No) in the last column on the right. If you like the question, rank how much you like it from one (1) to (ten), with 1 the lowest, and 10 the highest.

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
001 It is morally wrong to eat a mammal (other than a primate, horse, cat, or dog)	1	2	3	4	5	6	7	Y / N	
002 Is it morally permitted to keep an primate (other than a human) in zoo if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
003 It is morally permitted to eat invertebrates (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
004 It is morally wrong to kill a mammal (other than a primate, horse, cat, dog) for food	1	2	3	4	5	6	7	Y / N	
005 It is morally permitted to keep a bird, reptile or amphibian animal in zoo	1	2	3	4	5	6	7	Y / N	
006 It is morally permitted to use a cow in medical research, if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
007 It is morally permitted to kill a tree or plant for food	1	2	3	4	5	6	7	Y / N	
008 It is morally wrong to kill trees or plants for food	1	2	3	4	5	6	7	Y / N	
009 It is morally wrong to kill a cow for food, even if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
010 It is morally wrong to eat a cow	1	2	3	4	5	6	7	Y / N	
011 It is morally permitted to eat a horse	1	2	3	4	5	6	7	Y / N	
012 It is morally wrong to kill a fish or shark for food	1	2	3	4	5	6	7	Y / N	
013 It is morally forbidden to keep a bird, reptile or amphibian in zoo, even if the animal does not suffer	1	2	3	4	5	6	7	Y / N	
014 It is morally permitted to use an invertebrate (i.e., worms, insects, lobster, etc.) in medical research	1	2	3	4	5	6	7	Y / N	
015 It is morally permitted to kill an invertebrate for food (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
016 It is morally wrong to eat a horse	1	2	3	4	5	6	7	Y / N	
017 It is morally wrong to kill a cow for food	1	2	3	4	5	6	7	Y / N	
018 It is morally permitted to eat a primate that is not a human	1	2	3	4	5	6	7	Y / N	
019 It is morally wrong to kill a fish or shark for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
020 It is morally permitted to eat a mammal other than a primate, horse, cow, cat or dog	1	2	3	4	5	6	7	Y / N	
021 It is morally permitted to eat a bird, reptile or amphibian	1	2	3	4	5	6	7	Y / N	
022 It is morally permitted to use a mammal (other than a primate, horse, cow, dog or cat) in medical research	1	2	3	4	5	6	7	Y / N	
023 It is morally wrong to kill a cat or dog for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
024 It is morally wrong to eat a primate that is not a human	1	2	3	4	5	6	7	Y / N	
025 It is morally wrong to eat a cat or dog	1	2	3	4	5	6	7	Y / N	
026 It is morally permitted to eat a horse	1	2	3	4	5	6	7	Y / N	
027 It is morally permitted to keep a mammal (other than a primate, horse, cow, dog or cat) in zoo if it done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
028 It is morally permitted to keep a cat or dog in zoo if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
029 It is morally permitted to keep a fish in a zoo, if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
030 It is morally permitted to keep an invertebrate (i.e., worms, insects, lobster, etc.) in a zoo	1	2	3	4	5	6	7	Y / N	
031 It is morally permitted to eat a primate that is not a human	1	2	3	4	5	6	7	Y / N	
032 Is it morally forbidden to keep a primate (other than a human) in zoo	1	2	3	4	5	6	7	Y / N	
033 It is morally permitted to use a mammal (other than a primate, horse, cow, dog or cat) in medical research if it done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
034 It is morally permitted to eat a mammal that is not a primate, horse, cow, dog or cat	1	2	3	4	5	6	7	Y / N	
035 It is morally wrong to eat trees or plants	1	2	3	4	5	6	7	Y / N	
036 It is morally permitted to keep an invertebrate (i.e., worms, insects, lobster, etc.) in a zoo if it done without causing it pain	1	2	3	4	5	6	7	Y / N	
037 It is morally wrong to eat fish or shark	1	2	3	4	5	6	7	Y / N	
038 It is morally wrong to eat invertebrates (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
039 It is morally permitted to keep a mammal (other than a primate, horse, cow, dog or cat) in a zoo	1	2	3	4	5	6	7	Y / N	
040 It is morally permitted to kill a fish for food	1	2	3	4	5	6	7	Y / N	
041 It is morally wrong to kill an invertebrate for food (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
042 It is morally forbidden to keep an invertebrate (i.e., worms, insects, lobster, etc.) in zoo	1	2	3	4	5	6	7	Y / N	
043 It is morally permitted to eat a cow	1	2	3	4	5	6	7	Y / N	
