This is to certify that the

thesis entitled

A SURVEY OF MICHIGAN TEACHERS'

ATTITUDES TOWARDS ANIMALS

presented by

William Francis Siemer

has been accepted towards fulfillment
of the requirements for

Master of Science degree in Fisheries and Wildlife

R. Ben Peyton
Major professor

Date May 28, 1986

A SURVEY OF MICHIGAN TEACHERS' ATTITUDES TOWARDS ANIMALS

by

William Francis Siemer

A THESIS

Submitted to
Michigan State University
In partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Fisheries and Wildlife

1986

ABSTRACT

A SURVEY OF MICHIGAN TEACHERS' ATTITUDES TOWARDS ANIMALS

by

William Francis Siemer

Public schools provide an opportunity to expose students to a broad range of attitude perspectives, and increase their ability to make natural resource management decisions which balance environmental quality with other societal needs. But the selection and presentation of wildlife-oriented, and other environmental education materials is directly linked to classroom teacher attitudes, information, and skill.

To assess Michigan teachers' attitudes toward wildlife, Steve Kellert's national survey instrument was adapted for teachers and mailed to a sample of 1200 K-12 Michigan educators in January, 1985.

When compared to Kellert's survey of the general public, Michigan teachers held stronger naturalistic, ecologistic, and moralistic, and weaker utilitarian and negativistic attitudes. Their attitude profile suggests a perspective unlike that of the general public, but similar to other college educated citizens. Strong male/female differences may allow development of workshops which reflect a teacher's existing attitudes and values, yet contain information to broaden that perspective.

To my family

ACKNOWLEDGEMENTS

I would like to extend a deeply felt thank you to Dr. Ben Peyton. The quality and merit of this project is in large part due to his skilled guidance and ability as a teacher.

I would also like to thank Dr. Joseph Fridgen and Dr. William Taylor for their valuable contributions as graduate committee members.

For their support and assistance in mailings I wish to thank Becky Stout, Gloria Torello, and Tom Wessels. Special thanks are also extended to Gayle Wescott, who among other things served as a continual source of encouragement and a good friend.

For use of his survey instrument and scale scoring procedures I am indebted to Dr. Steven Kellert.

For their assistance in providing a teacher sample, I am indebted to Herb Sertman, John Elliot, George Garver, Tom Mclennan and John Pegan.

Appreciation is extended to Dr. Daniel Stynes for his help in determining survey sample size. I would also like to express my gratitude to Larry Gigliotti for his invaluable contributions as a computer consultant.

Finally, I would like to thank my family, whose total and continued support allowed the attainment of this goal.

Research funding was provided by the M.S.U. Agricultural Experiment Station (Project #3248) and a grant from the National Rifle Association.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCTION

Teachers and Society

In a quote used commonly in educational literature, James Adams states," A teacher affects eternity; he can never tell where his influence stops "(Ryans 1953, pg. 371). More than 150 years later we are only beginning to understand the mechanism of that influence. Research on the development of political attitudes in children indicates that teachers are strong socializing agents. They socialize their pupils through direct addition of information, activities, and attitudes (accumulation model), or by inadvertantly providing a role model for the pupil to imitate (identification model)(Hess 1967). Teachers may change their students' attitudes by verbal reinforcement of "correct" attitudes. They can provide new, discrepant information, forcing the student to accommodate new concepts with existing beliefs. They force the student to see several sides of an issue through counter attitude role playing, or debating. Teachers can even change student attitudes by arousing fear or anxiety (Hess, 1967). It is a process which eludes precise quantification even today, yet the assumption that teacher attitudes and behavior affect student attitudes and behavior is implicit in all teacher research, and it forms the cornerstone of this research effort. Pettus et al. (1978) state this simple premise behind all teacher attitude research.

> " If one assumes that teacher's attitudes towards issues affect their student's attitudes towards those issues, then it is important to give consideration to what the teacher's attitudes are" (pg. 367).

In the field of wildlife education, as others, it is important that those who develop curricula give consideration to teacher attitudes. Since the consciousness raising of the 1960's, a wide variety of environmental and wildlife education materials have been developed (i.e., "Project Wild", "Project Learning Tree", etc.). Yet, the extent of their use in the classroom is not fully known, and the degree to which these materials are used effectively may not be known without a better understanding of teacher attitudes.

Attitude research might reveal that many teachers hold strong negative feelings towards wildlife, or certain types of wildlife like predators and invertebrates. Negative attitudes could cause teachers to avoid those materials developed around unpopular species. Likewise, disinterested teachers may present wildlife education materials only briefly, or not at all.

And even when wildlife education is given a significant place in a curriculum, the information conveyed is subject to teacher bias. This is well illustrated by a wildlife education program called "PROJECT WILD". The program contains a number of exercises illustrating wildlife management, ecology, population dynamics, and natural resource issues. But each exercise can be selected or presented to convey the teacher's personal bias (i.e.,

hunting, anti-hunting, preservation, exploitation, etc.).

