UNDERSTANDING

ANTHROPOCENTRIC/BIOCENTRIC ORIENTATIONS

TOWARD NATURAL PARKS: A SURVEY OF

STUDENT AT OKLAHOMA STATE UNIVERSITY

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CHAPTER I

Introduction

The human-nature relationship has been a focus of research since the 1970s. Following the publication of the dominant social paradigm (Pirages & Ehrlich, 1974) and the new environmental paradigm (Dunlap & Van Liere, 1978), public concern for the environment has seen a dramatic increase. Although both paradigms measure people's environmental attitudes, they contain different thoughts about the human-nature relationship. The dominant social paradigm reflects the theory of human domination over nature, whereas the new environmental paradigm seeks total ecological integrity. However, the study of anthropocentrism and biocentrism as another approach to study the human-nature relationship has not yet received enough attention (Kortenkamp & Moore, 2001).

Anthropocentrism literally means human-centered, whereas biocentrism means life-centered. Although both anthropocentric and biocentric individuals express environmental concerns and have an interest in protecting nature, they have different motives. Anthropocentric individuals care for the environment because they believe that everything in nature can be used to benefit humans. For example, they protect the rainforests because the destruction of rainforests may diminish the possibility of developing new medicines that could save human lives. Conversely, biocentric

individuals protect rainforests because they believe that everything in rainforests has value in itself, regardless of its purpose for human well being. In other words, nature has a spiritual dimension and intrinsic value, both of which are reflected by their experience in nature (Thompson & Barton, 1994).

These two environmental orientations, anthropocentrism and biocentrism, are vital to the management of natural resources and parks (Hendee & Dawson, 2002). With a human-centered perspective, anthropocentric individuals encourage management plans that alter park settings to enhance people's recreational experiences. By contrast, life-centered, biocentric individuals suggest that the ecological process should run freely without human influence and are willing to change their recreational behaviors to attain this objective. Overall, individuals' environmental orientation, whether anthropocentric or biocentric, reflects their recreational behaviors and expectations of park management (Clark & Kozacek, 1997; Hendee & Dawson, 2002).

To investigate the human-nature relationship, researchers have used the new environmental paradigm and studied whether environmental attitudes translate into environmentally responsible behaviors (Dunlap, Van Liere, Mertig, & Jones, 2000; Johnson, Bowker, & Cordell, 2004; Jones & Dunlap, 1992; Klineberg, McKeever, & Rothenbach, 1998). Few researchers have studied the relationship between anthropocentric and biocentric orientation and demographic variables, such as sex and ethnicity. This study, therefore, intends to fill the gap in the current literature. This research provides an understanding of anthropocentric and biocentric orientations and their relationship with the demographic variables of sex and ethnicity.

Statement of the Problem

Over the past 30 years, people who have engaged in environmental research have explored the human-nature relationship. Researchers have utilized the dominant social paradigm (Kilbourne, Beckmann, & Thelen, 2002; Kilbourne & Carlson, 2008; Kilbourne & Polonsky, 2005; Shafer, 2006), the new environmental paradigm (Bostrom, Barke, Turaga, R., & O'Connor, 2006; Dunlap, 2008; Dunlap & Van Liere, 2008; Schultz & Zelezny, 1999), egoistic/social-altruistic/biospheric orientations (Schultz, 2000, 2001; Schultz, Gouveia, Cameron, Tankha, Schmuck, & Franek, 2005; Stern, Dietz, & Kalof, 1993), and anthropocentrism/biocentrism (Amérigo, Aragonés, & Frutos, 2007; Karpiak & Baril, 2008; Kortenkamp & Moore, 2001; Thompson & Barton, 1994). While most research has focused on whether environmental attitudes translate into environmentally responsible behaviors, the relationship between environmental orientations and demographic variables has not yet attracted great attention from researchers. Moreover, no reported study has identified the relationship between anthropocentric and biocentric orientations and demographic variables in the context of park management. Thus, this exploratory research attempts to understand anthropocentric and biocentric orientations toward natural parks, as well as the relationship between environmental orientations and demographic variables.

Purpose of the Study

The purpose of this study was to understand the anthropocentric/biocentric orientations of students of different ethnicities and sexes at Oklahoma State University toward natural parks. Because the demographic composition in the United States is constantly changing, park managers must answer the recreational needs of a culturally

diverse clientele. An understanding of park users' environmental orientations helps managers better anticipate their recreational behaviors, which in turn, have implications for park management. Thus, this study was designed to answer the following questions:

1. What is the environmental orientation of students of different ethnicities at Oklahoma State University?
2. What is the environmental orientation of students of different sexes at Oklahoma State University?
3. Is there a significant difference in environmental orientation between expected and observed values of specific ethnic groups?
4. Is there a significant difference in environmental orientation between expected and observed values of ethnic minority and non-minority students?
5. Is there a significant difference in environmental orientation between expected and observed values of male and female students?

Hypotheses

Based on the research questions, the researcher intended to test the following hypotheses:

H_0-1: There is no significant difference in environmental orientation between expected and observed values of specific ethnic groups.

H_0-2: There is no significant difference in environmental orientation between expected and observed values of ethnic minority and non-minority students.

H_0-3: There is no significant difference in environmental orientation between expected and observed values of male and female students.

Significance of the Study

Using a survey instrument adopted from the Wilderness Value Test, the researcher intended to understand the anthropocentric/biocentric orientations of students of various ethnicities and sexes at Oklahoma State University. The Wilderness Value Test was published in the *Journal of International Wilderness* in 1997. According to the survey designers, the Wilderness Value Test has been used in wilderness stewardship training sessions and modified for several other investigations. Thus, the present study was unique because it was the first study to employ a survey adopted from the Wilderness Value Test on college students to determine their environmental orientations, filling a gap in the literature. This research may also contribute to park management. If ethnicity and sex were found to be associated with a specific environmental orientation, park managers may anticipate visitors' needs and expectations by identifying these physical characteristics such as ethnicity and sex. This study contributed a deeper understanding of anthropocentric/biocentric orientations of college students toward natural parks and provides insights to improve the management of natural parks.

Assumptions

There were five underlying assumptions of this research:

1. Straightforward instructions on the survey elicited a sufficient amount of survey completion.
2. Individuals who participated in the survey gave honest answers to each question.
3. Survey participants understood that all the answers to the survey questions were based on their personal beliefs, not on any legal requirement or government policy.

4. Survey participants had a similar understanding of a park environment. In other words, they had a similar picture of parks in their minds when they answered the survey questions.
5. Each individual survey participant only completed the online survey once during the survey period.

Delimitations

This research was delimited to students at Oklahoma State University enrolled during the fall semester of 2009.

Limitations of the Study

1. The fact that the 2000 census allowed people to select more than one race for the first time blurred the line between race and ethnicity (Frey, Abresch, & Yeasting, 2001; Pollard & O'Hare, 1999). Also, Hispanics (people who originate from a Spanish-speaking country) could be of American, African, Asian, American Indian, European, or other origins (Pollard & O'Hare, 1999). Race and ethnicity have been used interchangeably in previous studies (Pollard & O'Hare, 1999). The researcher was not able to completely separate ethnicity from race; further, racial and ethnic status were self-reported in this study.
2. A difference in environmental orientations may exist between individuals with mixed races and other particular ethnic groups. Due to the fact that ethnic classification by Oklahoma State University does not include an option of mixed race, the study results may not be representative of such individuals.
3. Individuals who were born in the United States and raised in other countries may have different environmental perspectives. However, because the researcher was not

able to distinguish such individuals, the study results are not representative of such individuals.

Definition of Terms

African Americans are individuals having origins among any of the original peoples of Africa south of the Sahara (Oklahoma State University [OSU], 2009b).

Anthropocentrism is an environmental orientation under which the natural environment is viewed primarily from a sociological or human-oriented perspective. The naturalness of the environment is less important than maximizing direct human use (Hendee & Dawson, 2002).

Asians are individuals having origins among any of the original peoples of the Far East, Southeast Asia, or the Pacific Islands. This category would include, for instance, China, Japan, Korea, Thailand, Vietnam, the Philippines, Samoa, Indonesia, New Zealand, Australia, and the Indian subcontinent, which includes all persons from Afghanistan, Nepal, Burma, India, and Pakistan (OSU, 2009b).

Biocentrism emphasizes the natural integrity of ecosystems at the expense of human use (Hendee & Stankey, 1973).

Environmental attitude is the collection of beliefs, affect, and behavioral intentions a person holds regarding environmentally related activities or issues (Schultz et al., 2005).

Environmental concern refers to the affect associated with environmental problems. It is one aspect of environmental attitude (Schultz et al., 2005).

Environmental orientation covers environmental attitudes toward nature and the physical environment. Environmental orientation is part of a general worldview, which is closely tied to cultural patterns (Skogen, 1999).

Environmental value is a framework from which an individual selectively interprets information about the environment. It is a stable structure that is generated in the socialization process. It also guides an individual's environmental behaviors (Amérigo, Aragonés, & Frutos, 2007).

Environmental worldview refers to a person's belief about humanity's relationship with nature (Dunlap & Van Liere, 1978).

Hispanics are individuals having origins among any of the Spanish speaking countries, such as Spain and Portugal. This category would generally include, for instance, Chicanos, Mexican-Americans, Mexicans, Central and South Americans, Cubans, Puerto Ricans, Spaniards, and Portuguese (OSU, 2009b).

Minority groups are non-White groups, who are usually referred to African Americans, Asians, Hispanics, American Indians, Alaska Natives, Native Hawaiians, Pacific Islanders, and individuals with two or more races (OSU, 2009a). In this particular research, minority groups refer to African Americans, Native Americans, Hispanics, and Asian Americans.

Native Americans are individuals having origins among any of the original peoples of North or South America (OSU, 2009b).

Park is a piece of public land maintained in a natural state. Parks may vary in size, features, and management style. Generally speaking, parks offer visitors a chance to participate in some form of outdoor recreation (Kaval, 2007).

Whites are all individuals having origins among any of the original peoples of Europe (except Spain and Portugal), North Africa (above the Sahara), or the Middle East. This category would include, for instance, Italy, France, the British Isles, Scandinavia, Germany, Russia, Romania, Greece, Turkey, Morocco, Algeria, Libya, Egypt, Iraq, Israel, Saudi Arabia, and Iran. Any person at Oklahoma State University not claiming an ethnicity is categorized as White (OSU, 2009b).

CHAPTER II

Review of Literature

This chapter presents a review of the literature related to environmental beliefs in the United States, environmental research, and environmental orientations by ethnicity and sex. The review is divided into six sections: (a) early development of environmental beliefs, (b) environmental beliefs after the 1960, (c) research on environmental issues, (d) research on the human-nature relationship, (e) research on environmental orientations and ethnicity, and (f) research on environmental orientations and sex.

Early Development of Environmental Beliefs

The pioneers of American contemporary environmentalism were writers who valued the human-nature relationship. The most well-known authors in the early 19th century were Henry David Thoreau, John Muir, and Aldo Leopold (Wells & Schwartz, 1997).

Henry David Thoreau, 1817-1862

A poet, philosopher, and naturalist, Henry David Thoreau is considered by many to be the first American environmentalist in the 19th century (Wells & Schwartz, 1997). Thoreau promoted the transcendentalist philosophy, which depicts a divinity beyond the physical environment. For Thoreau, nature was a symbol for a higher reality, and the city represented what was evil in civilization (Palmer, 1997; Wells & Schwartz, 1997).

Thoreau was best known for his book *Walden*, in which he describes a harmonious appreciation of nature (Ibrahim & Cordes, 2008). In *Walden*, Thoreau not only sees a need to search for spirituality in a commercially expanding society, but he also criticizes the dehumanizing effects of industrial society. When Thoreau foresaw the destruction of wildland by capitalists seeking economic gain, he argued that they had no concern for nature (Ibrahim & Cordes, 2008; Wells & Schwartz, 1997). In addition, Thoreau recognizes that humans are part of, rather than apart from, nature. He emphasizes harmony with nature, as well as the importance of leading a simple, self-sufficient life. He also maintains that living in the wilderness would give people insight into their spiritual reality (Palmer, 1997).

Thoreau's simplicity, however, was not simplicity of thought or experience. His self-directed life required a limited use of external goods and a focus on the task at hand (Cafaro, 2001). Such simplicity is a key virtue in stabilizing an individual's life, and it develops a rich character that manifests diverse virtues. It also allows people to understand the effects of their actions on the environment and to act with integrity. Moreover, simple, self-sufficient living decreases human desires and, thus, results in less of an influence on other living things. Thoreau, along with many environmentalists, claimed that living simply would improve quality of life (Cafaro, 2001).

In addition to simplicity, Thoreau's picture of the good life included freedom, pleasure, self-culture, and a rich experience and knowledge of self, nature, and God (Cafaro, 2001). He often detailed his pursuit of these components in terms of his relationship with the natural environment. For Thoreau, freedom was the time to explore his surroundings and the privilege to wander through the local landscape. He further

reported that living in solitude and away from civilization awakened him to the possibilities for connecting with nature (Cafaro, 2001).

Thoreau's writing influenced the thinking and writing of many naturalists who have followed him. He was a visionary who recognized a need to preserve wilderness for all people. He suggested that nature and wilderness were attractive as opposed to threatening and disagreeable. To many, Thoreau is considered the father of the environmental movement (Ibrahim & Cordes, 2008).

John Muir, 1838-1914

After spending a few years at the University of Wisconsin, Muir walked from the Midwest to the Gulf of Mexico, keeping his thoughts and appreciation of nature in his journal entries. He wrote of his experiences with inhabitants and of his personal reflections on human responsiveness toward nature. In his journeys throughout the United States, he noted both his scientific and aesthetic impressions of nature (Ibrahim & Cordes, 2008; Wells & Schwartz, 1997).

Muir contested the Christian concept of human dominion over natural resources, and he saw the spirit in everything natural (Ibrahim & Cordes, 2008). He appreciated the intrinsic value of wildlife and wildlands, asserting that every life-form has its own good and that humans are spiritually and ecologically a part of the natural world (Palmer, 1997; Wells & Schwartz, 1997). As an ardent advocate of wilderness preservation, Muir helped persuade President Benjamin Harrison to set aside 13 million acres of forest to protect it from commercial logging and convinced President Grover Cleveland to set aside another 21 million acres. Together with President Theodore Roosevelt, they formulated Roosevelt's innovative conservation plan. With his ceaseless efforts, he

helped designate over 50 national parks, 200 national monuments, and 140 million acres of national forests. Muir is often referred to as the father of the national park system, and his preservation work later evolved into the mission of the park system (Ibrahim & Cordes, 2008).

In addition to his contributions in forming the national park system, Muir was also the founder of the Sierra Club in San Francisco, one of the most influential environmental groups in the United States. Although the Sierra Club has been recognized for its efforts to preserve and reserve natural areas first in California and then across the United States, Muir lost his last major battle in 1913 when Congress authorized the construction of the Hetch Hetchy reservoir, adjacent to Yosemite Valley. Because publicity of the case raised public awareness of the exploitation of parks, there was perhaps for the first time ambivalence among the public about sacrificing nature for human benefits (Ibrahim & Cordes, 2008; Palmer, 1997; Wells & Schwartz, 1997).

Muir's contribution to wilderness preservation came from his recognition that the wilderness has spiritual and economic value and should exist simply for its inherent value. To Muir, anyone could appreciate the living creatures in the wilderness, finding his or her part in harmony with nature (Ibrahim & Cordes, 2008). After his death, he left a body of writing about his understanding of ecology and wilderness living and is now recognized as the father of the preservation movement (Palmer, 1997; Wells & Schwartz, 1997).