044 It is morally permitted to eat a mammal as long as it is not a primate, horse, cow, cat or dog	1	2	3	4	5	6	7	Y / N	
045 Is it morally permitted to keep an primate (other than a human) in zoo	1	2	3	4	5	6	7	Y / N	
046 It is morally wrong to kill a fish or shark for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
047 Is it morally permitted to use an primate (other than a human) in medical research if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
048 It is morally permitted to kill a cow for food	1	2	3	4	5	6	7	Y / N	
049 It is morally wrong to kill a fish or shark for food, even if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
050 It is morally permitted to kill a mammal (other than a primate, horse, cow, cat or dog) for food	1	2	3	4	5	6	7	Y / N	
051 It is morally wrong to eat birds, reptiles or amphibians	1	2	3	4	5	6	7	Y / N	
052 It is morally wrong to kill a bird, reptile or amphibian for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
053 It is morally permitted to eat invertebrates (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
054 It is morally permitted to eat trees or plants	1	2	3	4	5	6	7	Y / N	
055 It is morally forbidden to keep an mammal (other than a primate, horse, cow, dog or cat) in a zoo	1	2	3	4	5	6	7	Y / N	
056 It is morally permitted to eat a fish	1	2	3	4	5	6	7	Y / N	
057 It is morally permitted to kill a cow for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
058 It is morally permitted to kill a bird, reptile or amphibian for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
059 It is morally wrong to kill a bird, reptile or amphibian for food	1	2	3	4	5	6	7	Y / N	
060 It is morally wrong to eat birds, reptiles or amphibians	1	2	3	4	5	6	7	Y / N	
061 It is morally permitted to eat a dog or cat	1	2	3	4	5	6	7	Y / N	
062 It is morally wrong to kill a cow for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
063 Is it morally forbidden to keep a primate (other than a human) in zoo even if the animal does not suffer	1	2	3	4	5	6	7	Y / N	
064 It is morally wrong to eat invertebrates (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
065 It is morally wrong to eat a cow	1	2	3	4	5	6	7	Y / N	
066 It is morally permitted to eat a mammal other than a primate, horse, cow, cat or dog	1	2	3	4	5	6	7	Y / N	
067 It is morally permitted to kill a cat or dog for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Question?	How much? (1-10)
068 It is morally permitted to kill a cat or dog for food	1	2	3	4	5	6	7	Y / N	
069 It is morally permitted to keep a bird, reptile or amphibian in zoo, if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
070 It is morally forbidden to keep a cow in zoo	1	2	3	4	5	6	7	Y / N	
071 It is morally wrong to kill a cat or dog for food, even if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
072 It is morally forbidden to keep a fish in zoo, even if the animal does not suffer	1	2	3	4	5	6	7	Y / N	
073 It is morally permitted to use a bird, reptile or amphibian animal in medical research	1	2	3	4	5	6	7	Y / N	
074 It is morally permitted to eat trees or plants	1	2	3	4	5	6	7	Y / N	
075 It is morally wrong to eat a mammal (other than a primate, horse, cat, or dog)	1	2	3	4	5	6	7	Y / N	
076 Is it morally permitted to use a cat or dog in medical research	1	2	3	4	5	6	7	Y / N	
077 Is it morally permitted to use an primate (other than a human) in medical research	1	2	3	4	5	6	7	Y / N	
078 It is morally permitted to eat a primate that is not a human	1	2	3	4	5	6	7	Y / N	
079 It is morally wrong to eat a primate that is not a human	1	2	3	4	5	6	7	Y / N	
080 It is morally wrong to kill a cat or dog for food	1	2	3	4	5	6	7	Y / N	
081 It is morally permitted to keep a fish in a zoo	1	2	3	4	5	6	7	Y / N	
082 It is morally permitted to eat a bird, reptile or amphibian	1	2	3	4	5	6	7	Y / N	
083 It is morally forbidden to keep a tree or plant in zoo	1	2	3	4	5	6	7	Y / N	
084 It is morally permitted to keep a tree or plant in a zoo	1	2	3	4	5	6	7	Y / N	
085 It is morally permitted to keep a cow in zoo	1	2	3	4	5	6	7	Y / N	
086 It is morally permitted to eat a mammal other than a primate, horse, cow, dog or cat	1	2	3	4	5	6	7	Y / N	
087 It is morally wrong to kill an invertebrate for food (i.e., worms, insects, lobster, etc.), if it done without causing it pain.	1	2	3	4	5	6	7	Y / N	
088 It is morally permitted to kill a mammal that is not a primate, horse, cow, cat or dog for food, if it done without causing it pain	1	2	3	4	5	6	7	Y / N	