The Goals of Environmental Education

Though a cross sample of teachers were studied, this research was motivated primarily by a desire to assist those teachers who are or would like to be environmental educators. They may be formal environmental educators, working through a science curricula, or nonformal environmental educators teaching nonscience disciplines developed around current environmental issues. But regardless of the vehicle they use, environmental educators share several common goals.

Broadly stated, the mission of environmental education is the achievement of a dynamic equilibrium between the quality of life and environmental quality (Harvey 1977). The mission of environmental educators is to help the citizenry become aware of, fully comprehend, and take action to resolve environmental problems (Tbilisi Intergovernmental Conf. Report 1978). Hungerford et al. (1980) operationalized these foci into 4 specific goals.

The first goal is to supply the student with a firm basis of ecological understanding. Once the student has a firm foundation from which to make ecologically sound decisions, the next goal is to make he or she aware of "how individual and collective actions may influence the quality of life and the quality of the environment... [and] also how these actions result in environmental issues which must be resolved through investigation, evaluation, values clarification, decision making and finally, citizenship

action" (Hungerford et al. 1980, pg. 204). The third goal is to teach students how to effectively investigate and evaluate environmental issues. In this stage students are introduced to the value components that are associated with each environmental issue. They are taught how to identify and clarify their own values and the values of others in an issue. The final goal is to teach the student how to take actions which help achieve optimum tradeoffs between environmental quality and the quality of life. In other words, the ultimate goal of environmental education is the development of students who are "better" decision makers, where better decisions are defined as those which reflect the evaluation and selection of alternatives based on all known consequences and values.

An essential component of both the second and third goals is values education. In order to effectively deal with environmental problems students must be able to identify the values associated with a given course of action, and realize how that course of action will affect the environment and their lives. If the process was successful, the student should choose a course of action based on carefully identified, prioritized, and evaluated sets of values, and the educator hopes, consistant with an optimal level of environmental quality.

During this process of values clarification the educator serves as a moderator, providing new information, values, and levels of problem complexity as needed. Throughout the

process the educator strives to maintain a "value fair" environment: an environment where new values and positions can be presented and evaluated with as little bias as possible. Instead of being given the "correct " answers to problems, the students are presented with the complex of components forming an environmental issue and then guided not to a direct solution, but through a process of personal moral reasoning.

For example, one of these approaches to values education (moral reasoning) is based on Kohlberg's theory of moral development. The theory holds that reasoning occurs at 3 levels. In the first (preconventional)level notions of right and wrong center around personal gain (right) or loss (wrong). At the second level concepts of right and wrong are based on society's set of rules, norms, and laws. At the third (postconventional) level personally developed norms and rules may override those described by society as a whole, so that an individual may not deem an act to be morally wrong even when it breaks the given laws of society.

In using Kohlberg's theory as an approach for environmental education, the desired outcome is not a particular decision, but the process used to arrive at that decision (Kauchak et al. 1978). The outcome of the process may or may not be desirable from the educator's viewpoint. However, it is assumed that by and large students who have been helped to a high (postconventional) state of moral reasoning make decisions and take actions based on a more comprehensive thought process.

The critical component underlying this whole process is an educator who is willing and able to provide students with a value fair environment. Curricular materials, no matter how fine, may not effectively achieve wildlife education goals if classroom teachers are strongly negativistic towards animals, lack the motivation to utilize the materials, or do not have the balanced perspective necessary to use them effectively. An accurate assessment of teacher's attitudes towards animals will allow us to determine the extent to which these problems exist, and where teacher training might help teachers provide their students with a broader range of attitude perspectives, and thus become more effective environmental educators.

It is proposed here that an awareness and tolerance of the full range of attitude positions surrounding an issue would provide two primary benefits. First, teachers who are aware of a wide range of attitude positions will be better able to provide their students with opportunities to see these divergent perspectives. Second, it is proposed that students or teachers who are able to acquire this kind of perspective balance will become better resource management decision makers, because their choices and actions can reflect the evaluation and selection of alternatives based on a wide range of known consequences and values.

The Purpose of Teacher Attitude Research

Educational planners and wildlife management agencies

need information on teacher attitudes for at least five reasons. Perhaps the most basic reason is to learn more about how teachers perceive wildlife and wildlife management. Existing research indicates that teacher perceptions, and perceptions of Americans in general, may be inaccurate. For instance, in a California study Hooper (1983) found that California teachers do hold misconceptions about the role of hunting as a management tool, and they maintain negative attitudes toward and low participation levels in hunting. In a Virginia study Taylor and Samuel (1975) found that science teachers and senior science education majors had little knowledge of game animals, hunting regulations, and game management principles. Kellert (1978) found that the general public generally holds low knowledge of animals and seem to be more aware of and concerned with emotional issues (like seal hunting) than with more ecologically important issues (like habitat loss). Kellert (1978) and Bart (1972) indicate that Americans' best like large furred animals and often dislike invertebrates and snakes. Further, Americans seem indifferent to the protection of endangered plants, insects, and many small nongame animals (Kellert 1978). Basic information on these kinds of perceptions is vital to effective education programs.