Aldo Leopold, 1887-1948

While working for the U.S. Forest Service, Aldo Leopold contributed to the establishment of the Gila Wilderness in New Mexico, the world's first designated

wilderness area. Like Muir, Leopold expressed interests in wilderness preservation, and these interests later turned into an ecological philosophy (Wells & Schwartz, 1997).

Leopold was best known for his writing about land. His major work, *A Sand County Almanac*, is believed to be the most influential publication of ecocentrism (Curry, 2006). Leopold believed that people had reached the point where they could not improve their lives through the accumulation of wealth, and they should strive to live lives rich in perception and knowledge of their surroundings. To encourage this worldview, Leopold demonstrated an aesthetic appreciation of nature and exhibited the characteristics of a naturalist, such as persistence and skills in making distinctions and crafting precise descriptions related to the natural environment. From Leopold's standpoint, such characteristics make people happier and enrich their life experiences without diminishing nature (Cafaro, 2001).

In addition to his appreciation of nature, Leopold saw a need for humans to develop a new ethical relationship with nature. He illustrated how humans should live accordingly on the land and explored this human-nature relationship personally. In particular, the idea of this relationship, which he called land ethic, rested upon one single premise: humans are a member of a biotic community of interdependent parts. In other words, the environment is not a commodity for humans to control but a community to which they belong (Ibrahim & Cordes, 2008). According to Leopold's land ethic, ecological boundaries should be broadened to embrace soils, plants, animals, and waters, or, collectively, the land (Palmer, 1997; Scherer & Attig, 1983). To do so, humans need to love, respect, and admire nature (Papadakis, 1998). They should see themselves not as

conquerors of the land community, but as plain members and citizens of an ecological community (Ibrahim & Cordes, 2008; Palmer, 1997; Wells & Schwartz, 1997).

Furthermore, Leopold argued for the development of an ecological conscience to be incorporated into a land ethic. He wrote, “A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise” (Leopold, 1970, p. 262). Although published after Leopold’s death, *A Sand County Almanac* contains the concept of ecological responsibilities, the value of land, an awareness of biocentrism and spirituality, and his lifetime observations about nature (Ibrahim & Cordes, 2008; Leopold, 2004; Papadakis, 1998). For more than a half-century, land ethic has been a major paradigm of ethical and environmental thinking (Leopold, 2004).

Environmental Beliefs after 1960

The foundation of the environmental movement in the United States was established in the late 1880s and thrived until 1920. This period was known as the progressive era in the conservation movement (Thapa, 1999). The movement originated out of public concern about negative impacts of capitalism and industrialization on the environment. The idea behind the conservation movement was to protect natural areas from human consumptive behaviors (Faber & O'Connor, 1988). It was also during this period that many agencies (e.g., the Forest Service) and private organizations (e.g., the Sierra Club) were established. It was widely believed that the progressive era set the path for the modern environmental movement (Faber & O'Connor, 1988).

From the 1960s to the 1970s, many authors and their writings influenced the modern environmental movement in the United States. These authors argued that

humans' inappropriate treatments of nature was the result of an anthropocentric view and called for a change of value in connection to the environment (Brennan & Lo, 2008; Thapa, 1999). These authors and their writings laid the foundation of anthropocentrism and biocentrism and are discussed in the following section. Authors are listed in chronological order.

Albert Schweitzer, 1875-1965

Throughout his life, Schweitzer was committed to caring for others. He was a prolific writer, devoting much of his works to the diagnosis of the ethical problems of modern society and seeking solutions. Reverence for life was a fundamental attitude that he believed could offer hope to a world beset with conflict (Des Jardins, 1993).

In Schweitzer's opinion, industrial society lacked a worldview that connected life and nature. Science and technology split ethics from nature. People in the industrial era viewed nature as a value-free, mechanical force that should be governed by physical and mechanical laws. Schweitzer sought to re-establish the bond between nature and ethics. He believed that there was good in nature, which could provide a basis for human ethics (Des Jardins, 1993).

He argued in his work, *The Reverence for Life*, that all living organisms, both humans and nonhumans, have a desire to move toward self-realization and unification with other living beings. Schweitzer termed such desire a will-to-live (Schweitzer, 1969). When humans recognize the need to fulfill their will-to-live, they show reverence for the will-to-live of all other living things. Schweitzer suggested all living things have an inherent worth, commanding awe and reverence from humans. Instead of being value-free, life is good in itself, inspiring and deserving of respect (Des Jardins, 1993; Palmer,

1997). Furthermore, Schweitzer maintained that life is not for human use or pleasure. Humans are part of life, and bear the responsibility of enhancing and serving every manifestation of it (Palmer, 2001). He also wrote that only when humans obey the compulsion to help all life forms they are able to assist will they become ethical (Palmer, 2001).

Schweitzer regarded traditional philosophy, which restricted ethics to human relations, as spiritually impoverished. He rejected the long tradition that humanity was at the top of moral hierarchy (Palmer, 2001). His biocentric reverence for life, which he considered his most meaningful contribution, has been influential in environmental ethics and the development of the deep ecology movement (Des Jardins, 1993; Palmer, 1997; Palmer, 2001).

Garrett Hardin, 1902-2003

Garrett Hardin, a population biologist, had interests in the study of overpopulation. His introduction of the principle of competitive exclusion expressed that no two species with similar behavioral patterns in an ecosystem can live in harmony without competing for resources (Wells & Schwartz, 1997). Hardin popularized this dilemma with his 1968 essay, *The Tragedy of the Commons* (Berkes, Feeny, McCay, & Acheson, 2006).

Hardin presents a parable of a metaphorical village where herdsmen shared a common area for the purpose of grazing cattle. To accumulate personal wealth, each individual had to graze as many cattle as possible. When all herdsmen acted according to this logic, the commons would be vulnerable to overexploitation (Berkes et al., 2006; Hardin, 1968). In other words, if each individual takes advantages of unlimited access to

limited resources, the result is overuse and losses for all (Berkes et al., 2006; Curry, 2006; Hardin, 1968).

Hardin argues that since technical solutions do not help with such problems, government control related to access of limited resources should be emphasized. Alternatively, some resource economists suggest that privatization of common resources could be another solution. Others have presented arguments for limiting population growth and resource consumption (Berkes et al., 2006; Wells & Schwartz, 1997). *The Tragedy of the Commons* has been considered a catalyst for the realization that the global commons must be equally shared and protected (Wells & Schwartz, 1997).

Hardin presumed that resource degradation was unavoidable unless governmental controls were imposed or privatization of resources took place. However, Berkes et al. (2006) argue that Hardin failed to take into account the self-regulating capacities of resource users. Under some conditions, resource users can act collectively to open up other policy alternatives. For example, communities dependent on shared resources may adopt various institutional arrangements to manage common properties and usually have varying degrees of success in achieving sustainable use (Berkes et al., 2006).

In another controversial essay, *Lifeboat Ethics*, Hardin (1974) presents a scenario that illustrates an ethical dilemma. Considering resource availability in the future and the population growth rate, Hardin compares the situation to a series of lifeboats. In Hardin's argument, rich countries are boats with moderate numbers of passengers on board, whereas poor countries are overcrowded vessels. The poor continuously fall out, hoping to be taken in by one of the less crowded boats. Hardin points out that according to classical Christian or Marxist ethics, everybody should be allowed aboard; however

although this mentality might lead to complete justice, it could also lead to complete catastrophe (Simmons, 2006).

Hardin's answer was that no additional passengers should be allowed when a lifeboat reached its capacity. From Hardin's standpoint, when wealth helped the poor with food aid programs or technology transfers, they risked their safety margin and thus reduced the choices for their own future generations (Simmons, 2006). One of his solutions to this issue is mandatory birth control. Hardin suggests that rich countries should not help poor countries, arguing that the freedom to populate could destroy the life-support ecosystem of the earth (Wells & Schwartz, 1997).

Hardin was designated as a social Darwinist and anti-people, encouraging competition among individuals, groups, and nations (Wells & Schwartz, 1997). Some argue that justice should be prioritized before general well-being, and some say the duties to the present generation should outweigh those to future generations. Some claim that the democratic decision-making process can produce a different set of outcomes (Simmons, 2006).

Kohák (2000) points out that Hardin was willing to face a dilemma in which people are compelled to find a solution, even when there is no absolutely acceptable solution. Hardin also argues that the possibilities in life are limited, whereas human demands are naturally unlimited. If humans want to survive, they have to limit their demands themselves. Curry (2006) concludes that Hardin's work was primarily concerned with human fate, and, thus, remains within anthropocentric beliefs.

Rachel Carson, 1907-1964

An American naturalist, writer, and biologist, Rachel Carson is thought of as a founder of the modern environmental movement and one of the pioneer female environmentalists in U.S. environmental history (Cafaro, 2002; Palmer, 1997; Wells & Schwartz, 1997). While working at the U.S. Fish and Wildlife Service, Carson tackled many environmental issues, such as preventing pollution, restoring natural areas, and ending ocean dumping of atomic wastes (Cafaro, 2002). In the 1950s, Carson was disturbed by, and became interested in, the influence of synthetic chemicals on wildlife and its habitat, as well as its effect on human life (Papadakis, 1998). As a young biologist, Carson was particularly concerned with the increasing misuse of synthetic pesticides, especially dichlorodiphenyl trichloroethane (DDT), which was found to be effective in controlling the spread of malaria among U.S. soldiers during World War II (Wells & Schwartz, 1997). Although its broad killing capacity was a promising solution for farmers with insect problems, DDT was found to be carcinogenic and mutagenic, presenting an environmental threat that Americans had to confront (Lear, 1993; Wells & Schwartz, 1997).

Published in 1962, *Silent Spring* grew out of Carson's concern with toxic effects of DDT on wildlife and humans. Although Carson was not the first to suggest that chemicals produced by modern industry were carcinogenic, she was the first to synthesize scientific and medical information into an understandable coherent argument about human health and the environment (Lear, 1993; Palmer, 1997; Seager, 2003). In *Silent Spring*, Carson attributes a considerable increase to cancer cases as a result of excessive use of pesticide, herbicide, and insecticide. Carson describes how carcinogenic

chemicals entering the environment had the potential to cause an ecological catastrophe in the United States (Cafaro, 2002; Carson, 1962; Wells & Schwartz, 1997). Following an experiment on crops, Carson found that DDT killed more than targeted insects. Its residues remained toxic for a long period of time in the environment even after being diluted by rainwater. She also referenced an American town where all life, including wildlife and human children, had been contaminated by the effects of DDT (Carson, 1962).

Carson did not say, however, that such chemical use should be entirely banned. She indicated that the use of toxic chemicals should be strictly limited and regulated. When the use of such chemicals was inevitable, careful application and safe disposal would be necessary (Cafaro, 2002). For Carson, preventing carcinogens from being developed and released was more important than waiting until the damage was done (Seager, 2003).

Carson reveals her ecocentric view, which emphasizes the interconnectedness between humans and nonhumans. She writes, “Man however much he may like to pretend the contrary, is part of nature. [He cannot] escape a pollution that is now so thoroughly distributed throughout the world” (Carson, 1962, p. 169). She stresses that due to the fact that humans and nonhumans inhabit the same environment, the interests of two parties coincide. It is not possible for humans to poison other animals without poisoning themselves (Cafaro, 2001, 2002). Moreover, Carson asserts the moral considerability of nonhuman organisms (Cafaro, 2001). The existence of wild animals makes human life pleasant, and they are essential to agriculture and landscape. These

creatures, therefore, deserve something better from humans than the senseless destruction of their habitats (Cafaro, 2001; Carson, 1962).

Silent Spring successfully called the attention of the public to inappropriate chemical uses and pollutions. This work also led to landmark legislation, such as the U.S. Clean Water Act and was pivotal in the banning of DDT in many countries around the world (Cafaro, 2002).

Lynn White, 1907-1987

In 1967 Lynn White, a North American historian wrote an influential article titled, *The Historical Roots of Our Ecological Crisis*. According to Roper (2007), an adjunct research fellow at the University of Western Sydney, this article was a turning point regarding the public's attitude of the relationship between humans and nature.

White believed religion was influential in determining how people view themselves in relation to their environment (White, 1967). In *The Historical Roots of Our Ecological Crisis*, White argues that because the Bible provides guidance for people about how to view the environment, the Bible presents an anthropocentric view of Christianity, which was also a dominant environmental belief in Western society in the 1960s (White, 1967). White claims that Christianity is "the most anthropocentric religion the world has seen" (p. 1205), and this anthropocentric view is the cause of the environmental crisis (Curry, 2006; Simmons, 2006; White, 1967).

White states in his article that "Man [*sic*] named all the animals, thus establishing his dominance over them. God planned all of this explicitly for man's benefit and rule: no item in the physical creation had any purpose save to serve man's purposes" (p. 1205). White therefore argues that Christian theology is fundamentally exploitative of the

natural world. When God created humans in his own image, he created a moral hierarchy in which humans transcended nature (Des Jardins, 1993; White, 1967). Christianity, according to White (1967), not only established the dualism of humans and nature, but it also insisted that God permitted humans, as dominators, to exploit nature for their needs.

When White asserted that the western Christian tradition was responsible for the environmental crisis (Roper, 2007; White, 1967), he encouraged people to rethink nature in relation to human destiny (White, 1967). He emphasized that humans should be deposed from their monarchy over creation to set up a democracy of all creatures (White, 1967).

While White's interpretation was that human dominance over nature resulted in environmental problems, Roper (2007) took a different approach in interpreting the Bible. Although humans had dominion over the earth and all living creatures, humans did not own them. The ideas of cultivation and caring for the earth led people to the idea of stewardship. Stated differently, the legitimate God-given power to rule the earth and use resources are accompanied by responsibility. Humans, as a result, are guardians of the earth. They are accountable to God for how they manage the earth (Kempton, Boster, & Hartley, 1995; Roper, 2007). Humans, after all, should not be the historical source of ecological problems.

Arne Naess, 1912-2009

Arne Naess was fascinated by wilderness and became active in the growing environmental movement during the 1960s. He articulated the term, deep ecology, in his 1973 publication, *The Shallow and Deep, Long-Range Ecology Movement*. This article is now widely regarded as the beginning of the modern deep ecology movement (Palmer,

1997; Wells & Schwartz, 1997). Naess made a distinction between shallow ecology and deep ecology in this article. Shallow ecologists are chiefly concerned about human welfare and issues such as pollution and resource depletion. Because shallow ecologists deal with the immediate effects of the environmental crisis, they inevitably reflect an anthropocentric attitude to the environment, a dominant worldview in which humans protect the environment for human interests (Des Jardins, 1993; Palmer, 1997; Wells & Schwartz, 1997).

In contrast, deep ecologists have more profound concerns with issues such as egalitarianism, diversity, and intrinsic value in nature (Palmer, 1997). The idea of deep ecology is centered around all life organisms, both humans and nonhumans. Deep ecologists hold a biocentric view that nature should be preserved and protected for its intrinsic value instead of any utilitarian value (Curry, 2006; Papadakis, 1998; Wells & Schwartz, 1997). Not only do deep ecologists focus on human unity with nature, but they also maintain the biological integrity and evolutionary process of all life (Papadakis, 1998; Sessions, 1993). Unlike shallow ecologists, who are primarily concerned with minimizing environmental consequences, deep ecologists suggest a fundamentalist approach, asking people to rethink real problems in a radical fashion (Papadakis, 1998; Wells & Schwartz, 1997).

To maintain biological integrity, Naess developed the deep ecology platform. This platform is a series of environmental beliefs and justifies the activism of the deep ecology movement (Naess, 1991). The platform affirms some common principles for deep ecologists. First, the intrinsic value of humans and nonhumans should be respected and protected. Second, the richness and diversity of life forms on Earth contribute to the

realization of those intrinsic values. Third, humans are allowed to reduce such richness and diversity only when they have to satisfy vital needs. Lastly, the prosperity of human life and culture is compatible with a substantially small population. The flourishing of nonhuman life only requires a small human population (Curry, 2006; Des Jardins, 1993; Wenz, 2001). Furthermore, deep ecologists promote changes in policy on economic, technological, and ideological structures and believe such change would result in a better environment. They encourage appreciation of life and discourage high standards of living. Deep ecologists maintain that those who willingly abide by the platform must implement the changes required to fulfill the goal of the deep ecology ideal (Curry, 2006; Des Jardins, 1993).