089 It is morally permitted to eat trees or plants	1	2	3	4	5	6	7	Y / N	
090 It is morally wrong to eat trees or plants	1	2	3	4	5	6	7	Y / N	
091 It is morally permitted to use a tree or plant in medical research	1	2	3	4	5	6	7	Y / N	
092 It is morally permitted to eat a fish or shark	1	2	3	4	5	6	7	Y / N	
093 It is morally wrong to eat a cat or dog	1	2	3	4	5	6	7	Y / N	
094 Is it morally permitted to kill an invertebrate for food (i.e., worms, insects, lobster, etc.), if it done without causing it pain	1	2	3	4	5	6	7	Y / N	
095 It is morally permitted to eat a cow	1	2	3	4	5	6	7	Y / N	
096 It is morally forbidden to keep a mammal (other than a primate, horse, cow, dog or cat) in zoo even if the animal does not suffer	1	2	3	4	5	6	7	Y / N	
097 It is morally permitted to use a bird, reptile or amphibian in medical research, if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
098 It is morally wrong to kill a mammal (other than a primate, horse, cat, dog) for food	1	2	3	4	5	6	7	Y / N	
099 It is morally forbidden to keep a bird, reptile or amphibian animal in zoo	1	2	3	4	5	6	7	Y / N	
100 It is morally permitted to use a fish in medical research, if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
101 It is morally wrong to kill an invertebrate for food (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
102 It is morally permitted to eat a primate, as long as it is not a human	1	2	3	4	5	6	7	Y / N	
103 It is morally wrong to kill a bird, reptile or amphibian for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
104 It is morally permitted to eat a mammal that is not a primate, horse, cow, cat or dog	1	2	3	4	5	6	7	Y / N	
105 It is morally forbidden to keep a cow in zoo, even if the animal does not suffer	1	2	3	4	5	6	7	Y / N	
106 It is morally permitted to kill a fish for food, if it is done without causing it pain	1	2	3	4	5	6	7	Y / N	
107 It is morally permitted to eat soil or drink water	1	2	3	4	5	6	7	Y / N	
108 It is morally wrong to kill a mamma l(other than a primate, horse, cat or dog) for food, if it done without causing it pain	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
109 It is morally permitted to eat a horse	1	2	3	4	5	6	7	Y / N	
110 Is it morally forbidden to keep a cat or dog in zoo even if the animal does not suffer	1	2	3	4	5	6	7	Y / N	
111 It is morally wrong to kill trees or plants for food	1	2	3	4	5	6	7	Y / N	
112 It is morally wrong to kill an invertebrate for food (i.e., worms, insects, lobster, etc.), even if it done without causing it pain	1	2	3	4	5	6	7	Y / N	
113 It is morally wrong to kill a cow for food	1	2	3	4	5	6	7	Y / N	
114 It is morally permitted to keep a cow in zoo, if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
115 It is morally permitted to eat a fish or shark	1	2	3	4	5	6	7	Y / N	
116 It is morally permitted to eat a bird, reptile or amphibian	1	2	3	4	5	6	7	Y / N	
117 It is morally wrong to kill a mamma l(other than a primate, horse, cat or dog) 117 for food, even if it done without causing it pain	1	2	3	4	5	6	7	Y / N	
118 Is it morally permitted to use a cat or dog in medical research if it is done without causing it to suffer	1	2	3	4	5	6	7	Y / N	
119 It is morally permitted to eat a mammal that is not a primate, horse, cow, cat or dog	1	2	3	4	5	6	7	Y / N	
120 It is morally permitted to use a fish an animal in medical research	1	2	3	4	5	6	7	Y / N	
121 It is morally forbidden to keep an invertebrate (i.e., worms, insects, lobster, etc.) even if the animal does not suffer	1	2	3	4	5	6	7	Y / N	
122 It is morally permitted to eat invertebrates (i.e., worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
123 It is morally permitted to kill a bird, reptile or amphibian for food	1	2	3	4	5	6	7	Y / N	
124 It is morally permitted to keep a cat or dog in zoo									
125 Is it morally forbidden to keep a cat or dog in zoo	1	2	3	4	5	6	7	Y / N	
126 It is morally wrong to eat a horse	1	2	3	4	5	6	7	Y / N	
127 It is morally forbidden to keep a fish an animal in zoo	1	2	3	4	5	6	7	Y / N	
128 It is morally permitted to a cow in medical research	1	2	3	4	5	6	7	Y / N	
129 It is morally wrong to kill a bird, reptile or amphibian for food	1	2	3	4	5	6	7	Y / N	
130 It is morally permitted to eat a cow	1	2	3	4	5	6	7	Y / N	
131 It is morally wrong to kill a cat or dog for food	1	2	3	4	5	6	7	Y / N	
132 It is morally wrong to eat fish or shark	1	2	3	4	5	6	7	Y / N	
133 It is morally permitted to use an invertebrate (i.e., worms, insects, lobster, etc.) in medical research if it done without causing it pain	1	2	3	4	5	6	7	Y / N	