Next, planners need to know if teachers reflect a cross section of American society. In their studies on political attitude development in children, Hess and Torney (1967) state that; "Teachers as an occupational group, are not representative of the general population and may be expected

to hold dissimilar views in several important respects" (pg. 27).

Third, we need to know more about what teachers value. The 1983 study by Hooper dealt with specific attitudes toward consumptive use, but did not investigate the range of stronger, critical values incorporated into attitude formation concerning animals (wildlife) in general. Investigating this set of values (discussed more thoroughly in the next chapter) is a main objective of the proposed study, and may be more diagnostic in predicting teacher perceptions of not only wildlife issues, but many types of resource issues.

A knowledge of teacher attitudes will allow us to fulfill a fourth need, the need to improve curricula development and teacher training workshops. Due to the increasing popularity and awareness of environmental education occurring in recent years, a variety of classroom environmental education materials have been developed. Information from the proposed study should indicate how these materials might incorporate a sensitivity to teacher animal perceptions, thus increasing their usefulness and longevity.

Finally, the study should provide insight into the roles played by classroom teachers in resolving many of the wildlife related issues facing society today (e.g. blood sports controversies, land use management issues). Certainly, classroom educators have the potential role of change agents in our society, and the extent to which their

attitudes reflect various positions in society is of considerable interest.

As the demands on our wildlife resources continue to increase, the role of environmental education must keep pace to insure a sound basis for resource decisions. Findings from this study should help public and private organizations achieve this increased pace through better adapted educational programs.

Chapter 2

LITERATURE REVIEW

Chapter Organization

The chapter is organized into 5 segments, which support the study's underlying assumptions. The literature review begins with a review of the theoretical framework which was used to study teacher attitudes. The second segment proposes Kellert's survey instrument as a tool functioning within this framework to assess and define teacher attitudes towards animals. Based on work by Kellert and others, the third segment argues that effective public participation in resource management is best achieved by citizens with a broad base of wildlife values. The fourth segment of the review discusses some of the work indicating that teacher attitudes do impact teacher behavior and student learning. It further presents literature suggesting that careful attitude research can in fact be a valid means of predicting behavior. The last segment of the literature review documents the assumption that after learning more about teacher attitude profiles, effective means exist to strengthen and broaden those profiles with resultant improvements in wildlife education.

Theoretical Framework of the Instrument

Attitudes are a mental process combining beliefs and evaluations of objects, attributes or events (Peyton 1984).

"In strictly social-psychological terms, attitudes refer to broadly integrated feelings, beliefs and values possessed by individuals" (Kellert 1980b, pg. 31). Kellert states that they are rarely entirely consistant with an individual's behavior, but that in nearly all cases some evidence of attitude-behavior consistancy is expressed. The interrelationship of beliefs, values and attitudes dictates that any understanding of one component stems from an understanding of the others.

Values are defined here as those underlying standards and ideals which serve to influence one's evaluations, preferences and behaviors (Peyton 1984). Combined with beliefs,or that which the individual holds to be true, they form the basis of an expressed attitude. Both beliefs and values exist in systems, with some being more central and important than others. Individuals hold many values simultaneously, and many values exert influence over any given attitude. Yet, these value sets are not equally weighted or ranked. In the process of attitude formation values are identified and prioritized (Peyton 1984). And because heirarchal values are expressed through attitudes, we can use these attitudes to identify the primary values in society, and the behaviors likely to accompany those values.

Kellert's typology of attitudes towards animals is an effort to "facilitate an understanding of the competing wildlife values in society"(Kellert 1980b, pg. 32), and is proposed here as an adequate tool to analyze wildlife values involved in individual teacher perceptions.

Reliability and Validity of the Instrument

Kellert's typology of attitudes was originally developed in 1974, largely on the basis of content analysis of open-ended interviews with a small (n=64) but diverse group of persons directly involved with animals. The group contained 16 women and 49 men from across the country (with mean age 45) involved in various occupations and avocations (i.e., artists, birders, conservationists, ecologists, farmers, horsemen, hunters, pet owners, scientists, vegetarians, veternarians, writers, and zoo personel). These individuals were assigned to attitude categories based on their responses in the interview.

Validity of the attitude classifications was supported by a statistical technique called multiple discriminant function analysis. For this validity test the respondents were clustered using their answers to 20 close-ended questions. Their answers were compared to the average response pattern of their assigned attitude group to determine how "correct" the assignment was. The discriminant analysis in fact yielded fairly distinct clusters, by and large confirming the validity of the classifications and attitude typology.

The attitude typology was modified in the course of a 1975 small scale study, adding the utilitarian attitude domain. In 1978 the negativistic attitude domain was separated into negativistic and neutralistic domains,but later was again collapsed into 1 domain. An aesthetic

domain was also developed, but no useful way of measuring it was created. The refined typology became part of a large national study on American attitudes, knowledge, and behavior toward wildlife and natural habitats.