Although Naess maintained that deep ecology is essentially biocentric, critics objected on the grounds that any attempt by deep ecologists to posit non-anthropocentric values was still based on human attempts to formulate values (Papadakis, 1998). Some claimed that because deep ecology is overly concerned with philosophical, fundamental, and individual lifestyles, it fails to address the importance of developing an effective political position. Consequently, some shallow ecologists deliberately ignored the questioning process and were eager to make political changes (Sessions, 1993).

However, Sessions (1993) argues that without purposefully rethinking the causes of environmental problems, people remain mesmerized by superficially socially approved ecological behaviors (e.g., recycling and or buying green products). As a result, Sessions disregards high-consumption behaviors and encourages the shift from shallow ecology to deep ecology in terms of ecological revolution (Sessions, 1993).

Francoise d'Eaubonne, 1920-2005

Ecofeminism, as its name suggests, concerns itself with the feminist movement and ecology. Francoise d'Eaubonne coined the term in 1974, and since that time there has been a significant amount of writing and research on the topic. In this area, ecofeminism is an alternative interpretation of the relationship between humans and nature (Des Jardins, 1993; Wells & Schwartz, 1997).

Ecofeminists believe the degradation of nature was caused by a social hierarchical pattern. In such hierarchy, some humans exercise control and power over others. In contrast to deep ecologists who ask fundamental ethical questions, ecofeminists shift their attention to questions traditionally associated with social and political philosophy (Des Jardins, 1993; Wells & Schwartz, 1997).

As indicated by Des Jardins (1993), human domination centers on the relationship between the social organization and the individual humans in it. When examining a society, ecofeminists find that many social structures serve to suppress some members of society for the benefit of others. Such oppressive structure reinforces a way of thinking and living that encourages human domination in all forms, including the domination over nature (Des Jardins, 1993; Palmer, 1997). Ecofeminists further argue that human domination originated from a mentality rooted in Western thought. According to this mentality, some individuals are superior to others because of their greater reasoning ability. Some social ranks (e.g., women, indigenous people, racial minorities, animals, and ecosystems) are inferior because they lack advanced reasoning ability or cannot reason as well as some others (Wenz, 2001).

Karen Warren, a philosopher, designates three components in this mentality (Warren, 1998). First, dualism divides reality into two exclusive groups, such as men vs. women, humans vs. animals, and masters vs. slaves. Second, each group has a hierarchy. Men, humans, and masters are higher than women, animals, and slaves. Third, inferiors should fulfill the needs and desires of the superiors (Warren, 1998). Additionally, Wenz (2001) notes that people with this mentality are anthropocentric and do not appreciate the intrinsic value of nature. Wenz argues that under the patriarchy of the Western culture, men generally believe that they have control over others, including women and nature. Due to selfishness, prejudice, and misunderstanding, men tend to serve themselves at the expense of others as well as nature (Wenz, 2001).

Unlike patriarchal institutions and the dominant Western culture, which stress men's dominance and an anthropocentric view, ecofeminists support environmental synergism (Rocheleau, Thomas-Slayter, & Wangari, 2006; Wenz, 2001). Wenz (2001) writes that ecofeminists "claim that much human oppression results from combining anthropocentrism's lack of respect for nature with patriarchy's association of many human beings with nature. Ecofeminists say that respect for nature generally promotes human welfare, and genuine respect for all human beings tends to protect nature" (p. 190).

Moreover, ecofeminists believe that earth is feminine and refer to it as Mother Earth. Because of their unique bodily experiences, such as ovulation, child birth, and breast-feeding, women are close to and readily connect with nature (Archambault, 1993). Thus, women are closer to nature than men and can derive unique insights from this connection. Typical female characteristics, such as care, love, friendship, trust, and

reciprocity, are meant to overcome male domination (Archambault, 1993; Wells & Schwartz, 1997).

Perhaps the most common criticism that ecofeminists encounter is related to the woman's bodily experience. Archambault (1993) argues that women who do not experience biological processes such as child-bearing or breast-feeding are not necessarily less connected with nature than those who have had such experiences. Eckersley (1992) also suggests that although the bodily experience may separate men from women, there is no reason why one should be seen as socially superior to another. She also questions whether women's bodies are more "natural" than men's. Additionally, emphasizing the separation of men and women only reverses the hierarchical dualism that many ecofeminists want to overcome (Eckersley, 1992).

Dobson (1990) questions whether men with female characteristics would be close to nature. He also questioned whether women with subservience traits were close to nature. Due to the fact that biological traits are unalterable and psychological traits are determined by society, Dobson does not see female traits as more valuable than male characteristics, and vice versa (Dobson, 1990).

Murray Bookchin, 1921-2006

An American social ecologist and anarchist philosopher, Murray Bookchin wrote about the social, psychological, and health consequences of urbanization before the development of a public wide environmental consciousness (Rudy & Light, 1995). Bookchin also wrote about the inappropriate use of industrial chemicals in modern industrial society, although Rachel Carson was better known for the same issue (Rudy & Light, 1995). In *Our Synthetic Environment*, published in 1962, Bookchin presents his

ecological and anarchist perspectives on environmental issues and ecological debates during the 1950s and early 1960s (Rudy & Light, 1995).

In contrast to deep ecology, which is concerned about the exploitation of the natural environment, social ecology presents a view that human domination over nature has derived from their domination over each other (Papadakis, 1998). Bookchin introduced the term social ecology in the 1960s and explored the implication of domination and hierarchy for society and the environment (Curran, 1999). Social ecology, as Curran (1999) indicates, "chronicles the complex historical narrative of domination in its various guises and traditions…. [and] argues vigorously for a social organization that dissolve domination and hierarchy" (p. 61).

Bookchin blamed hierarchy for being the cause of environmental disaster. Hierarchy is a social mutation from which people develop a hierarchical sensibility toward the natural world. When people practice hierarchy, they extend their domination to all aspects of life, including nature (Bookchin, 1962; Curran, 1999).

To dismantle this power structure, Bookchin proposed a small, self-reliant, decentralized community (Wells & Schwartz, 1997). In such a community, people focus on the integrity of the natural world and of social and political balance. The community is the immediate political arena, in which there is no absolute division between private and public. Individuals actively work together to stamp out social hierarchy (Curran, 1999). Bookchin envisioned that these communities were democratic in form, providing each citizen with an equal opportunity to be engaged effectively in social and political affairs (Curran, 1999).

Paul Taylor, 1923-

One of the most thoroughly developed and philosophically sophisticated contemporary defenses of biocentric beliefs, *Respect for Nature*, is Paul Taylor's defense of why it is important to adopt a biocentric attitude (Des Jardins, 1993). He emphasizes that humans are part of an interconnected and interdependent ecosystem. Humans and nonhumans deserve equal respect, and have the right to pursue their own good in their own way (Palmer, 1997; Taylor, 1986). According to Taylor (1986), each individual organism is a "teleological-center-of-life" (p.45) and has a good of its own, which can be either enhanced or damaged. In other words, these individuals have inherent worth or intrinsic value, which entitles them a moral consideration (Brennan & Lo, 2008). When individuals accept and recognize the inherent worth of all living things, they adopt a biocentric attitude of respect for nature. As a result, they act in a morally responsible way toward nature and avoid harmful behaviors toward living organisms (Des Jardins, 1993; Palmer, 1997). Any practice that treats nature as a mere means to an end and displays a lack of respect is intrinsically wrong (Brennan & Lo, 2008).

Despite the criticism that Taylor worked at the level of the ecosystem or species rather than the individual organism, *Respect for Nature* has been one of the key systematic works in environmental ethics. For this reason, Taylor has been considered a central figure in the development of environmental ethics (Palmer, 1997).

Paul Ehrlich, 1932-

Paul Ehrlich, a population biologist, has written numerous books on biology, ecology, and environment. Ehrlich is generally considered anthropocentric, as most of his works are specific to human interests. He is best known for his controversial views on

population growth and its influence on the environment. Ehrlich's most controversial work, *The Population Bomb,* was published in 1968. Since its publication, Ehrlich has been at the center of debates on several environmental issues, including global warming, biodiversity, and nuclear winter, and others (Papadakis, 1998; Wells & Schwartz, 1997).

In *The Population Bomb*, Ehrlich pointed out that the human population would increase exponentially while agricultural resources would only grow arithmetically. Ehrlich predicted that at some point, population growth would outstrip agricultural growth, if it were not well controlled. He writes, "In the 1970s and 1980s hundreds of millions of people will starve to death…The battle to feed humanity is already lost, in the sense that we will not be able to prevent large-scale famines in the next decade" (p.18). While Ehrlich foresaw the consequences of overpopulation, he did not have solutions to avoid such a disaster if it occurred. His only solution was a radical one: starve the countries that refuse to implement a population control policy (Ehrlich, 1968).

In addition to his predictions, Ehrlich introduced an environmental impact formula. This formula describes that human impact (I) on the environment is the product of population (P), affluence (A: consumption per capita), and technology (T: environmental impact per unit of consumption). Based on this formula, I=PAT, Ehrlich postulated that environmental problems could be caused by the increase in population, multiplied by resource consumption and the advancement of technology (Ehrlich, 1968; Wells & Schwartz, 1997).

Critics pointed to Ehrlich as an alarmist of the environmental movement. They noted over time that Ehrlich's dire predictions did not come to pass as he had envisioned (Wells & Schwartz, 1997). The green revolution contributed to world food production,

which has increased exponentially and outpaced population growth in developed and developing countries. Critics also argued that if farmers throughout the world could use the current technology to raise the productivity to present U.S. level, they would be able to feed ten billion people (Bailey, 2004). The global birth rate has been decreasing, and affluence and technology actually promote human flourishing, rather than harming nature (Bailey, 2004).

In a 2004 interview, Ehrlich acknowledged that some of his prediction in *The Population Bomb* did not happen. However, as to several of his assertions, he maintained that science had proved them valid. He stated:

> When I wrote *The Population Bomb* in 1968, there were 3.5 billion people. Since then we've added another 2.8 billion — many more than the total population (2 billion) when I was born in 1932. If that's not a population explosion, what is? My basic claims (and those of the many scientific colleagues who reviewed my work) were that population growth was a major problem. Fifty-eight academies of science said that same thing in 1994, as did the world scientists' warning to humanity in the same year. ("Paul Ehrlich, famed ecologist, answers questions", 2004)

Ehrlich remains at the forefront of environmental issues, specializing in population growth and its relations to environmental destruction. He is also considered a pioneer in calling for population control (Wells & Schwartz, 1997).

Holmes Rolston III, 1932-

Environmental researchers recognize Holmes Rolston III as the father of environmental ethics as a modern academic discipline. He has devoted his career to

interpreting the natural world from a philosophical perspective and is regarded as one of the leading scholars on the philosophical, scientific, and religious conception of nature. A prolific writer, Rolston has contributed to professional periodicals and published several critically acclaimed books. As a founder of the influential academic journal *Environmental Ethics*, Rolston has been instrumental in establishing, shaping, and defining the modern discipline of environmental philosophy (Becher, 2000; Causey, 1994; Palmer, 1997).

Rolston rejected the anthropocentric view that nature is merely for human interests. He believed that humans preserve nature, not because it has economic, aesthetic, or spiritual benefits, but because there is no firm boundary between humans and ecosystems. He also suggested that ecosystems should be preserved to enable the further evolution of the planet, including that of human life (Weir, 2001). In addition, Rolston maintained that nature has intrinsic values that humans should recognize and appreciate. Such intrinsic values are found in humans, nonhumans, entire ecosystems, and natural processes. Humans have a duty toward nature and should prevent ecosystems from devastation (Palmer, 1997). Unlike anthropocentric approaches that treat ecosystems as resources to be exploited, Rolston argued that environmental holism is intrinsically valuable and non-anthropocentric (Weir, 2001).

In his book, *Environmental Ethics*, Rolston (1988) elaborates his biocentric view. Value-centered environmental ethics is prevalent in this publication. He asserts that intrinsic value is ubiquitous and imposes obligations on humans to species and ecosystems. Moreover, Rolston emphasizes five important concepts throughout his writing: (a) intrinsic value, which is non-anthropocentric since it is apart from human

interests; (b) ecological holism; (c) human duties to nature; (d) the intrinsic value of species as forms or groupings of life; and (e) biocentrism, which emphasizes the intrinsic value and respect paid to each individual living organism (Rolston, 1988; Weir, 2001). Rolston continues to integrate practical and theoretical dimensions in his work. He examines life, discovers its meaning, and expands the circle of moral significance to include all natural entities, processes, and systems (Becher, 2000).

Dennis Meadows, 1942-

Published in 1972, *The Limits to Growth* was perhaps one of the most debatable publications in the environmental field and spawned many follow-up publications (Wells & Schwartz, 1997). This book was based on a study under the direction of a research team at the Massachusetts Institute of Technology. The research team was led by Dennis Meadows and their primary goal was to develop a better understanding of the interconnectedness of five major trends of global concern—accelerating industrialization, rapid population growth, widespread malnutrition, depletion of nonrenewable resources, and a deteriorating environment. The study examined the complex interaction between these five factors, rather than investigating them individually (Meadows, Meadows, Randers, & Behrens, 1972; Papadakis, 1998).

The team concluded that the planet would reach its limits of growth in the next century if the growth trends in population, industrialization, pollution, food production, and resource depletion were constant. If the prevailing pattern of economic growth continued, humans would face environmental catastrophe. The team suggested that a focus on a sustainable system of economic growth and environmental protection would be a possible solution (Meadows et al., 1972; Papadakis, 1998; Wells & Schwartz, 1997).

They indicated that humans should design a global equilibrium that would satisfy the basic material needs of each individual. In such a circumstance, individuals have an equal opportunity to fulfill their human potential (Meadows et al., 1972).

While the study results were cautionary, critics pointed to the computer's inability to analyze human perception, which changes rapidly and is more complicated than a computer model. Additionally, critics argued that the researchers failed to consider that changes in technology and the discovery of new resources and energy might prevent the predicted outcomes. The team was also castigated for promoting industrialism and capitalism in which people show no interest in imagining a qualitatively different society and culture (Papadakis, 1998). Although *The Limits to Growth* encouraged a fair distribution of wealth and resources from wealthy countries to less developed ones, such theories were regarded as attempts to attain wealth and prosperity from more developed countries by less developed countries in the name of economic growth (Papadakis, 1998).

Despite the shortcomings of the study, the message in *The Limits to Growth* raised awareness of vulnerability of the environment. The publication motivated the public to join the social and political movement with special concern for the environment (Papadakis, 1998). *The Limits to Growth* encouraged efforts to develop more efficient technology, look for new natural resources, and become creative when dealing with environmental challenges (Papadakis, 1998). Meadows et al. further stimulated anthropocentric beliefs like those depicted in the *The Population Bomb*, which were mostly concerned with human interests.

Worldview between Industrial Era and Ecological Era

A worldview guides human behaviors and attitudes (Jurin & Hutchinson, 2005). A comparison of environmental worldviews that people held in the industrial era and ecological era indicates a transition from human-centeredness to life-centeredness. In other words, there has been a shift in environmental beliefs from anthropocentrism to biocentrism (Jurin & Hutchinson, 2005).