4. These questions ask about *your beliefs* in the value of the environment. The questions concern two different types of values.

   The first type is use value to humans. The use value question asks if *you* believe that something is useful to humans, for improving anything: our economy, our income, our health, our recreational opportunities, or our well-being.

   The second type is intrinsic value, which asks if *you* believe if the entities are valuable in and of themselves, regardless of their usefulness to humans. These questions are in random order.

   Please indicate how much you agree or disagree with each statement, using a range from one (1) to seven (7), where "1" stands for "strongly disagree", and "7" stands for "strongly agree. Please circle your response and use the following scale:

   1 = strongly disagree
   2 = disagree pretty strongly
   3 = slightly disagree
   4 = neutral or undecided
   5 = slightly agree
   6 = agree pretty strongly
   7 = strongly agree

   Please indicate whether or you not you like the question by circling Yes (Y) or No (No)

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
001 A 10 yr old child can be useful	1	2	3	4	5	6	7	Y / N	
002 Humans will be better off if laws exist to protect human ability to observe or benefit from birds, reptiles and amphibians	1	2	3	4	5	6	7	Y / N	
003 Humans will be better off if laws exist to protect mammals	1	2	3	4	5	6	7	Y / N	
004 Rocks, soil, water in rivers and lakes, have inherent value	1	2	3	4	5	6	7	Y / N	
005 Fish, including sharks, have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
006 Humans will be better off if laws exist to protect human ability to observe or benefit from dogs and cats	1	2	3	4	5	6	7	Y / N	
007 Horses have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
008 Wildness and beauty in the environment has inherent value	1	2	3	4	5	6	7	Y / N	
009 Rocks, soil, water in rivers and lakes, have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
010 Trees and plants should have some rights	1	2	3	4	5	6	7	Y / N	
011 Laws should exist to protect mammals from suffering	1	2	3	4	5	6	7	Y / N	
012 Humans will be better off if laws exist to protect human ability to observe or benefit from rocks, soil, water in rivers and lakes	1	2	3	4	5	6	7	Y / N	
013 Laws should exist to protect invertebrates (worms, insects, lobster, etc.) from suffering	1	2	3	4	5	6	7	Y / N	
014 Birds, reptiles and amphibians have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
015 Horses can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
016 Laws should exist to protect 10 yr old children from suffering	1	2	3	4	5	6	7	Y / N	
017 Primates (other than humans) should have some rights	1	2	3	4	5	6	7	Y / N	
018 Laws should exist to protect horses from suffering	1	2	3	4	5	6	7	Y / N	
019 Mammals can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
020 Mammals have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
021 Humans will be better off if laws exist to protect human ability to observe or benefit from wildness and beauty in the environment									
022 Dogs and cats should have some rights	1	2	3	4	5	6	7	Y / N	
023 Humans will be better off if laws exist to protect primates (other than people)	1	2	3	4	5	6	7	Y / N	
024 A 10 yr old child has inherent value	1	2	3	4	5	6	7	Y / N	
025 A 10 yr old child should have some rights	1	2	3	4	5	6	7	Y / N	
026 Humans will be better off if laws exist to protect human ability to observe	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
or benefit from horses									
027 Laws should exist to protect birds, reptiles and amphibians from suffering	1	2	3	4	5	6	7	Y / N	
028 Fish, including sharks, can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
029 Laws should exist to protect fish, including sharks	1	2	3	4	5	6	7	Y / N	