Before developing the survey for his study, Kellert conducted an extensive literature review, and conferred with representatives of over 50 federal, state, and private wildlife management agencies and conservation organizations. Critical issues and research priorities were then determined based on an assessment of their potential relevance to the studies' goals and objectives.

During the survey construction process more than 1500 attitude, knowledge and behavior questions were developed and reviewed. Each of the survey's sections underwent 5 to 7 pretests. There were 5 survey sections: attitudes (both basic attitudes towards animals and feelings about specific issues), knowledge of wildlife, animal related activities and behavior, parent or grandparent experiences with wildlife, and social demographic characteristics. For this study of Michigan teachers only the attitude, animal related activity and demographic sections were used.

In the development process Kellert used a variety of question types: closed and open-ended response formats, simple statements, more elaborate scenario-type questions, and Likert scales with 5 to 9 response alternatives. Attitude questions were omitted if any of the following flaws were substantially present: too general, double negatives, two part questions, too esoteric, difficult wording,

questionable intelligibility to the least educated person, or too idealized or simplistic. Whenever possible questions involving protection of wildlife or habitats included tradeoffs involving various types of socioeconomic impact and sacrifice.

The attitude scales were developed based on Kellert's (1976) typology of 9 basic attitudes toward wildlife and the natural world. Cluster and other correlational analyses were used to construct the scales. Sixty-nine attitude questions were used with the smallest scale (the ecologistic) consisting of 6 items while the largest scale (the utilitarian) include 13 questions. Whenever appropriate, the strength of the response (e.g., strongly versus slightly agree/disagree) was included. Scale scores ranged from 0 to 11 for the ecologistic scale, to 0 to 27 for the utilitarian (Table 2.1). Useful scales were developed to measure the presence and strength of all attitudes except the neutralistic and aesthetic attitudes. The independence of the other 8 attitude scales was partially indicated by relatively small intercorrelations: 14 under .20; the smallest, .04, the largest negative correlation, -.42; and the largest positive correlation, .40 (Kellert and Berry 1980a, pg.s 129-133).

The final instrument allows individuals or groups to be characterized by attitude profiles depending on the relative strengths of the following attitudes.

Table 2.1. Attitude Scale Questions and Scaling (Kellert 1980)

Attitude Domain	Number of Questions	Scoring Range
NATURALISTIC	8	0 - 16
ECOLOGISTIC	6	0 - 17
HUMANISTIC	6	0 - 13
MORALISTIC	10	0 - 20
SCIENTISTIC	10	0 - 18
UTILITARIAN	13	0 - 27
DOMINIONISTIC	8	0 - 18
NEGATIVISTIC	8	0 - 17

Naturalistic:	Primary interest and affection for wildlife and the outdoors.
Ecologistic:	Primary concern for the environment as a system, for interrelationships between wildlife species and natural habitats.
Humanistic:	Primary interest and strong affection for individual animals, principally pets.
Moralistic:	Primary concern for the right and wrong treatment of animals, with strong opposition to exploitation or cruelty towards animals.
Scientistic:	Primary interest in the physical attributes and biological functioning of animals.
Utilitarian:	Primary concern for the practical and material value of the animal's habitat.
Dominionistic:	Primary interest in the mastery and control of animals typically in sporting situations.
Negativistic:	Primary orientation an active avoidance of animals due to indifference, dislike or fear.

(Kellert 1980a, pg.42)

National Attitude Survey Results

It is assumed that an adequate tool exists to assess and define the attitudes that Americans' hold towards wildlife. Steve Kellert's national survey instrument (1978) is proposed here as such a tool. Kellert's survey instrument was the final product of an extensive literature review, open-ended personal interviews, and thorough pretesting. Its usefulness as an attitude measure is demonstrated by Kellert's results and by a replication study using the instrument on BLM biologists (Peyton 1985). Peyton (1985) found the instrument a sound tool, yielding comparable and useful results, with exception of the utilitarian scale

scores. He suggests that utilitarian scores be interpreted cautiously because the scale seems inversely related to attitudes on the left end of the spectrum.

The following is a discussion of Kellert's national attitude research, which provides basic comparitive data for the research presented here.

Kellert assessed the knowledge of and attitudes towards animals in American society using a probability random sample of 3107 Americans age 18 and older. Data were collected by personal interviews of approximately 1 hour in length. Comparison of the study sample to census statistics indicated that the sample drawn was in fact a good representation of tha American population.

The knowledge segment of the survey consisted of 33 true/false and multiple choice questions, as well as a group of questions to access the respondent's awareness of 8 important wildlife management issues of the day. These issues were: killing baby seals, pesticide effects on birds, steel leghold traps, the endangered species act, livestock killing by coyotes, the tuna-porpoise controversy, the Tellico Dam snail darter issue, and using steel vs. lead shot. In phase 3 of his 5 phase report to the U.S. Fish and Wildlife Service Kellert reported that survey results indicated that most Americans have little awareness of wildlife management issues, or the relative ecological importance of those issues.