In the industrial era people were dominators who viewed themselves as the center of the social world. The anthropocentric orientation, also a dominant worldview in industrial society, has permitted and driven humans to pursue exploitative, destructive, and wasteful applications of technology. Such technological advancement has allowed humans to extract natural resources for their own benefits (Metzner, 1993). In terms of their relationship to nature, humans came to consider nature as an inexhaustible resource and a supply of lifeless materials. Nature only had instrumental value, and was either exploited or conserved for human purposes (Elgin, 2006; Metzner, 1993). Land was primarily used for farming and herding, and undeveloped land was generally considered useless and empty (Anderson, 2002).

The ecological worldview was contrasted with the dominant industrial worldview shaped by the Industrial Revolution (Metzner, 1993). In the ecological era, individuals sought harmony in their relationships to the environment. The idea of environmental synergism has led to an awareness of the importance of protecting ecological integrity and diversity (Metzner, 1993). As individuals became aware of the vulnerability of ecosystems, they used only as much as they needed (Elgin, 2006). Furthermore, biocentric or ecocentric values were encouraged in the ecological era, in which humans

were seen as part of nature. Instead of being conquerors, humans had the potential to extend their sense of identity to include everything in the ecosystem (Metzner, 1993). Each individual took responsibility for the well-being of the world and emphasized the connectedness between humans and nature. As Anderson (2002) indicates, "Humankind was made for earth; not earth for man [*sic*]" (p. 25).

Bengston, Webb, and Fan (2004) confirmed a transition in environmental orientation. To study the shift in anthropocentric, biocentric, and moral/spiritual/aesthetic orientations toward forests from 1980 through 2001, Bengston et al. collected a large database of news stories discussing forest planning, policy, and management in the United States. Using computer coded content analysis, these researchers identified shifts in the relative importance of forest value orientations during this period. Their findings showed that the anthropocentric orientations declined while biocentric orientations increased. Moral/spiritual/aesthetic orientations remained constant over the period.

Also using computer coded content analysis, Webb, Bengston, and Fan (2008) measured and tracked the relative importance of commodity, ecological, and moral/spiritual/aesthetic forest value orientations over a period from 1997 to 2004 in Australia. In this study, Webb et al. defined commodity-related values and benefits of forests as part of an anthropocentric value orientation. Similar to Bengston, Webb, and Fan (2004), they analyzed Australian news media discourse about the management of Australian native forests. They reported a statistical significance in the decline of commodity value orientation and an increase in ecological and moral/spiritual/aesthetic forest value orientations (Webb et al., 2008).

Environmental Issues

Environmental issues have been widely discussed for the past four decades. These issues vary across environmental disciplines and are typically environmental concerns, environmental attitudes and behaviors, cross-cultural comparison of environmental concerns, and human-nature relationships.

In studies of environmental orientations and sociodemographic variables, study findings were mixed. Nevertheless, there is a general pattern (Marquart-Pyatt, 2008). Young individuals were more likely to express concern for the environment and engage in environmentally responsible behaviors than adults (Dunlap et al., 2000; Johnson et al., 2004; Jones & Dunlap, 1992; Klineberg et al., 1998). Individuals with high levels of education had more opportunities to explore environmental concerns and values, as compared to their counterparts with low levels of education. Researchers attributed the difference to systematic school education, which allows individuals to learn about the environment (Jones & Dunlap, 1992; Klineberg et al., 1998; Marquart-Pyatt, 2008; McMillan, Hoban, Clifford, & Brant, 1997). Moreover, while individuals with low incomes focused more on material needs, and, thus, were less concerned with the environment, individuals with high incomes were more supportive of environmental protection (Jones & Dunlap, 1992; Klineberg et al., 1998; McMillan et al., 1997). According to various study findings (Dietz, Kalof, & Stern, 2002; Johnson et al., 2004; Stern, Dietz, & Kalof, 1993), women have stronger environmental beliefs than men and express more altruistic attitudes about the biosphere. Jones and Dunlap's (1992) study found that people who were raised in or were currently living in urban areas tended to exhibit higher levels of concern about environmental issues as opposed to rural residents.

Human-Nature Relationships

Some of the terms used interchangeably in environmental research literature include environmental attitude, environmental concern, environmental ethics, environmental value, environmental orientation, and environmental worldview (Schultz et al., 2005). However, it should be clarified that each term means something slightly different. Environmental attitude is the collection of beliefs, affect, and behavioral intentions someone holds regarding environmentally related issues. Environmental concern refers to the emotions associated with environmental problems (Schultz et al., 2005). Environmental ethics examine how humans should and ought to interact with nature (Palmer, 1997). Environmental ethics also argue that morality should be extended to include human-nature relationships (Kortenkamp & Moore, 2001). Environmental value is a framework from which a person selectively interprets information about the environment. This framework is a stable structure and stems from the socialization processes. Environmental values guide a person's environmental behaviors (Amérigo et al., 2007). Lastly, environmental orientation covers environmental attitudes toward nature and the physical environment. Environmental orientation is part of a general worldview, which is closely tied to cultural patterns (Skogen, 1999). In the research reported in this study, environmental beliefs and environmental attitudes are used interchangeably with environmental orientations. Environmental orientations refer to anthropocentric and biocentric orientations in this study.

Social psychologists attempted to understand the driving force behind public concern about environmental issues when the environmental movement began 40 years ago. In the 1990s, environmental researchers began to study how environmental attitudes

were formed (Schultz & Zelezny, 1999). Their studies were based on the anthropocentric and biocentric concepts. Researchers attempted to differentiate these ideas in various ways. Stern and Dietz (1994) had three distinct categories for environmental attitude (egoistic, social-altruistic, and biocentric). Dunlap and his associates identified the dominant social paradigm and the new environmental paradigm (Dunlap, 2008; Dunlap & Van Liere, 1978; Dunlap & Van Liere, 1984; Dunlap & Van Liere, 2008), while Hirsh and Dolderman (2007) had consumerism and environmentalism.

Anthropocentrism

Anthropocentrism literally means human-centered. Although Campbell (1983) coined this term in 1983, the perspective that nature is created for human use and benefits is not uncommon throughout Western history. Among the early philosophers who are thought to have held an anthropocentric perspective, Aristotle is perhaps the most known. In *Politics*, Aristotle maintains not only that animals exist for the sake of humans but also that nature has made all things specifically for the benefit of humans (Brennan & Lo, 2008). American paleontologist George Simpson (1964) had a similar perspective and stated that he "could think of no better reason for the existence of fishes…than that they provided food for man" (p. 101). Charles Lyell, a leading geologist of the 19th century, reflected his anthropocentric perspective in early writings, noting that domestic animals have been expressly designed for human use (Scherer & Attig, 1983).

As mentioned previously, American historian Lynn White, in *The Historical Root of Ecological Crisis*, asserted that Christianity was the most anthropocentric religion of all time and argued that the anthropocentric orientation was the source of environmental disaster. Despite the fact that God created living creatures, it was humans who named

them and established dominance over them. When God created humans in his image, he also purposefully created a moral hierarchy in which humans were superior to nature. Humans, as a result, had the ruling power over everything in nature and had the right to use nature for their sake (Des Jardins, 1993; White, 1967).

Anthropocentrism represents a perspective that humans are the center of the universe and are the highest purpose of existence in the world (Xu, 2004). The chief characteristic of anthropocentrism is the direct moral concern given to humans (Campbell, 1983; Curry, 2006; Kortenkamp & Moore, 2001; Thompson & Barton, 1994). In addition, anthropocentrism considers humans to be the most important life form and the sole aspect of value. Anthropocentric individuals assign intrinsic value to humans alone or assign a significantly greater amount of intrinsic value to humans than to nonhuman species (Brennan & Lo, 2008). Nonhuman beings are important only to the extent that they affect humans or can contribute to human well-being. Simply put, anthropocentric individuals tend to see the physical environment as a means to support their physiological and material needs (Bourdeau, 2004; Curry, 2006; Xu, 2004). If nonhuman beings do not have instrumental values, they can therefore be easily consumed or destroyed (Kortenkamp & Moore, 2001; Xu, 2004).

Although anthropocentrism places significant emphasis on human well-being, it does not assume that humans should sacrifice nature for their own sake. Today, anthropocentric individuals believe that people should preserve natural resources and maintain a healthy ecosystem for human comfort and quality of life (Curry, 2006; Thompson & Barton, 1994). Based on this notion, it is considered wrong to cut down

rainforests because this degrading behavior will result in the loss of potential cures for human diseases (Kortenkamp & Moore, 2001).

Biocentrism

In contrast with anthropocentric orientation, which places emphasis on human benefits, biocentric orientation means life-centered and, thus, stresses the value of both humans and nonhuman species. An American biochemist, Lawrence Henderson, coined the term biocentrism in 1913 to delineate that the universe itself was the originator of life (Campbell, 1983). Deep ecologists later adopted this term to refer to the idea that all lives are equally important due to their intrinsic values, regardless of their usefulness to humans (Des Jardins, 1993; Nash, 1989).

Despite its first official appearance being in 1913, the concept of biocentrism has been around for centuries. According to Campbell (1983), the biocentric perspective can be traced back to Charles Darwin. In his argument, Darwin claimed that humans and animal species evolved in the same way, entangled together in the evolutionary process, and that humans were not superior to other species. In his theory of transmutation of species, Darwin wrote that he could not believe that humans and animals had a different origin (Campbell, 1983); Campbell (1983) viewed Darwin as non-anthropocentric.

Based on Darwin's study of natural selection, Campbell (1983) considered him biocentric. Darwin indicated that the relationships among species largely determine the characteristics of the species. Such relationships include, for example, competition for food and space. In other words, the biosphere is a self-regulating system (Campbell, 1983). Furthermore, Darwin was known for pointing to instances in which the web of life was suddenly and irrevocably changed by the introduction of one new species. Although

Darwin did not imply that human behaviors alter the ecological system, he believed that the human species was not superior to other species (Campbell, 1983).

Albert Schweitzer also depicted an early version of a biocentric orientation (Des Jardins, 1993). He writes, "The man [*sic*] who has become a thinking being feels a compulsion to give every will-to-live the same reverence for life that he gives to his own. He experiences that other life in his own…to preserve life, to promote life, to raise to its highest value life which is capable of development" (1972, p. 131). Schweitzer claimed that all living things have inherent worth that commands awe and respect from humans. Life is good in itself, inspiring and deserving of reverence (Des Jardins, 1993).

In order for humans to develop an attitude of respect towards nature, they should regard the wild plants and animals of the natural ecosystems as possessing intrinsic value (Taylor, 1986). Whether an individual being is a plant, an animal, or a micro-organism, it has a good or well-being of its own, which can either be damaged or enhanced. Taylor (1986) further asserted that each individual thing has inherent worth, and humans have a responsibility to protect and promote the well-being of these things (Brennan & Lo, 2008).

Based on various writings of the biocentric perspective, it can be concluded that biocentrism has four aspects: (a) humans and other species are all members of the community of life in the same sense, (b) the community of life is made up of a system of interdependence, (c) each individual living thing has inherent worth, and (d) humans are not superior to other species (Curry, 2006; Des Jardins, 1993). Brennan and Lo (2008) also indicate that any practice that treats nature merely for its usefulness to humans or lacks respect for nature is intrinsically wrong.

Perhaps one of the most cited studies on anthropocentrism and ecocentrism is Thompson and Barton's (1994). In their study, they define ecocentric value as "deserving protection because of its intrinsic value" (p. 149). The idea of ecocentrism in this study is the same as biocentrism in other studies (Amérigo et al., 2007; Eckersley, 1992; Grendstad & Wollebaek, 1998).

Thompson and Barton conducted two studies in their research. They developed scales to measure anthropocentric and ecocentric attitudes and general apathy toward environmental issues. In the first study, they randomly asked 115 participants about their attitudes toward various environmental issues. Using zero-order correlations of interest and multiple regression, the authors found that individuals with an ecocentric orientation expressed less apathy about environmental issues, were more likely to engage in conservation behaviors, belonged to more environmental organizations, and gave more open-ended reasons for their concerns about the environment, as compared to their anthropocentric counterparts (Thompson & Barton, 1994).

The second study was comprised of 71 college students. Using the same scales with items added to measure apathy toward environmental issues, the researchers reported negative correlations between ecocentrism and environmental apathy. They also found a positive statistical difference between ecocentric orientation and self-reported conservation behaviors as well as between ecocentric orientation and interest in joining environmental groups. However, anthropocentrism was not related to any of those variables.

The researchers applied multiple regression analyses to examine the effects of ecocentrism, anthropocentrism, and the environmental attitude, as measure by the

Environmental Concern Scale (Weigel & Weigel, 1978) on conservation behaviors and environmental apathy. The results showed that ecocentrism was positively correlated with conservation behavior when environmental attitudes were controlled. The environmental attitudes as measured by Environmental Concern Scale did not predict conservation behaviors when two environmental orientations were included in the analyses. However, environmental attitudes predicted environmental apathy when two environmental orientation (anthropocentrism and ecocentrism) were accounted for (Thompson & Barton, 1994).

Based on the Thompson and Barton (1994), Amérigo et al. (2007) explored the relationship of behavioral patterns to environmental beliefs. Instead of studying the two dimensional structure of anthropocentric and ecocentric orientations, Amérigo et al. studied a three dimensional structure of environmental beliefs, which included egocentric, biospheric, and egobiocentric orientations. To compare the two models, Amérigo et al. studied 212 university students and 205 general participants. Using a confirmatory factor analysis, they analyzed the relationship between dimensions from two models. The study results suggested that the student sample and general population had the same structures of environmental orientations, and a statistical difference was found to exist in both samples. Specifically, the egobiocentric orientation was statistically significant to the biospheric orientation in both samples. Anthropocentrism, however, had no statistically significant relation to egobiocentric orientation. While anthropocentric orientation was not related to biospheric orientation in student samples, anthropocentric orientation showed statistically significant and negative relation with biospheric orientation in the general population sample.

Both sample groups were asked to fill out questionnaires to measure their environmental beliefs. The questionnaire was a short version of the scale designed by Thompson and Barton (1994). Amérigo et al. performed an analysis of three dimensions with an intention to investigate individuals' commitment to proenvironmental behaviors. The results showed that individuals with no intention to engage in ecological behaviors in the future had high mean scores on the anthropocentric scale. By contrast, individuals with an intention to participate in environmental campaign obtained high mean scores on both the egobiocentric and biospheric scales. The results were consistent with Tompson and Barton (1994).

To understand the perceptions of the American public regarding the Louisiana coastal restoration project, Voorhies-Holloway (2009) conducted a self-administered survey in 2006. The survey was used to identify respondents' environmental orientations (anthropocentric or biocentric orientations) and assess their attitudes toward support of project funding. The survey was also used to determine if outside effects (knowledge of Louisiana coastal wetlands, gender, and education), made respondents with specific orientations more likely to support restoration funding. The sample was comprised of 1,441 residents living in the Mississippi River Valley.

Voorhies-Holloway (2009) reported a slightly larger number of biocentric females than males. The study results indicated that biocentric respondents were more likely than anthropocentric respondents to support increased funding for the coastal restoration project. Biocentric respondents with low knowledge of coastal wetlands were more likely than anthropocentric respondents with low knowledge to support the project. Support increased parallel to knowledge. However, anthropocentric respondents with low

knowledge showed negative support for the project. When their knowledge increased, their support for the restoration project tended to drop even more.

Researchers also found that environmental attitudes differed across cultures. To investigate the differences in environmental attitudes in a cross-cultural context, Sarigollu (Sarigollu, 2009) surveyed residents in Canada and Turkey. A total of 881 Canadians and 950 Turks were selected using multistage sampling and phone contact.

Sarigollu argued that Canada, as a Christian country, reflected an anthropocentric orientation in terms of the human-nature relationship. The dominance over nature also reflected an individualistic orientation, indicating that people's needs were superior to ecological integrity. By contrast, the belief that God has power over everything in the Muslim Turkish culture indicated that harmony between humans and nature is a must. This belief reflects a biocentric view in Turkish culture. Sarigollu also pointed out that as the environment is a collective matter, the collectivistic Turks showed stronger proenvironmental attitudes than the individualistic Canadians.