030 Laws should exist to protect fish, including sharks, from suffering	1	2	3	4	5	6	7	Y / N	
031 Mammals should have some rights	1	2	3	4	5	6	7	Y / N	
032 Invertebrates (worms, insects, lobster, etc.) have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
033 Laws should exist to protect dogs and cats	1	2	3	4	5	6	7	Y / N	
034 Horses should have some rights	1	2	3	4	5	6	7	Y / N	
035 Primates (other than humans) have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
036 Humans will be better off if laws exist to protect fish, including sharks	1	2	3	4	5	6	7	Y / N	
037 Humans will be better off if laws exist to protect trees and plants	1	2	3	4	5	6	7	Y / N	
038 Humans will be better off if laws exist to protect human ability to observe or benefit from trees and plants									
039 Laws should exist to protect birds, reptiles and amphibians	1	2	3	4	5	6	7	Y / N	
040 Humans will be better off if laws exist to protect human ability to observe or benefit from mammals (other than primates, cats, dogs, horses and cows)	1	2	3	4	5	6	7	Y / N	
041 Wildness and beauty in the environment is important for human well-being									
042 Humans will be better off if laws exist to protect human ability to observe or benefit from invertebrates (worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
043 Humans will be better off if laws exist to protect wildness and beauty in the environment	1	2	3	4	5	6	7	Y / N	
044 Laws should be increased to protect wildness and beauty in the environment	1	2	3	4	5	6	7	Y / N	
045 Humans will be better off if laws exist to protect birds, reptiles and amphibians	1	2	3	4	5	6	7	Y / N	
046 Humans will be better off if laws exist to protect human ability to observe or benefit from primates (other than people)	1	2	3	4	5	6	7	Y / N	
047 Dogs and cats should be have some rights	1	2	3	4	5	6	7	Y / N	
048 Mammals (other than primates, cats, dogs, horses and cows) have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
049 Wildness and beauty in the environment can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
050 Mammals (other than primates, cats, dogs, horses and cows) can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
051 Laws should exist to protect trees and plants from suffering	1	2	3	4	5	6	7	Y / N	
052Humans will be better off if laws exist to protect rocks, soil, water in rivers and lakes	1	2	3	4	5	6	7	Y / N	
055 Invertebrates (worms, insects, lobster, etc.) can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
056 Dogs and cats have inherent value	1	2	3	4	5	6	7	Y / N	
057 Mammals (other than primates, cats, dogs, horses and cows) should have some rights	1	2	3	4	5	6	7	Y / N	
058 Humans will be better off if laws exist to protect mammals (other than primates, cats, dogs, horses and cows)	1	2	3	4	5	6	7	Y / N	
059 Laws should exist to protect rocks, soil, water in rivers and lakes	1	2	3	4	5	6	7	Y / N	
060 Primates (other than humans) can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
061 Humans will be better off if laws exist to protect horses	1	2	3	4	5	6	7	Y / N	
062 Laws should exist to protect primates (other than people)	1	2	3	4	5	6	7	Y / N	
063 Invertebrates (worms, insects, lobster, etc.) should have some rights	1	2	3	4	5	6	7	Y / N	
064 Primates (other than humans) have inherent value	1	2	3	4	5	6	7	Y / N	
065. A 10 yr old child has inherent value, independent of any usefulness to others	1	2	3	4	5	6	7	Y / N	
066 Wildness and beauty in the environment should be have some rights	1	2	3	4	5	6	7	Y / N	
067 Laws should exist to protect mammals (other than primates, cats, dogs, horses and cows) from suffering	1	2	3	4	5	6	7	Y / N	
068 Laws should exist to protect mammals (other than primates, cats, dogs, horses and cows)	1	2	3	4	5	6	7	Y / N	