> " A number of impressions can be derived from these results. First, the public was not especially

> aware of any of the issues, with no issue recognized to a moderate or very knowledgeable extent by a majority of those surveyed. Secondly. as suggested in a previous report, when comparing the most with the least recognized issues, the public appeared to be far more aware and, in all likelihood, concerned about relatively emotional issues involving specific, attractive, large and phylogenetically 'higher' animals, than issues involving indirect impacts on wildlife and dealing with biologically unfamiliar and 'lower' animals. Finally, a wide desparity appeared to exist between the public and the professional wildlife manager regarding the most important wildlife issues. For example, to most wildlife managers, the baby seal controversy is of minor, superficial significance, whereas to the public, this issue was most recognized. In contrast, the steel vs. lead shot controversy appeared to be of marginal relevance to the general public, although this issue represents a very important concern of contemporary wildlife management " (Kellert and Berry 1980a, pg. 10).

The 33 knowledge questions used in Kellert's survey also yielded results important to wildlife managers. Kellert's results indicated that most Americans have a very limited understanding of animals. They seem to know least about endangered species, invertebrates, and animal taxonomy. Americans seemed most informed about injurious and domestic animals.

The groups who scored highest on the knowledge questions were males, college educated respondents, and residents of Alaska or the Rocky Mountain region. At the other end of the spectrum, recording the lowest knowledge scores, were blacks, city dwellers, those under 25 or over 76, and those with less than an 11th grade education. More than half of the respondents with very high knowledge scores were college educated. High scorers were likely to be involved in an animal related activity such as birdwatching , conservation

club membership, or hunting (to be close to nature). Those with high knowledge scores also tended to have very strong naturalistic and ecologistic attitudes, combined with low utilitarian scores, indicating their strong interest in animals as parts of natural systems, and their willingness to sacrifice economic benefits to protect wildlife and natural habitats (Kellert and Berry 1980a, pg. 27).

Kellert's knowledge measure indicates a number of interesting possibilities, and provides useful insights on the public's perception of animals, but the knowledge portion of the instrument was not included in the adapted survey used here.

Kellert found that several demographic variables have significant affects on knowledge and attitude expression. Among these variables are: age, sex, race, residence, education, and animal related activities. The following is a brief summary of the contribution of each variable to knowledge level and attitude formation.

Age:

Kellert's research indicated that those from 18 to 25 were generally more appreciative and affectionate, but less utilitarian towards animals than older persons. They also exhibited the highest humanitarian attitudes of any age group. Those over 75 seemed to be highly utilitarian and negativistic towards animals. Both the 18-25 and 75 and over groups exhibited animal knowledge below other ages and the national mean. The data hint at two interesting possibilities: attitudes may become more utilitarian as one

grows older, and more naturalistic as society becomes more urbanized, affluent, and separated from the land.

Sex:

As a group, females held high moralistic and humanistic attitudes. This seems to account for strong representation of women in anti-hunting and humane organizations. Men were generally found to hold lower humanistic, moralistic and negativistic attitudes than women. They tended to hold higher naturalistic and utilitarian attitudes than women. Males also seemed to be more knowledgeable and interested in animals and animal related activities than women.

Race:

As a whole, blacks exhibited lower interest for habitat, lower naturalistic attitudes, and lower knowledge than other racial groups. They also exhibited very low participation in animal related activities, high negativism towards animals, and the lowest ecologistic attitudes of any demographic group. The knowledge gap between races remained pronounced even when blacks and whites were compared at high education and socioeconomic class levels.

Residence:

Rural residents held higher naturalistic and ecologistic , and lower moralistic and negativistic attitudes than urban residents. Rural residents also tended to have higher knowledge scores and participate in more animal related

activities. Urban residents showed a general animal knowledge below the national mean, and tended to be more opposed to utilitarian animal activities (i.e., hunting, trapping, predator control).

Education:

Kellert found education to be " the most sensitive indicator of appreciation, knowledge and respect for animals" (Kellert and Berry 1980a, pg. 71). The correlation between knowledge and education was strong, linear and direct. Increased education directly correlated with a reduction of utilitarian and negative attitudes . College education seems to be a critical event in developing concern for animals.

Activities:

Although animal related activity groups exhibited a variety of attitudes, in general, those involved in animal related activities showed higher ecologistic and naturalistic attitudes, and lower negativistic attitudes than the general public. They also generally showed higher animal knowledge than the general public. Birdwatching, conservation club membership, and hunting were all associated with high knowledge, while zoo visitation , pet ownership, and anti-hunting were all associated with low knowledge scores.

Kellert also reported information on the characteristics of hunters which, "more than any other single subject, provided a kind of barometer for assessing people's much broader understandings of the natural world" (Kellert 1978b, pg. 2). Thirty-two percent of the population in this national

study had hunted at some time; 5.5% hunted often. As a group, hunters showed lower negativistic and higher naturalistic attitudes than nonhunters. They also showed higher knowledge scores, higher scientistic attitudes, more desire for wildlife contacts,and more interest in the outdoors than nonhunters. Demographically, hunters were more likely to have a rural background, be over 30, and live in the Rocky Mt., Southeastern, or West/Central states than nonhunters. The hunting population was predominantly male. Kellert identified 3 primary attitudes which motivate hunters as utilitarian, dominionistic, and naturalistic. These factors are listed in Figure 2.1, in order of decreasing frequency.