Egoistic, social-altruistic, and biospheric orientations

In North American environmental research literature, researchers have been discussing three types of values: egoistic, social-altruistic, and biospheric orientations (Stern et al., 1993). Researchers believe that these values serve as bases for beliefs about environmental justice and have profound influences on proenvironmental actions (Stern & Dietz, 1994).

Egoistic attitudes "predispose people to protect aspects of the environment that affect them personally, or to oppose protection of the environment if the personal costs are perceived as high" (Stern & Dietz, 1994, p. 70). Individuals with an egoistic

environmental orientation are concerned about the environment, but their concerns lie on a personal level. For instance, egoistic individuals are concerned about air pollution because such pollution might affect them personally (Schultz et al., 2005). In contrast with egoistic attitudes, social-altruistic attitudes "predispose people to judge environmental issues on the basis of costs or benefits for a human group" (Milfont, Duckitt, & Cameron, 2006, p. 746). Individuals with social-altruistic attitudes have an overall concern for all people. They are are concerned about environmental problems because these problems affect everybody (Schultz et al., 2005). In addition to egoistic and social-altruistic attitudes, individuals who hold biospheric attitudes judge environmental issues based on the costs and benefits to entire ecosystems (Milfont et al., 2006; Schultz et al., 2005). Individuals with either egoistic or social-altruistic attitudes are categorized as anthropocentric because they have concerns about human benefits. Individuals with biospheric attitudes are ecocentric because their environmental attitudes focus on the equality of humans and environment (Amérigo et al., 2007).

Stern, Dietz, and Kalof (1993) developed a social-psychological model to investigate gender differences in three environmental beliefs. This model not only included three environmental dimensions, but it also incorporated a political action scale, which measured individuals' willingness to take political actions for environmental protection. Stern et al. chose 343 university students from a systematic random sample, and participants were asked to respond to a 4-point Likert scale survey. The results indicated that gender had a significant effect on environmental beliefs and on willingness to take political actions to protect the environment. However, when the environmental beliefs were controlled, the effect of gender on behavioral intentions dropped

substantially, and the relationship was not significant. Stern et al. claimed that women tend to take a more proenvironmental stance than men. Women were also more likely than men to recognize the effects of environmental quality on personal well-being, social welfare, and the health of biosphere. The researchers concluded that their social-psychological model served as a mechanism for interpreting the gendered effects on environmental actions.

Dominant social paradigm and new environmental paradigm

Milbrath (1984) defined the dominant social paradigm (DSP) as "the values, metaphysical beliefs, institutions, habits, etc. that collectively provide social lenses through which individuals and groups interpret their social world" (p. 7). Because the DSP forms the core value of a society in Western culture, several authors have argued that the DSP inevitably provides guidance for individual and societal behaviors and determines individual beliefs and attitudes on social and environmental issues (Dunlap & Van Liere, 2008; Kilbourne et al., 2002; Kilbourne & Carlson, 2008; La Trobe & Acott, 2000; Sheppard, 1995). The DSP is said to be associated with the traditional Western environmental belief that nature is composed of mechanistic and usable resources; some authors have argued that the DSP was the result of environmental declines (Dunlap & Van Liere, 1984; Sheppard, 1995). Bonnes and Bonaiuto (2002) also indicated that because DSP is based on the idea that humans are exempt from the constraints of nature, the DSP can also be known as Human Exemptionalism Paradigm.

The DSP is a multidimensional instrument developed to measure political, economic, and technological dimensions. These three dimensions support ideologies such as free enterprise, private property rights, economic individualism, and unlimited

economic growth. The DSP also promulgates a faith in science and technology to solve environmental problems (Kilbourne, 2006; Kilbourne & Carlson, 2008; Kilbourne & Polonsky, 2005; Shafer, 2006).

In contrast to the DSP, which presents an anthropocentric view, the new environmental paradigm (NEP) is defined as a vision of the world consisting of ideas opposing the anti-ecological DSP (Dunlap & Van Liere, 1978). The NEP is a general environmental orientation toward nature and human-nature integrity. Since its appearance, it has reflected the change of public opinion toward an environmental belief that humans should live in harmony with nature, rather than considering nature as a resource for human consumption (Bostrom et al., 2006). Developed by Dunlap and Van Liere, this instrument has been widely used across the world in studies of environmental attitudes (Dunlap & Van Liere, 2008).

Dunlap and Van Liere (1978) declared that the NEP was unidimensional when they developed it. Nevertheless, subsequent research has suggested that the NEP is multidimensional and that its internal consistency varies across cultures (Bostrom et al., 2006). Despite these disagreements, researchers have suggested that this ecologically sound vision of the world reflects three orientations: (a) the limits of growth in availability of resources for human use, (b) the vulnerability of natural balance and the risk incurred by human activities, and (c) respecting nature rather than dominating for human needs (Bonnes & Bonaiuto, 2002; Bostrom et al., 2006).

The DSP has been empirically tested, and researchers have reported a negative correlation with proenvironmental attitudes (Kilbourne et al., 2002; Kilbourne & Carlson, 2008; Kilbourne & Polonsky, 2005). Kilbourne and Polonsky (2005) developed a causal

model of environmental attitudes using the DSP scale. They examined the environmental attitudes presented within the DSP alongside perceived change for a better environment. Their samples included university students from New Zealand and Australia. Kilbourne and Polonsky found that individual's beliefs in DSP were negatively related to environmental attitudes and perceived change and the relationship between environmental attitudes and perceived change was positive. Among Australian students, the relationship between behavioral change and environmental attitudes was found to be positive and significant. The relationship was also positive, but not significant, for New Zealand students. Kilbourne and Polonsky further suggested that individual behaviors could become more environmentally friendly if environmental attitudes and knowledge improved.

Similar study results were found by Kilbourne and Carlson (2008). Kilbourne and Carlson performed a comparison to determine if the education process could influence environmental attitudes toward the DSP and ecological environment. As part of the research, they also investigated whether the education process could influence the willingness to change consumptive behaviors. The sample was comprised of some students who were in a social responsibility class and some who were not. Findings indicated that the DSP was negatively related to proenvironmental attitudes. As individuals' environmental beliefs measured in the DSP increased, expressed environmental concerns declined. Students in the social responsibility class were more concerned with the environment and perceived that environmental problems were more critical, as opposed to students not in the class. Both student samples believed that individual and social changes were necessary to ameliorate environmental problems.

La Trobe and Acott (2000) measured the extent to which individuals accepted ideas of the two paradigms, the DSP and the NEP, and their survey reflected the environmental attitudes presented in both paradigms. Survey respondents came from both the general population and the members of an environmental organization. La Trobe and Acott expected contrasting attitudes toward nature between the two groups. Proenvironmental responses were found in both groups, but members of the environmental organization showed stronger proenvironmental attitudes than the general public. The study findings suggested that the majority of survey respondents had environmental beliefs similar to those described in the NEP. The responses were also close to those held by environmentalists.

Bostrom et al. (2006) conducted three surveys in Bulgaria over three successive years from 1998 to 2000. The research was intended to identify environmental risk perceptions, local environmental policies, and attitudes toward these policies. Bostrom et al. suggested that environmental beliefs, environmental concerns, and exposure to pollution were related. The study results indicated that although participants' experiences with pollution and their perception of environmental hazards made them support environmental policies, they did not perceive potential environmental problems as serious. Moreover, the authors reported a positive relation among environmental risk perception, support for environmental protection, and NEP score. Regarding issues such as climate change, the NEP scores were positively correlated with support for environmental protection. These two variables, however, were not found to be statistically significant in the other two surveys on governmental policies.

Consumerism and environmentalism

Researchers have conceptualized consumerism and environmentalism as mutually opposing constructs in environmental research. Consumerism is a value structure that stresses the relative importance of material success and the pursuit of personal wealth over other domains of life. Individuals with high levels of consumerism focus on the accumulation and consumption of material resources. They display self-interest and are not concerned with others. They are individualistic and pay much attention to individual goals. They demonstrate low levels of empathy, high levels of relationship conflict, and lack of gratitude (Hirsh & Dolderman, 2007). According to McCarty and Shrum (2001), individualistic people, similar to those who hold a high regard for consumerism and display major self-interest, have a tendency to weigh pros and cons before engaging in environmentally friendly behaviors. In other words, they place great importance on the relationship between their behaviors and their needs. Individualistic people are thus concluded to be anthropocentric.

Environmentalism is associated with individual satisfaction and a lack of group goals. Environmentalism is thought to connect with empathy, concerns for others, and proenvironmental attitudes (Hirsh & Dolderman, 2007). Hirsh and Dolderman point out that environmentalism is based on three environmental values: egoistic, social-altruistic and biospheric, all of which have been previously defined. The concerns of egoistic individuals for environmental degradation are related to personal well-being, social-altruistic individuals care about the environment because environmental problems affect others, and individuals with biospheric values are concerned with the integrity of nature itself.

Hirsh and Dolderman (2007) expected environmentalism to be related to some personality constructs of the Big Five Inventory (BFI) (John & Srivastava, 1990). The BFI includes extraversion, agreeableness, conscientiousness, neuroticism, and openness. Researchers assumed that high levels of proenvironmental values would be related to agreeableness because this personality trait is associated with empathy (Hirsh & Dolderman, 2007). Their research examined college students' personalities, environmental beliefs, value orientations, and behaviors.

The study results showed that there were no gender differences in environmental orientation, which measured consumerist attitudes and behaviors. The researchers suggest that this finding might be due to the limited number of male students in the study. On the other hand, females tended to present a higher level of proenvironmental values, as compared to males. Agreeableness was negatively associated with consumerism values. Individualistic people showed less empathy, as expected by researchers.

Specifically, agreeableness and openness were positively correlated with environmentalism, whereas only agreeableness was associated with consumerism, and in a negative direction. These findings supported an earlier study that found that less agreeable individuals showed a propensity for demonstrating self-interests (Graziano & Eisenberg, 1997). Hirsh and Dolderman (2007) further indicated that agreeable individuals were more likely to display high levels of proenvironmental beliefs, and, thus, engaged in environmentally responsibly behaviors more often than those who were less agreeable. The researchers suggested that overall, personality traits are good indicators of environmental beliefs.

Environmental Orientations and Ethnicity

Much environmental research has sought to determine whether certain demographic variables are related to environmental orientations. Early research by McMillan et al. (1997) was performed to determine if six variables (age, gender, race, education, income, and residence) were related to the environmental attitudes as measured by NEP scale. Telephone interviews were conducted, and the study sample was comprised of 1,047 residents in North Carolina and Virginia. Due to the small population of races other than African American and White, residents of other races were eliminated from the analysis. Regression models were used for data analysis. McMillan et al. reported findings similar to the national trend: Younger people, women, Whites, and people with higher education levels held proenvironmental attitudes as measured by the NEP scale.

Johnson et al. (2004) studied ethnic variation for environmental behaviors and beliefs. Their study included White, African American, U.S.-born Latino, foreign-born Latino, and Asian American participants. Environmental beliefs were measured by the new ecological paradigm, a modified version of the new environmental paradigm. The environmental behaviors investigated were environmental reading, household recycling, participation in environmental groups, and participation in outdoor recreation. Other demographic variables included gender, age, family size, residence, education, and political affiliation.

A logistical regression analysis was utilized to examine ethnic variation for environmental beliefs measured by the new ecological paradigm. Study results showed that, in terms of the new ecological paradigm scale, African Americans and foreign-born

Latinos had significantly lower scores than Whites. Older study participants and those with large family sizes also tended to score lower on the scale. Women showed stronger proenvironmental attitudes than men, and people with liberal political affiliations were also more environmentally concerned. Overall this study was consistent with McMillan et al. (1997).

After examining the combined effects of various demographic variables and behavioral variables in the causal model, Johnson et al. concluded that respondents who scored higher on the new ecological paradigm were more likely to engage in proenvironmental behaviors. A significant difference was found between African Americans and Whites on three environmental behaviors: environmental reading, recycling, and outdoor recreation participation. A statistical difference was found between U.S.-born Latinos and Whites as far as environmental organization membership and outdoor recreation participation. Moreover, a difference in recycling, environmental group membership, and outdoor recreation participation was reported between foreign-born Latinos and Whites. Contrary to researchers' expectations, Asian Americans and Whites differed significantly only for outdoor recreation participation. Johnson et al. concluded that U.S.-born Latinos and Asian Americans were most similar to Whites in environmental beliefs, whereas African Americans' environmental concerns and behaviors were least similar to those of Whites'.

Environmental Orientations and Sex

To understand the relationship of environmental orientations to gender, Stern et al. (1993) developed a social-psychological model based on Schwartz's theory of altruism. According to Schwartz (1968), proenvironmental behaviors became probable

when individuals became aware of environmental degradation and its influence on others. Proenvironmental behaviors were also likely to happen when individuals ascribed responsibility to themselves to change the offending environmental conditions. Stern et al. assumed that environmentally responsible behaviors could result from any of three environmental orientations: egoistic, social-altruistic, or biospheric orientations.

These authors also presumed that gender may have implications for the relationship between the three orientations and proenvironmental behaviors. Their survey data included 349 college students, randomly and systematically selected. Participants were asked to respond to a Likert-scale on beliefs about the consequences of environmental quality or environmental protection for the self, the welfare of others, and the biosphere. They were also asked to respond to a Likert-scale on political actions. Study results showed that three environmental orientations predicted an individual's willingness to take political actions. However, only the egoistic orientation reliably predicted an individual's willingness to pay through taxes for environmental protection. Moreover, women had stronger beliefs than men about environmental consequences. Women also were more accepting than men of messages that linked environmental consequences to the three orientations. Additionally, the study results were found to be consistent with arguments in feminist theory that women were more concerned with and affected by environmental consequences to others, and, therefore, were more likely than men to develop proenvironmental beliefs (Stern et al., 1993).

Caiazza and Barrett's (2003) research with the Institute for Woman's Policy Research concluded similar findings to Stern et al. (1993) that indicated different environmental attitudes between men and women. In general, women cared more about

environmentalism and were more concerned about environmental problems that create risks for their health and safety. Furthermore, their higher levels of empathy, altruism and personal responsibility made them more interested in environmentalism as a way to protect for themselves, their families, and others.

To discover the possible curriculum change in environmental education, Fernández-Manzanal, Rodríguez-Barreiro, and Carrasquer (2007) evaluated the environmental attitudes of 952 university students. The researchers developed their own Environmental Attitudes of the University Scale, which was composed of four dimensions: education, field trip, conservation, and intention of acting in an environmentally sustainable way. Their research findings reported a difference in environmental attitudes between male and female students. When compared to male students, females demanded more environmental education, and were more sensitive to the conservation aspects presented in the questionnaire. They also had stronger intention to act in an environmentally sustainable way. Nonetheless, while field trips was important aspect of environmental education from teachers' perspective and may be requested more by females than by males, there was no significant difference found between sexes.

Summary

This chapter has discussed authors and their writings which have shaped the environmental beliefs in the U.S. environmental history. The researcher has reviewed studies on environmental issues, human-nature relationships, and environmental orientations to ethnicity and sex.

Review of literature suggests that environmentalists are categorized according to their environmental orientations. Authors who believe that everything in nature can be

used to enhance human well-being and who are concerned with human interests are inferred to be anthropocentric. By contrast, authors who believe that nature itself has spiritual and intrinsic values are inferred to be biocentric.

Also in this section, the researcher presented studies on human-nature relationships. The dominant social paradigm and the new environmental paradigm were created on the basis of anthropocentric and biocentric orientations, and have been intensively studied in the field of environmental research. The three dimensional structure of egoistic, social-altruistic, and biospheric orientations, as well as consumerism versus environmentalism are discussed in this chapter, too.