	Strongly Disagree			Neutral			Strongly Agree	Like Quest -ion?	How much? (1-10)
069 Fish, including sharks should have some rights	1	2	3	4	5	6	7	Y / N	
070 Laws should exist to protect invertebrates (worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
071 Rocks, soil, water in rivers and lakes should have some rights	1	2	3	4	5	6	7	Y / N	
072 Humans will be better off if laws exist to protect invertebrates (worms, insects, lobster, etc.)	1	2	3	4	5	6	7	Y / N	
073 Birds, reptiles and amphibians can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
074 Humans will be better off if laws exist to protect human ability to observe or benefit from mammals	1	2	3	4	5	6	7	Y / N	
075 Trees and plants have inherent value	1	2	3	4	5	6	7	Y / N	
076 Humans will be better off if laws exist to protect dogs and cats	1	2	3	4	5	6	7	Y / N	
077 Laws should exist to protect dogs and cats from suffering	1	2	3	4	5	6	7	Y / N	
078 Laws should be increased to protect wildness and beauty in the environment from being destroyed, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
079 Trees and plants have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
080 Laws should exist to protect primates (other than people) from suffering	1	2	3	4	5	6	7	Y / N	
081 Laws should exist to protect fish, including sharks from suffering	1	2	3	4	5	6	7	Y / N	
082 Dogs and cats can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
083 Trees and plants can be useful to humans	1	2	3	4	5	6	7	Y / N	
084 Humans will be better off if laws exist to protect human ability to observe or productively use fish, including sharks	1	2	3	4	5	6	7	Y / N	
085 Fish, including sharks, have inherent value	1	2	3	4	5	6	7	Y / N	
086 Laws should exist to protect horses	1	2	3	4	5	6	7	Y / N	
087 Mammals have inherent value	1	2	3	4	5	6	7	Y / N	
088 Mammals (other than primates, cats, dogs, horses and cows) have inherent value	1	2	3	4	5	6	7	Y / N	
089 Dogs and cats have inherent value, independent of any usefulness or value to humans	1	2	3	4	5	6	7	Y / N	
090 Rocks, soil, water in rivers and lakes, can be useful or valuable to humans	1	2	3	4	5	6	7	Y / N	
091 Birds, reptiles and amphibians should have some rights	1	2	3	4	5	6	7	Y / N	
093 Laws should exist to protect trees and plants	1	2	3	4	5	6	7	Y / N	
094 Horses have inherent value	1	2	3	4	5	6	7	Y / N	
095 Laws should exist to protect mammals	1	2	3	4	5	6	7	Y / N	
096 Invertebrates (worms, insects, lobster, etc.) have inherent value	1	2	3	4	5	6	7	Y / N	
097 Birds, reptiles and amphibians have inherent value	1	2	3	4	5	6	7	Y / N	

4. The following questions are related to your personal history

465. What is your highest level of formal education? (Check one)

- ☐ Some H.S.
- ☐ H.S. Diploma/GED
- ☐ Some College
- ☐ 4-Year college degree
- ☐ Some graduate work
- ☐ Masters degree
- ☐ Doctoral degree

466. What year were you born? _____

467. What is your sex? (Check one) ☐ Female ☐ Male

468. What is your political ideology? (Check one)

- ☐ Conservative
- ☐ Liberal
- ☐ Socialist

469. What is your political affiliation? (Check one)

- ☐ Communist
- ☐ Democrat
- ☐ Democratic Socialist
- ☐ Green Party
- ☐ Libertarian
- ☐ Independent
- ☐ Republican

470. What is your ethnicity? (Check one)

- ☐ Asian/Islander
- ☐ Native American/American Indian/Native Alaskan
- ☐ Black/African Am.
- ☐ Hispanic/Mexican American/Latino
- ☐ Other (Please specify) _____
- ☐ White/Caucasian
- ☐ Multiracial

471. What is your religious affiliation? (Check one)

- ☐ Christian/Catholic
- ☐ Jewish
- ☐ Hindu
- ☐ Muslim
- ☐ Agnostic/Atheist
- ☐ Other (Please specify) _____

472. What is your spiritual affiliation? (Check all that apply)

- ☐ Eco-spirituality
- ☐ Gaist
- ☐ Native American spirituality
- ☐ None
- ☐ Other (Please specify) _____

473. What is your major or occupation? _____

474. Please feel free to write additional comments or information below, concerning this questionnaire.

Thanks for helping!