Twenty-nine percent of the population in the study declared that sport hunting is wrong, and may be labeled as anti-hunters (Kellert 1978b). As a group, anti-hunters held high humanistic and very high moralistic attitudes. Demographically, anti-hunters were more likely to come from an urban background, be under 30, and live in the Pacific coast or mid-Atlantic regions than hunters. The anti-hunting population was largely female. Kellert identified 2 primary attitudes which motivate anti-hunters as moralistic and humanistic. These factions are also listed in Figure 2.1, in order of decreasing frequency.

Kellert's results indicate that the most prevalent attitudes in American society are: interest and affection for individual animals (humanistic), concern for the right and

HUNTERS	
Utilitarian	43 % of all hunters. Primarily concerned with obtaining meat, harvesting game, trapping for profit or predator control. Animal seen as a harvestable commodity.
Dominionistic	39 % of all hunters. Primarily concerned with competition, achievement, skill, prowess. The animal is seen as a symbol of success and achievement.
Naturalistic	18 % of all hunters %. Primarily concerned with intimate involvement with animals, union with nature, and contact in a natural setting. The animal is viewed with interest, affection, and respect.
ANTI-HUNTERS	
Moralistic	88 % of all anti-hunters. Primary concern is for the ethical treatment of animals. Believe hunting is cruel and immoral. The animal is viewed reverently. Death is justified only by necessity, and hunters take life otherwise are deemed degenerate.
Humanistic	11 % of all anti-hunters. Primarily concerned for the suffering ofindividual animals. Empathy is felt not for the species, but for individuals. The animal is assumed to feel human fear and pain.

Figure 2.1. Primary hunter and anti-hunter types as defined by Kellert (1980a).

wrong treatment of animals (moralistic), concern for the practical and material value of animals (utilitarian), and indifference, dislike or fear of animals (negativism). The least prevalent attitude in our society seems to be interest in the physical traits and biological functioning of animals (scientistic). An ecologistic concern for wildlife species, their habitats, and the environment as a system (ecologistic) seems weakly present in many Americans, though it is "rarely manifest in a highly committed fashion" (Kellert andBerry 1980a, pg. 46). The reported relative frequency of each attitude is shown in Figure 2.2 (Kellert 1981, pg. 38).

Kellert feels that the prevalence of humanistic, moralistic, utiltarian, and negativistic attitudes may infact be at the heart of today's wildlife issues (Kellert and Berry 1980a, pg. 43). Those individuals whose primary orientation is toward moral treatment of animals, are in direct opposition to those individuals who see animals primarily for their usefulness or material worth. In the same fashion, those primarily oriented toward individual animals, often on which they convey human affection and attributes, have little understanding for those in society who dislike or even fear the very same animals. The failure of simple information campaigns to resolve many wildlife issues is consistant with the idea that such difficult issues involve widely disparent value components which must also be addressed if the issues are to be resolved.

Kellert also expressed some specific concern over the prevalence of humanistic and moralistic attitudes in much of