Early research indicates that demographic variables such as ethnicity and sex are predictors of environmental orientations. Generally speaking, young people, women, Whites, and people with high education levels and income levels are more concerned with the environmental and thus hold proenvironmental attitudes.

In the following chapter, a description of the subjects, the instrument, and procedures for data collection and data analysis will be introduced.

CHAPTER III

Methodology

The purpose of this study was to identify environmental orientations of students of different ethnicities and sexes at Oklahoma State University. The topics presented in this chapter include a description of the sampling, subjects, the instrument, and an outline of the research procedure and data analysis utilized in the study.

Sampling

Subjects were selected through quota sampling. The objective of quota sampling is to generate a sample that reflects a population in terms of the relative proportions of people in different categories, such as sex and ethnicity (Alan, 2001). The total student population of Oklahoma State University during the fall semester of 2008 was approximately 20,000: 15,653 Whites (82.15%), 1,757 Native Americans (9.22%), 797 African Americans (4.18%), 510 Hispanics (2.68%), and 337 Asian Americans (1.77%). International students were not included in the sample population.

Following approval from the thesis committee and the Institutional Review Board (IRB), the researcher asked for assistance from OSU Communications office for subject selection. OSU Communications office generated a random sample of students along with their email addresses based on the proportion of the target population.

Two-thousand email invitations to an online survey were sent to students in the sample. The email script is provided in Appendix A. Two weeks after the initial email invitation, a follow-up email was sent to the same participants. Due to a low response rate from some minority groups, the survey invitations were also sent to the presidents of ethnic student associations one week after the follow-up email invitation. These student associations included the African American Student Association, the Native American Student Association, the Hispanic Student Association, and the Asian American Student Association. The presidents of each student association were asked to forward the survey invitations to their members and request members to help with the research. A total of 194 surveys were returned. Surveys with missing and incomplete data were eliminated; thus, a total of 167 participants were included in data analysis.

Subjects

Subjects were 167 full-time students of different ethnicities at Oklahoma State University. Subjects were 106 (63.5%) Whites, 5 (3.0%) African Americans, 6 (3.6%) Native Americans, 22 (13.2%) Hispanics, and 28 (16.8%) Asian Americans who were at least 18 years old.

Instrument

The instrument selected for this study was a questionnaire adopted from the Wilderness Value Test. The Wilderness Value Test was originally developed by Clark and Kozacek (1997) to test the wilderness values of potential wilderness managers. The Wilderness Value Test has been modified several times and used with people facing challenges of managing Wild and Scenic River, National Recreation Areas, Threatened and Endangered Species, and other more aspirational land management programs where

values play in day-to-day management decisions and choices (K. Clark, personal communication, August 14, 2008). When Clark and Kozacek designed the Wilderness Value Test, Clark was the district ranger for the Eagle Cap Ranger District of the Wallowa-Whitman National Forest in Enterprise, Oregon, and Kozacek was the district ranger for the Wilderness Ranger District on the Gila National Forest in Mimbres, New Mexico. The Wilderness Value Test was first published in the *International Journal of Wilderness* in 1997.

The Wilderness Value Test distinguishes two contrasting environmental orientations, anthropocentrism and biocentrism. These two orientations are often used to categorize philosophies of wilderness stewardship. This instrument contains 35 questions requiring "yes" or "no" answers, where "yes" answers represent an anthropocentric orientation and "no" answers indicate that an individual falls toward the biocentric end of the spectrum.

The Wilderness Value Test is designed to help wilderness managers recognize that even wilderness managers themselves can have different wilderness orientations and philosophies. Their wilderness orientations and philosophies form the basis for the management policies and actions for wilderness stewardship.

Because the Wilderness Value Test was designed for training purposes, it incorporated technical language. In order to apply the instrument to the general public, Choate (2009) conducted a pilot study to test the instrument's validity and reliability. Choate collected data for a total of nine days, on-site and in contact with visitors to Charons Garden Wilderness in the state of Oklahoma between August 27 and October 5,

2008. His respondents included day-users and overnight users. A total of 25 survey responses were collected for his data analysis.

Choate conducted an assessment of the instrument using Cronbach's Alpha to determine internal consistency of responses. Cronbach's Alpha is designed to evaluate single dimensional response and provides a suitable measure of reliability for this instrument. Choate obtained the reliability coefficient of 0.77. To address validity, Choate asked his respondents to identify individual questions for which they had difficulty in interpreting and Choate restated these questions for clarity. The seven original questions are listed below, followed by their corresponding modifications:

1. Question #3 – In an area that has established wildlife watering devices (e.g., guzzlers), do you feel it is appropriate to maintain and leave them in wilderness?

   Modification – In an area that has established wildlife watering devices (e.g., watering holes), do you feel it is appropriate to maintain and leave them in wilderness?
2. Question #5 – Are low-level aerial-game surveys acceptable to you?

   Modification – Are low-level aerial-game surveys (by helicopter or airplane) acceptable to you?
3. Question #6 – Do you feel we should be protecting known threatened and endangered species habitat from Prescribed Natural Fires (PNF)?

   Modification – Do you feel we should be protecting known threatened and endangered species habitat from Prescribed Natural Fires (PNF-deliberately ignited fires to restore an area to a natural state)?

4. Question #7 – Is it acceptable to you to have Managed Ignited Fires (MIF) in a wilderness area?

   Modification – Is it acceptable to you to have Managed Ignited Fires (MIF-naturally caused fires that are controlled by management) in a wilderness area?

5. Question #16 – Do you feel that cutting logs in trails to facilitate passage by pack strings is appropriate in wilderness?

   Modification – Do you feel that cutting logs that are lying across trails to allow passage by pack strings is appropriate in wilderness?

6. Question #22 – Do you feel that it is appropriate to leave some established rock-bolt routes for climbers in wilderness areas?

   Modification – Do you feel that it is appropriate to leave some established permanent bolt anchors for rock climbers in wilderness?

7. Question #34 – Do you feel it is appropriate to allow a one- or two-week window for chain-saw use to open trails after an intense blow down event?

   Modification – Do you feel it is appropriate to allow a one- or two-week window for chain-saw use to open trails after an intense blow down (high wind) event?

For this present study, the questionnaire title was changed to “The Environmental Orientation Test” to avoid the assumption that the researcher was seeking wilderness-specific values. Specific demographic questions (ethnicity and sex) were added. In addition, the researcher assumed that all subjects had similar understandings of a park environment; therefore, he replaced the word “wilderness” with “natural park”. For example, question 30, “Do you feel OK about burying decomposable garbage in

wilderness?" was modified to "Do you feel OK about burying decomposable garbage in a natural park?" The full questionnaire is provided in Appendix B.

Procedures

Once this research was approved by the research committee, a proposal was made to the Institutional Review Board (IRB) at Oklahoma State University. The letter from IRB granting approval for the research is provided in Appendix C.

Upon approval from the IRB, the researcher posted the questionnaire on SurveyMonkey.com, an online survey program. The questionnaire was posted online from mid-August through mid-September of 2009. The researcher contacted potential subjects through the university email system requesting survey participation. The email explained the purpose and significance of the study and contained a hypertext link to the online survey. Subjects were informed that the questionnaire was part of a thesis, and their help for completing the questionnaire was requested. Subjects were also informed that their participation was voluntary and that they were free to discontinue participation at any time. Subjects were assured that any information that may reveal their identities would be removed, as each individual response would be assigned a number, making all data anonymous. The questionnaire took 15 to 20 minutes to complete.

By clicking the hypertext link, subjects agreed to participate in the research voluntarily. Subjects began by identifying their ethnicity and sex, and then continued on to the Environmental Orientation Test. Surveymonkey.com automatically saved responses submitted by subjects in a comma delimited file, and the researcher logged onto the website to retrieve responses. Data were used for analysis in this research only.

Research Design and Data Analysis

The modified survey, The Environmental Orientation Test, included 35 yes or no questions. A "yes" answer would place a participant on the anthropocentric end of the scale, while a "no" answer would reflect a biocentric perspective. As designed by Clark and Kozacek, those who had more than 25 "yes" answers revealed an anthropocentric orientation whereas those who had less than 15 "yes" answers revealed a biocentric orientation. Individuals who had between 15 and 25 "yes" answers revealed a midcentric orientation.

The independent variables were demographics variables of sex and ethnicity. The dependent variables were the anthropocentric or biocentric orientations. All data were analyzed using Statistical Package for Social Science (SPSS) 16.0 version for Windows, with a significance level of .05.

Data frequencies were used to answer question 1, "What is the environmental orientation of students of different ethnicities at Oklahoma State University?" and question 2, "What is the environmental orientation of students of different sexes at Oklahoma State University?" Chi-square tests and cross-tabulations were utilized to test Hypothesis 1: "There is no significant difference in environmental orientation between expected and observed values of specific ethnic groups", Hypothesis 2: "There is no significant difference in environmental orientation between expected and observed values of ethnic minority and non-minority students", and Hypothesis 3: "There is no significant difference in environmental orientation between expected and observed values of male and female students."

CHAPTER IV

Findings

This chapter reports the results of the statistical treatment of the data collected for this research. Data were collected from students of various ethnicities and sexes at Oklahoma State University who enrolled during the fall semester of 2008. Data were analyzed using the process described in Chapter 3. The study instrument was distributed to 2,000 students of different ethnicities and sexes at Oklahoma State University. A total of 194 surveys were returned. Missing and incomplete data were eliminated; thus, a total of 167 completed online surveys were utilized for data analysis.

Independent variables, including ethnicity and sex, were generated from demographic questions in the survey. The chi-square test was utilized to determine the significance of a relationship (if one existed) by comparing observed cell frequencies with expected cell frequencies. The survey questions were analyzed to answer the following research questions:

1. What is the environmental orientation of students of different ethnicities at Oklahoma State University?
2. What is the environmental orientation of students of different sexes at Oklahoma State University?

3. Is there a significant difference in environmental orientation between expected and observed values of specific ethnic groups?
4. Is there a significant difference in environmental orientation between expected and observed values of ethnic minority and non-minority students?
5. Is there a significant difference in environmental orientation between expected and observed values of male and female students?

Demographic Description of Study Respondents

In this study, the total number of participants was 167 students of various ethnicities and sexes at Oklahoma State University. These participants received an online survey invitation and volunteered to participate in this project. Each participant answered two demographic questions before they proceeded to take the Environmental Orientation Test. The demographic description of participants is presented in the following section.

Ethnicity

The statement "Please identify your ethnicity" was designed to gather participants' ethnicity information. Table 1 shows that 106 participants (63.5%) reported themselves as White, 5 participants (3.0%) as African American, 6 participants (3.6%) as Native American, 22 participants (13.2%) as Hispanic, and 28 participants (16.8%) as Asian American.

Table 1

Summary of Participant Ethnicity

Ethnicity	Frequency	Percent	Valid%	Cumulative%
White	106	63.5	63.5	63.5
African American	5	3.0	3.0	66.5
Native American	6	3.6	3.6	70.1
Hispanic	22	13.2	13.2	83.2
Asian American	28	16.8	16.8	100.0
Total	167	100.0	100.0	

Sex

The statement "Please identify your sex" was utilized for determining participants' sex. Table 2 shows that 64 participants (38.3%) were male and 103 participants (61.7%) were female.

Table 2

Summary of Participant Sex

Sex	Frequency	Percent	Valid%	Cumulative%
Male	64	38.3	38.3	38.3
Female	103	61.7	61.7	100.0
Total	167	100.0	100.0	

Environmental Orientations by Ethnicity and Sex

The Environmental Orientation Test was utilized to determine participants' anthropocentric or biocentric orientations. The Environmental Orientation Test consisted of 35 yes or no questions. The participants were instructed to indicate how they felt about the issues addressed in each question.

The participants were considered anthropocentric if they had 25 or more "yes" answers. Participants who had between 25 and 15 "yes" answers were considered midcentric. Participants with 15 or fewer "yes" answers were considered biocentric.

Question 1: What is the environmental orientation of students of different ethnicities at Oklahoma State University?

Analysis of data revealed that the majority of study participants were anthropocentric, followed by midcentric. Only one study participant was biocentric. Data showed that 65 (61.3%) White participants were anthropocentric, 40 (37.7%) were midcentric, and one (.9%) was biocentric. Among the five African Americans, three (60%) were anthropocentric, and two (40%) were midcentric. Five (83.3%) of six Native Americans were anthropocentric, and one (16.7%) was midcentric. Nineteen (86.4%) Hispanic participants were anthropocentric, and three (13.6%) were midcentric. As for Asian Americans, 12 (42.9%) were anthropocentric and 16 (57.1%) were midcentric. Due to inadequate responses from African Americans and Native Americans, the results for such groups may not be representative of the individual ethnic population at Oklahoma State University. Results of environmental orientations by ethnicity are presented in Table 3.

Table 3

Summary of Participant Environmental Orientations by Ethnicity

	Anthropocentric		Midcentric		Biocentric		Total
	count	%	count	%	count	%	count
Ethnicity							
White	65	61.3	40	37.7	1	.9	106
African American	3	60.0	2	40.0	0	.0	5
Native American	5	83.3	1	16.7	0	.0	6
Hispanic	19	86.4	3	13.6	0	.0	22
Asian American	12	42.9	16	57.1	0	.0	28
Total	104		62		1		167

Question 2: What is the environmental orientation of students of different sexes at Oklahoma State University?

Data analysis revealed that study participants were comprised of 64 males and 103 females. Of the 64 male students, 36 (56.3%) were anthropocentric, 27 (42.2%) were midcentric, and one (1.6%) was biocentric. As for female students, 68 (66.0%) were anthropocentric, and 35 (34.0%) were midcentric. No female student possessed a biocentric orientation. Results of environmental orientations by sex are presented in Table 4.

Table 4

Summary of Participant Environmental Orientations by Sex

	Anthropocentric		Midcentric		Biocentric		Total
	count	%	count	%	count	%	count
Sex							
Male	36	56.3	27	42.2	1	1.6	64
Female	68	66.0	35	34.0	0	.0	103
Total	104		62		1		167

Analysis of Difference

The primary statistical procedure utilized was the chi-square test. The chi-square test determined the possible differences in environmental orientations among students of different ethnicities and sexes. A significance level of .05 was used throughout the data analysis. Due to some small cell sizes, Yates' Correction was applied to the data. According to Lutz (1983), when one or more of the expected counts in a contingency table is less than five and degrees of freedom (df) equals or is greater than two, the calculated value of the chi-square tends to be too large. To correct this tendency when small frequencies occur, a more accurate value of chi-square is computed using Yates' Correction to the data. For Yates' Correction, observed counts should increase by 0.5 when they are less than expected counts. On the other hand, observed counts should be reduced by 0.5 when they are greater than expected counts.

Furthermore, Howell (1993) states that when degrees of freedom is greater than or equal to two, and when results may be affected by small cell size, it is recommended to utilize the Likelihood Ratio rather than the Pearson chi-square for data interpretation. Therefore, since chi-square tables contained cell values less than five and df equaled or

was greater than two, it was necessary to apply Yates' Correction to the data and utilize the Likelihood Ratio for data analysis in this study.

Hypothesis 1: There is no significant difference in environmental orientation between expected and observed values of specific ethnic groups.

To test this hypothesis, a chi-square test was performed to compare the two variables of ethnicity and environmental orientation. Yates' Correction was applied to the data because nine cells had expected counts of less than five. The results of this test indicated no relationship in environmental orientation of specific ethnic groups (see Table 5).