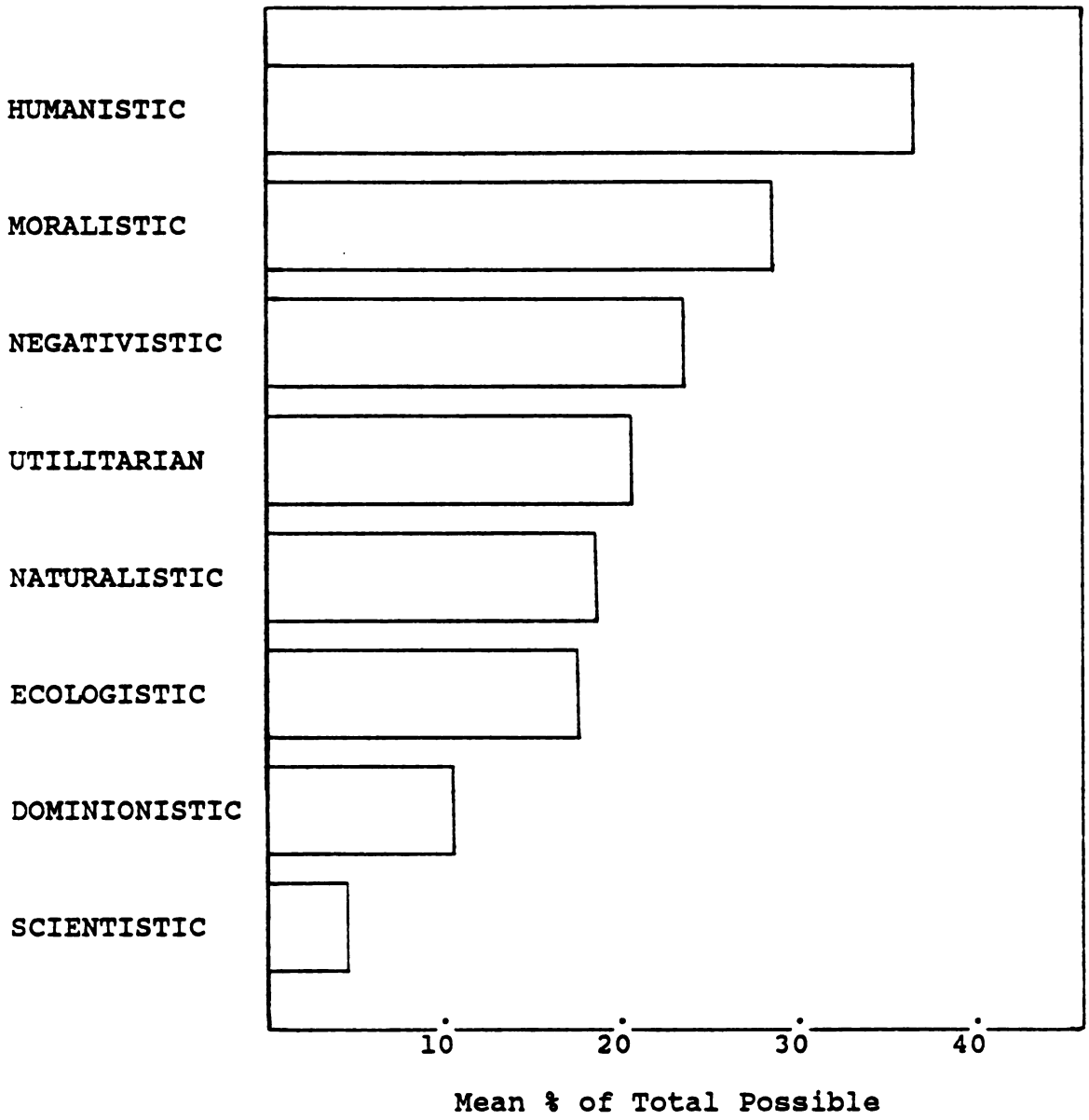

Figure 2.2. Relative Frequency of American Attitudes Toward Animals (as represented by mean attitude scores) (Kellert and Berry 1980)

the American populus. He contends that such an emotional, rather than an intellectual basis for concern and decision making can actually become an impediment to resolving wildlife issues. He feels such an attitude profile "can lead to an over emphasis on a narrow segment of wildlife (i.e., the large attractive animals) and overlook more basic considerations of ecological relationships between wildlife and their natural habitats" (Kellert and Berry 1980b, pg. 60).

On the other hand, Kellert expressed a degree of optimism in light of a seeming increase in naturalistic and ecologistic sentiments in society. The young, the educated, and western residents seem to be oriented toward this end of the attitude spectrum. Kellert feels that these groups may signal the expansion of naturalistic and ecologistic attitudes in America. His review of historical attitude trends over the last century also tend to support the notion that Americans may become increasingly oriented toward an appreciation for wildlife and natural habitats (Kellert 1981).

The Role of Citizen Values in Wildlife Issues

Peyton (1984) has suggested that resource issues consist of 1 to 3 important components (science/technology, public beliefs, and public values) and may be classified as 4 general types.

In the simplest resource issues science has adequately described the problem and the various publics have similiar

value priorities. In these issues the problem centers on a conflict in beliefs. For example, the issue which developed around the preservation of the California condor did not involve scientific or value components. Biologists had adequate information to explain the condor's decline, and all groups agreed that the bird should be saved from extinction, but management agencies and private organizations continue to disagree on the method.

Others, like resource allocation issues, may contain only value conflicts. Issues between sport and commercial fishermen, anglers and canoeists, or loggers and wilderness preservationists serve as good examples.

A third type of issue contains conflicts in beliefs and values. Peyton suggests the anti-hunting controversy as a prime example. Both hunters and anti-hunters have inaccurate conceptions about the effect of hunting on wildlife populations. But more importantly, the issue remains unresolved because the two have such divergent value priorities. Hunters seem motivated primarily by utilitarian, dominionistic, or naturalistic attitudes, while most anti-hunters seem motivated primarily by moralistic and humanistic values (Kellert 1980).

But the most common issues involve all 3 components. These issues involve significant gaps in scientific understanding, conflicts in beliefs, and conflicts in values. One such issue is toxic waste disposal. The health risks and environmental consequences of disposing of substances like

dioxins or PCB's are not fully known to scientists, and the general populus has only a vague, often erroneous perception of their effects and risks. Further, some publics will accept some environmental risk as a consequence of economic gain while others will not accept any level of risk despite associated benefits (Peyton 1980).

Peyton (1985) has suggested that public involvement offers several advantages in resolving these issues that autocratic government policies cannot provide. Yet to be useful public involvement has to be rational, and to be rational it should be based on a broad set of carefully evaluated and prioritized beliefs and values.