Table 5

Chi-Square Test Results (with Yates' Correction) of Environmental Orientations by Ethnicity

		Anthropocentric	Midcentric	Biocentric	Total
White	Observed	66	40	1	107
	Expected	66.3	40.0	.6	
African American	Observed	4	2	0	6
	Expected	3.7	2.2	.0	
Native American	Observed	5	2	0	7
	Expected	4.3	2.6	.0	
Hispanic	Observed	19	4	0	23
	Expected	14.3	8.6	.1	
Asian American	Observed	12	16	0	28
	Expected	17.4	10.5	.2	
Total		106	64	1	171

X^2=10.112, df=8, p=.257

Hypothesis 2: There is no significant difference in environmental orientation between expected and observed values of ethnic minority and non-minority students.

In this hypothesis, minority students referred to non-White students, including African Americans, Native Americans, Hispanics, and Asian Americans. Non-minority students were White students. Table 6 shows that 106 (63.5%) participants were non-minority and 61 (36.5%) non-White participants were minority.

Table 6

Summary of (Non)minority Status

(Non)minority	Frequency	Percent	Valid%	Cumulative%
Non-minority	106	63.5	63.5	63.5
Minority	61	36.5	36.5	36.5
Total	167	100.0	100.0	100.0

A chi-square test was conducted to compare the two variables of environmental orientation and (non)minority status. Yates' Correction was applied to the data because two cells had expected counts of less than five. The results of this test indicated no significant difference in environmental orientation of non-minority and minority students (see Table 7).

Table 7

Chi-Square Test Results (with Yates' Correction) of Environmental Orientations by (Non)Minority Status

		Anthropocentric	Midcentric	Biocentric	Total
Non-minority	Observed	66	40	1	107
	Expected	66.5	39.9	.6	
Minority	Observed	39	23	0	62
	Expected	38.5	23.1	.4	
Total		105	63	1	169

X^2=.924, df=2, p=.630

Hypothesis 3: There is no significant difference in environmental orientation between expected and observed values of male and female students.

A chi-square test was utilized to discern if any relationship existed between environmental orientation and sex. Yates' Correction was used because two cells had expected counts of less than five. The results of this test revealed no significant difference in environmental orientation between male and female students (see Table 8).

Table 8

Chi-Square Test Results (with Yates' Correction) of Environmental Orientations by Sex

		Anthropocentric	Midcentric	Biocentric	Total
Male	Observed	37	27	1	65
	Expected	40.4	24.2	.4	
Female	Observed	68	36	0	104
	Expected	64.6	38.8	.6	
Total		105	63	1	169

X^2=2.885, df=2, p=.236

Summary of Survey Responses

The research findings reported no significant difference in environmental

orientation between expected and observed values of specific ethnic groups, of ethnic minority and non-minority groups, and of male and female students. Nonetheless, the response to individual questions is presented to provide an insight into how Oklahoma State University students viewed issues related to park management.

Q1	Do you feel hunting is an appropriate activity in a natural park?	
	Frequency	Percent
Yes	58	34.7
No	109	65.3

Q2	Do you feel it is OK to stock native fish in lakes that historically have not had fish?	
	Frequency	Percent
Yes	106	63.5
No	61	36.5

Q3	In an area that has established wildlife watering devices (e.g., watering holes), do you feel it is appropriate to maintain and leave them in a natural park?	
	Frequency	Percent
Yes	153	91.6
No	14	8.4

Q4	Do you feel it is appropriate to control predators in a natural park that are killing a substantial number of livestock?	
	Frequency	Percent
Yes	114	68.3
No	53	31.7

Q5	Are low-level aerial-game surveys (by helicopter or airplane) acceptable to you?	
	Frequency	Percent
Yes	112	67.1
No	55	32.9

Q6	Do you feel we should be protecting known threatened and endangered species habitat from Prescribed Natural Fires (PNF-deliberately ignited fires to restore an area to a natural state)?	
	Frequency	Percent
Yes	150	89.8
No	17	10.2

Q7	Is it acceptable to you to have Managed Ignited Fires (MIF-naturally caused fires that are controlled by management) in a natural park?	
	Frequency	Percent
Yes	126	75.4
No	41	24.6

Q8	Do you feel it is appropriate to have technologically advanced data collecting stations in a natural park to monitor temperature, moisture content, wind, and other factors that would allow better information for PNF and MIF?	
	Frequency	Percent
Yes	151	90.4
No	16	9.6

Q9	Do you feel we should be suppressing any fires in a natural park?	
	Frequency	Percent
Yes	125	74.9
No	42	25.1

Q10	In your opinion, is it OK to maintain historic cabins in a natural park?	
	Frequency	Percent
Yes	159	95.2
No	8	4.8

Q11	Do you feel that there is a point when air quality is more important than allowing extended periods of PNF?	
	Frequency	Percent
Yes	139	83.2
No	28	16.8

Q12	Do you think, in a publicly available book, it is OK to interpret historic structures and cultural resources that are in a natural park?	
	Frequency	Percent
Yes	155	92.8
No	12	7.2

Q13	Do you feel that cattle or sheep grazing is an appropriate use for a natural park?	
	Frequency	Percent
Yes	87	52.1
No	80	47.9

Q14	Do you feel grazing permittees should be allowed to use motorized equipment for maintaining water developments in a natural park where this has been a historical method of maintenance (for example, using a dozer to clean out a dirt stock tank in a natural park)?	
	Frequency	Percent
Yes	107	64.1
No	60	35.9

Q15	Do you feel a hazard tree along a well-used trail should be cut to protect public safety?	
	Frequency	Percent
Yes	123	73.7
No	44	26.3

Q16	Do you feel that cutting logs that are lying across trails to allow passage by pack strings is appropriate in a natural park?	
	Frequency	Percent
Yes	123	73.7
No	44	26.3

Q17	Do you feel we should be placing signs by natural caves in a natural park that pose safety hazards?	
	Frequency	Percent
Yes	145	86.8
No	22	13.2

Q18	Do you feel it is appropriate for a visitor center to be giving users more information about hazards in a natural park so we can lessen the potential of search-and-rescue operations?	
	Frequency	Percent
Yes	165	98.8
No	2	1.2

Q19	Do you feel that signs should be placed at historic structures to warn people of the potential for Hantavirus?	
	Frequency	Percent
Yes	137	82.0
No	30	18.0

Q20	Do you feel we should rescue a person with a broken leg (but not in a life-threatening situation) in a natural park with a helicopter?	
	Frequency	Percent
Yes	111	66.5
No	56	33.5

Q21	Do you feel it is OK to use llamas or pack goats in a natural park?	
	Frequency	Percent
Yes	121	72.5
No	46	27.5

Q22	Do you feel that it is appropriate to leave some established permanent bolt anchors for rock climbers in a natural park?	
	Frequency	Percent
Yes	113	67.7
No	54	32.3

Q23	Does the value of having the number of users controlled by a permit system outweigh the value of unregulated use and freedom in a natural park (i.e., do you believe permit systems should be used in a natural park?)?	
	Frequency	Percent
Yes	99	59.3
No	68	40.7

Q24	Do you feel it is OK to allow people to collect crystals in a natural park?	
	Frequency	Percent
Yes	69	41.3
No	98	58.7

Q25	Do you feel it is OK to allow people to collect antlers in a natural park?	
	Frequency	Percent
Yes	79	47.3
No	88	52.7

Q26	Do you feel that recreation opportunities are the dominant value of a natural park?	
	Frequency	Percent
Yes	76	45.5
No	91	54.5

Q27	Do you feel it is OK to have trail signs in a natural park?	
	Frequency	Percent
Yes	161	96.4
No	6	3.6

Q28	Do you feel it is OK to put mileage on signs in a natural park?	
	Frequency	Percent
Yes	147	88.0
No	20	12.0

Q29	If a free one were available to you, would you take a cellular phone into a natural park with the intention that it would only be used to help in an emergency situation?	
	Frequency	Percent
Yes	157	94.0
No	10	6.0

Q30	Do you feel OK about burying decomposable garbage in a natural park?	
	Frequency	Percent
Yes	73	43.7
No	94	56.3

Q31	If you had a well-behaved dog, would you feel OK about taking it with you to a natural park?	
	Frequency	Percent
Yes	137	82.0
No	30	18.0

Q32	Do you think it is appropriate for outfitters to have business operations dependent on a natural park?	
	Frequency	Percent
Yes	80	47.9
No	87	52.1

Q33	Do you feel it is OK to film in a natural park a movie about values of a natural park?	
	Frequency	Percent
Yes	162	97.0
No	5	3.0

Q34	Do you feel it is appropriate to allow a one- or two-week window for chain-saw use to open trails after an intense blow down (high wind) event?	
	Frequency	Percent
Yes	139	83.2
No	28	16.8

Q35	Do you feel it is OK to apply a mandatory party size or limited permits to promote solitude in a natural park?	
	Frequency	Percent
Yes	100	59.9
No	67	40.1

CHAPTER V

Discussion, Conclusions, and Recommendations

Introduction

Clark and Kozacek (1997) designed the Wilderness Value Test to discover how potential wilderness managers at wilderness stewardship training sessions viewed issues regarding wilderness management. The 35-item survey was used to understand the anthropocentric or biocentric orientation of wilderness managers. The present researcher modified the questionnaire to ask students of different ethnicities and sexes at Oklahoma State University their personal opinions on issues related to park management.

The data were gathered through an online survey from students enrolled in the fall 2008 semester at Oklahoma State University. Data were compiled and analyzed using Statistical Package for Social Science (SPSS) version 16.0 for Windows. Data were also analyzed using frequencies, cross-tabulations, Chi-square test, and Yates' Correction. This chapter discusses the possible interpretations of results presented in the previous chapter and presents recommendations for future areas of research.

Discussion

Research question #1 asked, "What is the environmental orientation of students of different ethnicities at Oklahoma State University?" Frequencies revealed that 86.4% of Hispanic respondents were anthropocentric, followed by Native Americans (83.3%), Whites (61.3%), African Americans (60.0%), and Asian Americans (42.9%). Fifty-one percent of Asian Americans were midcentric in their environmental orientation, followed by African Americans (40.0%), Whites (37.7%), Native Americans (16.7%), and Hispanics (13.6%). The only biocentric respondent was White (.9%).

Research question #2 asked, "What is the environmental orientation of students of different sexes at Oklahoma State University?" Frequencies showed that 56.3% of male respondents and 66.0% of female respondents were anthropocentric. In other words, more than half of both male and female respondents were human-oriented in terms of park management and policy. Forty-two percent of male respondents and 34.0% of female respondents possessed midcentric orientation. There was one biocentric individual, who was a male respondent.

Research question #3 asked, "Is there a significant difference in environmental orientation between expected and observed values of specific ethnic groups?" Chi-square tests and 3 x 5 cross-tabulations were conducted and no significant relationship was found to exist. These research findings indicated that the responses by each ethnic group were distributed as statistically expected on environmental orientation.

As opposed to the literature, which suggests that Whites possessed proenvironmental attitudes (Johnson et al., 2004; McMillan et al., 1997), and report lower anthropocentric orientation toward forest management than their non-White counterparts

(Tarrant & Cordell, 2002), this study indicated that more than half of the respondents, regardless of their ethnic backgrounds, displayed a tendency toward anthropocentric orientation toward natural parks. While other demographic variables, such as household income, education, and age were incorporated along with ethnicity in early research, these variables were not the concerns in this study. The researcher had an intention of investigating whether physical characteristics and environmental orientations were related; and thus, purposefully excluded demographic variables which cannot be identified visually. It should be noted that while the research findings were inconsistent with previous studies, findings might have been different or consistent with previous studies if other demographic variables played a role in this study.

Prior to concluding that the majority of study participants were anthropocentric, it should also be noted that a low response rate from certain minority groups (African American and Native American) may have affected the study results. The literature suggested that African Americans and Native Americans tended not to respond to online surveys without incentives (Sax, Gilmartin, & Bryant, 2003), and the researcher faced an expected difficulty attracting enough responses from students of those ethnic backgrounds. As a result, the researcher was hesitant to conclude that test results were representative and that they would generalize to each individual ethnic population at Oklahoma State University.

Research question #4 asked, "Is there a significant difference in environmental orientation between expected and observed values of ethnic minority and non-minority students?" Chi-square tests and 3 x 2 cross-tabulations were conducted, and no significant relationship was found to exist. These researching findings showed that

neither ethnic minority nor non-minority respondents were more likely to be either anthropocentric or biocentric than expected.

Previous studies indicated that Whites held stronger proenvironmental attitudes than their counterparts of other ethnic backgrounds. McMillan et al. (1997) suggested that Whites held stronger proenvironmental attitudes than African Americans as measured by the NEP scale. Johnson et al. (2004) indicated that Whites scored significantly higher on environmental beliefs measured by the new ecological paradigm, when compared with African Americans and Latinos. Whites were more likely to engage in environmentally responsible behaviors than African Americans, and were more likely to join environmental organizations and participate in outdoor recreation than Latinos. Whites were also found to express lower utilitarian values of forests than non-Whites (Tarrant & Cordell, 2002).

Literature reported significant differences in environmental beliefs between Whites and other ethnic groups. For this reason, the researcher had an intention of investigating whether ethnic minority and non-minority groups would display a different tendency toward their environmental orientation. Hence, the researcher purposefully formed an ethnic minority group by combining all non-White groups.

Nevertheless, prior to concluding that the majority of study participants displayed a tendency toward anthropocentric orientation, it should be noted that a low response rate may have affected the research findings, as mentioned previously. Further, it should be noted that the minority group as a whole is a broad category and can include many groups. Each minority group includes subgroups. For instance, Asian Americans can include Chinese Americans, Japanese Americans, Korean Americans and Vietnamese

Americans, all of whom are believed to be influenced by their home cultures to some degree. Therefore, prior to suggesting that the majority of minority study participants were anthropocentric in their environmental orientation, it should be noted that individuals from different subgroups might have different environmental orientations.

Research question #5 asked, "Is there a significant difference in environmental orientation between expected and observed values between male and female students?" Chi-square tests and 3 x 2 cross-tabulations were conducted and no significant relationship was found to exist. These test results suggested that neither male nor female respondents were more likely to be either anthropocentric or biocentric than expected.

Previous studies reported significant differences in environmental attitudes between men and women. Women were more concerned about environmental issues and demonstrated stronger proenvironmental attitudes than their male counterparts (Caiazza, 2003; Fernández-Manzanal et al., 2007; Stern et al., 1993; Voorhies-Holloway, 2009). Furthermore, Vaske, Donnelly, Williams and Jonker (2001) suggested that females were closer to the biocentric end of the continuum toward forest management.

While research findings suggested that females were not more likely to be either biocentric or midcentric than expected, findings indicated that male students, as compared to female students by percent, displayed a tendency toward midcentric orientation. Thirty-four percent of female students were midcentric whereas 42.2% of male students were midcentric. The only biocentric individual was a male student.

The majority of female students from four ethnic groups (White, African American, Hispanic, and Native American) were anthropocentric. Among 12 Asian American

female students, 6 were anthropocentric and 6 were midcentric. It is surprising to learn that the only biocentric individual was a male student, and the majority of female students were anthropocentric (see Appendix D).

Conclusions

While no significant differences were found to exist between anthropocentric or biocentric orientation and demographic variables (ethnicity and sex), some important conclusions can be drawn from the research findings of this study.

It is important to note that natural park is after all an ambiguous term. Although the researcher assumed that all respondents had a similar understanding of a park environment, he was not able to control what type of parks the respondents were picturing when answering the questionnaire. Parks could be municipal parks, state parks, or national parks, all of which target visitors with different characteristics and serve different purposes. Moreover, parks are typically designed to have amenities to attract the public. These amenities include campgrounds, interpretation centers, food service areas and other hospitality services, which as literature suggests, enhance people's recreational experiences. When people visit parks, they are encouraged to use such amenities. The image of people using amenities probably sends out a human-over-nature message, and this type of message perhaps made the respondents anthropocentric even before they came to answer the questionnaire.

Another interpretation for the majority of respondents being anthropocentric is that TV programs send out anthropocentric messages. TV programs, such as *Travel Channel and The National Parks: America's Best Idea* serve a marketing purpose, and deliberately broadcast images of human enjoyment of parks. These programs attempt to attract

viewers to physically visit parks and therefore show images of people enjoying themselves inside park areas. When viewers watch such programs, they probably unconsciously receive the human-over-nature messages, which make them anthropocentric as well.

Unlike general questions addressed in the new environmental paradigm, the Environmental Value Test contains questions that specifically ask for personal opinions. When people usually have no problem with general questions, they tend to hesitate to answer questions that may affect them personally. This could be one of the reasons that the majority of respondents were anthropocentric because these questions concern their personal interests as well as address individual behaviors.

Additionally, the survey designers indicated that the Wilderness Value Test was developed for training purposes. It has been modified several times and tested with people facing challenges with managing Wild and Scenic River, National Recreation Areas, Threatened and Endangered Species, and other aspirational land management programs where values play in day-to-day management decisions and choices (K. Clark, personal communication, August 14, 2008). In other words, the Wilderness Value Test was developed to test people with wide knowledge of wilderness management. Although the researcher replaced the word wilderness with natural parks, he was still trying to seek personal opinions on management issues. Without enough knowledge of park management, some respondents indicated in their emails that they had difficulty understanding survey questions and giving answers. Also, the pilot study for the survey was not conducted with park users, but wilderness visitors (Choate, 2009). Therefore, it seems fair to say that this instrument is inappropriate to some degree. While being

anthropocentric in their environmental orientation, respondents may not be suited for this instrument.

Despite a number of shortcomings, results of some questions are worth noting. Question 1 “Do you feel hunting is an appropriate activity in a natural park?”, Question 24 “Do you feel it is OK to allow people to collect crystals in a natural park”, Question 25 “Do you feel it is OK to allow people to collect antlers in a natural park?, and Question 26 “Do you feel that recreation opportunities are the dominant value of a natural park?” are questions that generated more “no” answers than “yes” answers. The fact that the majority of respondents think that hunting is an inappropriate activity in parks leads the researcher to conjecture that respondents were picturing parks with visitors when answering the question 1. A park full of visitors is not an ideal place for hunting. Although “no” answer indicates a biocentric orientation, an image of a park full of visitors enjoying nature indicates a human dominance over nature, which is an anthropocentric view. When such image is planted in the respondents’ mind, this image could probably have made them anthropocentric before they even moved on to answer subsequent questions.

Question 25 and 26 are similar. Both questions ask whether it is OK for people to collect some types of natural objects in a park. To some degree, these two questions ask whether human exploitation of nature is appropriate. The majority of respondents answered “no”, indicating a biocentric orientation. Such response indicates that respondents understand that exploitation of natural resources is not appropriate in parks.

However, when being asked Question 16 “Do you feel that cutting logs that are lying across trails to allow passage by pack strings is appropriate in a natural park?” or

question 22 “Do you feel that it is appropriate to leave some established permanent bolt anchors for rock climbers in a natural park?”, the majority of respondents answered “yes”. Such response indicates an anthropocentric perspective. That is to say, the majority of respondents think that it is acceptable to leave human impacts on the natural environment. It is interesting to learn that while respondents realize that it is not appropriate to exploit nature, they probably do not realize that it is not appropriate to have excessive human impacts on natural environment, either.

It is intriguing that the majority of respondents do not think recreational opportunities are the dominant value of natural parks. National Park Service, for example, is established to not only conserve natural resources but also keep them unimpaired for the enjoyment of future generations. Nonetheless, it seems that the message of human enjoyment is not well delivered to the survey respondents. While the majority of respondents are anthropocentric in environmental orientation, they do not think that recreational opportunities and human enjoyment of parks are the dominant value. Nonetheless, an explanation for the majority of respondents not thinking recreational opportunities as dominant value of parks is that they probably are aware of keeping the natural area unimpaired as the purpose of parks. While recreation in a natural park should be hiking, climbing, camping, picnicking, or fishing in the researcher’s opinion, recreation could mean something different for the survey respondents. It is, therefore, necessary to see what the dominant value is for the respondents and what recreational activities are when they think of a park.

Several important implications in this study relate to park management. Approximately two-thirds of respondents possess anthropocentric orientation. This

indicates that park managers could face a tremendous challenge when managing potential visitors, and at the same time, keeping the park environment unimpaired for the enjoyment of future generations. Park managers are constantly dealing with people who have little knowledge of park policies, management actions and thoughts behind these policies and plans. It is suggested that park managers strengthen the educational programs by emphasizing the values of parks and difficulty in park management. Educational programs should also emphasize the integrity of ecosystems, and lead park visitors to believe that their behaviors leave impacts on the park environment. Although such impacts may not be seen immediately, they have influence on the environment in a long run. First-time and infrequent park visitors should be strongly encouraged to attend such educational programs.

Recommendations

This exploratory research lays the groundwork for future studies of environmental orientations toward park areas. The study represents the first attempt to use the survey modified from the Wilderness Value Test and explores the environmental orientations of college students toward natural parks. This survey also addresses park management issues. Therefore, this study has implications for environmental research as well as leisure research. To this regard, the suggestions for future research are as following:

1. Much of the literature indicated that demographic variables have effects on environmental orientations. These social demographic variables include but are not limited to age, household income, level of education, location of residence (e.g., urban vs. rural, proximity to park, and geographic region), length of time in residence, academic major, psychological indicator of gender (masculine vs. feminine), membership to

environmental organizations, and park visiting frequency. Further research is needed to determine the relationship between these variables and environmental orientations to provide deeper insight into how park visitors view the issues related to park management.

2. Yes or no questions force survey participants to choose between two answers and thus produce limited study results. A Likert-scale could be applied to the survey so survey participants could be more flexible when answering questions. As a result, more sophisticated study results would be generated and significant differences may be found to exist between demographic variables and environmental orientations.

3. Survey participants who were infrequent park visitors reported difficulties with terminology and concepts presented in the survey. Revisions to the survey may be required if the survey is to be used on individuals who are not currently frequent park visitors, but have the potential to visit more often.

4. Pre- and post-tests could be conducted to see if changes in environment orientations could occur when an educational program with emphasis on park management is provided. This option may provide new perspectives of what an educational program should be like.

5. Research findings could be different with additional responses from minority groups.

6. The research findings suggest that the majority of respondents do not think that recreational opportunities are the dominant value of a park. A comparative study could be conducted between the general public and park visitors to determine their differences in park values and management perspectives.

7. Researchers could conduct a study in which parks are clearly defined. For

example, they could try to understand the anthropocentric/biocentric orientations toward national parks, or toward Yellowstone National Park.

8. Researchers could conduct a study related to park management actions. Such study can be used to determine how much the park users understand the park policies and management actions, and the thoughts behind these management plans.

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APPPENDICES

APPENDIX A

Email Script

Dear Oklahoma State University students,

My name is Yu-Jen (Frank) Hu. I am a M.S. student in Leisure Studies program. As part of my degree requirements, I am conducting a research project titled ***Understanding the Anthropocentric/Biocentric Orientations toward Natural Parks: Survey of Students at Oklahoma State University***. The purpose of this study is to investigate the relationship of environmental orientations (anthropocentrism versus biocentrism) to ethnicity and sex. The study results will be important for park managers and you as a park visitor, because park managers can use this information to anticipate your recreational needs; therefore, to provide you a fulfilling recreational experience. Regardless of the way you feel about these issues, however, your responses are important. If you would take 15 to 20 minutes to answer the online survey, I would very much appreciate it.

Most OSU students are 18 years old or older. However, if you are less than 18 years of age, please disregard this invitation. Thank you.

If you are 18 or older, and are interested in participating, please follow the link.

http://www.surveymonkey.com/s.aspx?sm=4u52vs24VL4R_2bzvXSNXHJw_3d_3d

By clicking the hypertext link above, you agree to voluntarily participate in this research project. You also have the right to withdraw from this study at any time. The research should involve no risk of your physical and psychological well-being. Any information that can possibly reveal your identity will be removed and each individual response will be assigned a number. Data will be used for data analysis only. All collected data will be stored in my personal laptop, and be locked with a password. I am the only person who has access to the data. I will keep my laptop at the apartment where I am currently residing, and you can be sure that all responses will be anonymous. All data will be kept privately and be deleted when the research project is completed by the end of the fall semester of 2009.

If you have any questions or concerns, please feel free to contact me at yujen@okstate.edu or my thesis advisor Dr. Deb Jordan at deb.jordan@okstate.edu

If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-1676 or irb@okstate.edu.

Thanks again for your help.

Sincerely yours,

Yu-Jen (Frank) Hu
Leisure Studies
School of Applied Health & Educational Psychology
Oklahoma State University

APPENDIX B

Environmental Orientation Test

Please identify your ethnicity: □White □African American □Hispanic
□Native American □Asian

Please identify your sex: □Male □Female

1. (Y / N) Do you feel hunting is an appropriate activity in a natural park?
2. (Y / N) Do you feel it is OK to stock native fish in lakes that historically have not had fish?
3. (Y / N) In an area that has established wildlife watering devices (e.g., watering holes), do you feel it is appropriate to maintain and leave them in a natural park?
4. (Y / N) Do you feel it is appropriate to control predators in a natural park that are killing a substantial number of livestock?
5. (Y / N) Are low-level aerial-game surveys (by helicopter or airplane) acceptable to you?
6. (Y / N) Do you feel we should be protecting known threatened and endangered species habitat from Prescribed Natural Fires (PNF-deliberately ignited fires to restore an area to a natural state)?
7. (Y / N) Is it acceptable to you to have Managed Ignited Fires (MIF-naturally caused fires that are controlled by management) in a natural park?
8. (Y / N) Do you feel it is appropriate to have technologically advanced data collecting stations in a natural park to monitor temperature, moisture content, wind, and other factors that would allow better information for PNF and MIF?
9. (Y / N) Do you feel we should be suppressing any fires in a natural park?
10. (Y / N) In your opinion, is it OK to maintain historic cabins in a natural park?
11. (Y / N) Do you feel that there is a point when air quality is more important than allowing extended periods of PNF?
12. (Y / N) Do you think, in a publicly available book, it is OK to interpret historic structures and cultural resources that are in a natural park?
13. (Y / N) Do you feel that cattle or sheep grazing is an appropriate use for a natural park?
14. (Y / N) Do you feel grazing permittees should be allowed to use motorized equipment for maintaining water developments in a natural park where this has been a historical method of maintenance (for example, using a dozer to clean out a dirt stock tank in a natural park)?
15. (Y / N) Do you feel a hazard tree along a well-used trail should be cut to protect public safety?
16. (Y / N) Do you feel that cutting logs that are lying across trails to allow passage by pack strings is appropriate in a natural park?
17. (Y / N) Do you feel we should be placing signs by natural caves in a natural park that pose safety hazards?
18. (Y / N) Do you feel it is appropriate for a visitor center to be giving users more information about hazards in a natural park so we can lessen the potential of search-and-rescue operations?

19. (Y / N) Do you feel that signs should be placed at historic structures to warn people of the potential for Hantavirus?
20. (Y / N) Do you feel we should rescue a person with a broken leg (but not in a life-threatening situation) in a natural park with a helicopter?
21. (Y / N) Do you feel it is OK to use llamas or pack goats in a natural park?
22. (Y / N) Do you feel that it is appropriate to leave some established permanent bolt anchors for rock climbers in a natural park?
23. (Y / N) Does the value of having the number of users controlled by a permit system outweigh the value of unregulated use and freedom in a natural park (i.e., do you believe permit systems should be used in a natural park?)?
24. (Y / N) Do you feel it is OK to allow people to collect crystals in a natural park?
25. (Y / N) Do you feel it is OK to allow people to collect antlers in a natural park?
26. (Y / N) Do you feel that recreation opportunities are the dominant value of a natural park?
27. (Y / N) Do you feel it is OK to have trail signs in a natural park?
28. (Y / N) Do you feel it is OK to put mileage on signs in a natural park?
29. (Y / N) If a free one were available to you, would you take a cellular phone into a natural park with the intention that it would only be used to help in an emergency situation?
30. (Y / N) Do you feel OK about burying decomposable garbage in a natural park?
31. (Y / N) If you had a well-behaved dog, would you feel OK about taking it with you to a natural park?
32. (Y / N) Do you think it is appropriate for outfitters to have business operations dependent on a natural park?
33. (Y / N) Do you feel it is OK to film in a natural park a movie about values of a natural park?
34. (Y / N) Do you feel it is appropriate to allow a one- or two-week window for chain-saw use to open trails after an intense blow down (high wind) event?
35. (Y / N) Do you feel it is OK to apply a mandatory party size or limited permits to promote solitude in a natural park?

APPENDIX C

Oklahoma State University Institutional Review Board

Date:	Tuesday, August 11, 2009
IRB Application No	ED09108
Proposal Title:	Understanding Anthropocentric/Biocentric Orientations Toward Natural Parks: A Survey of Students at Oklahoma State University
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 8/10/2010

Principal Investigator(s):

Yu-Jen Hu
102 N. Univ. Pl. Apt. 11
Stillwater, OK 74075

Debra Jordan
180 Colvin Center
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

[X] The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

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

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

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Shelia Kennison, Chair
Institutional Review Board

APPENDIX D

Ethnicity	Sex	Anthropocentric	Midcentric	Biocentric	Total
White	Male	25	14	1	40
	Female	40	26	0	66
African American	Male	0	1	0	1
	Female	3	1	0	4
Native American	Male	1	1	0	2
	Female	4	0	0	4
Hispanic	Male	4	1	0	5
	Female	15	2	0	17
Asian American	Male	6	10	0	16
	Female	6	6	0	12
Total		104	62	1	167

VITA

HU, YU-JEN

Candidate for the Degree of

Master of Science

Thesis: UNDERSTANDING ANTHROPOCENTRIC/BIOCENTRIC ORIENTATIONS TOWARD NATURAL PARKS: A SURVEY OF STUDENTS AT OKLAHOMA STATE UNIVERSITY

Major Field: Leisure Studies

Biographical:

Education:
B.A. in English, Wenzao Ursuline College of Languages, Taiwan, June 2002

Completed the requirements for the Master of Science in Leisure Studies at Oklahoma State University, Stillwater, Oklahoma in May, 2010

Experience:
Graduate assistant, Oklahoma State University, September 2008 – December 2009
Teach Weight Training
Assist in Rock Climbing and Backpacking

Professional Memberships: National Recreation and Parks Association

Name: Hu, Yu-Jen Date of Degree: May, 2010

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: UNDERSTANDING ANTHROPOCENTRIC/BIOCENTRIC ORIENTATIONS TOWARD NATURAL PARKS: A SURVEY OF STUDENTS AT OKLAHOMA STATE UNIVERSITY

Pages in Study: 113 Candidate for the Degree of Master of Science

Major Field: Leisure Studies

Scope and Method of Study:

The purpose of this study was to understand the anthropocentric and biocentric orientations of Oklahoma State University students toward natural parks. This study was conducted to determine whether sex and ethnicity could be predictors of environmental orientations, which in turn, have implications for park users' recreational behaviors and park management.

Findings and Conclusions:

Inconsistent with previous research, the findings of this study concluded that sex and ethnicity are not significantly related environmental orientations. In other words, survey respondents of different ethnicities and sexes are not more likely to be either anthropocentric or biocentric than expected. The vast of majority of responses to the instrument showed that respondents are anthropocentric or midcentric in environmental orientation. Despite a number of shortcomings of the survey, the researcher concluded that the values of parks are not well understood by the general public, and the management issues are not well addressed in the educational programs. Implications for park management and recommendations for future research are discussed.

ADVISER'S APPROVAL: Dr. Deb Jordan