> "From a resource manager's position it is more desirable to have user attitudes formed by thorough, rational processes even if the positions differ from those of the manager. When individuals or groups with hastily formed attitudes take positions based on strong value concerns but with inadequate belief systems and unclear value priorities, they tend to engage in defending value concerns rather than seeking effective resolution to the issue"(Peyton 1985,pg. 16).

Frequently as issues emerge people become involved before they have much information about either side of the issue (Rankin 1969, Kasperson 1969, Murch 1971). A disruptive issue emerges because the resource manager cannot allocate the resource equally to every user group and at this point the groups are too polarized to negotiate a compromise. Resolution of the conflict depends on a compromise forged through the acceptance of new information and the consideration of opposing values. The process is illustrated by a case history of the Bay of Fundy herring fishery

(Kearney 1984).

The Bay of Fundy's herring fishermen were faced with economic crisis in the mid 1970's resulting from over fishing, poor marketing, intense competition, and intermittent over production. There were conflicts between weir fishermen and seine fishermen, fishermen and processors, and fishermen and managers. At the same time advisory committees (made of fishermen, processors, and government officials) existed to give advice to government officials. However, these groups were not afforded much consideration in policy decisions and they did little to improve the situation or give fishermen a voice in their fisheries' management.

But in the winter of 1975-76 the fishermen embarked on a course of co-management, through a new fisheries policy striving to involve the fishing industry in the regulation process. The new involvement was built on a series of meetings among the 3 existing fishermen organizations, followed by intense consultations with government officials. The meetings culminated in temporary subsides, a government study of the problem, and reformed regulations of fish meal production which all groups were able to quickly agree to. By starting on a process of cooperation between themselves and with the government, the fishermen had a real affect on their industry. It was this cooperation which translated into marketing and harvest strategies which restored prices, the local economy, and more equitable income among all fishermen.

> " The fishermen themselves took action that launched them on a totally new course in their relations with one another. In the first place, the intense consultations had brought two ancient enemies, the purse seine fishermen and weir fishermen, in close contact with one another on a continuing basis. The mutual understanding that developed through this process did much to improve the relationship between the two groups"(Kearney 1984, pg. 174).

Unfortunately, within a short time the meeting process was discontinued, and once again fishermen felt they had no way to influence policy or their own fate. Soon the groups were again polarized and further agreements were frustrated. This brief experiment in co-management supports the contention that the public can have a positive impact on management, but their successful participation depends on organized, rational, continual involvement (Kearney 1984). Token involvement, intermittent involvement, and unrepresentative involvement are at best frustrating and at worst a loss of time, money, and agency reputation.

Managers find themselves in a predicament. Informed public involvement may be the best way to serve societal needs and develop publically acceptable policies. Yet, managers face a public which is typically uninformed and by and large nonparticipatory (Schatzow 1977). Ironically, though effective participation depends on a well informed public, several studies indicate that the most likely persons to become involved are those whose information level is low, while those who become more informed grow less active and more moderate in their viewpoints (Kasperson 1969, Rankin 1969, Murch 1971, Tichenor et al. 1971, Ramsey and Rickson 1976). So while educators and managers may find

encouragement in the evidence that accepted information can have the moderating influence necessary for cooperation among publics, the task of informing the public and motivating these more informed, more moderate citizens still represents a formidable challenge.

The Influence of Teacher Attitudes on Teacher Behavior and Student Learning

Work by Stern and Keisler (1977) indicates that teacher attitudes impact behavior and student learning for a variety of attitudes and situations. In a recent review they report the highlights of their 3 volume report on teacher attitudes and attitude change. Over 5000 references were consulted and a complete literature review on teacher attitudes was performed. In the concluding segment of their review the authors state:

> "Two important points derive from the research reviewed: Teacher attitudes do make a difference in the teacher-learning process; Attitudes can be altered, although certain attitudes are more resistant to modification than others" (Stern and Keisler 1977, pg. 74).

Nowhere is the impact of teacher attitudes on student outcomes more evident than in teacher attitudes about race, class, and other student attributes. The classic illustration of a teacher attitude which affects student achievement is the pygmalian affect or self-fulfilling prophecy pioneered by Rosenthal and Jacobson (1968). The Rosenthal-Jacobson study created much controversy, and since it's completion many studies have probed the impact of teacher expectancies on student achievement. The majority of

later studies do in fact support the notion that teacher expectations have a significant affect on student achievement (Ashby 1978, Crano and Mellon 1978, Lichter and Johnson 1969, McArthur and Eisen 1976, Nash 1972, Palardy 1969, Rubovitz and Maehr 1971, Seaver 1973, Taylor 1979).

Existing research suggests that teacher attitudes concerning subject matter can have an affect on student achievement and learning, particularly if those attitudes are negative. Research by Bybee (1973) and Shrigley (1974) suggest that good teacher relations and enthusiasm may be even more influential to the learning process than the teacher's knowledge of the subject matter. Heil et al. (1960) also asserts that interested teachers can be more effective, and he states that his findings "confirm this common-sense assumption" (pg. 67).

> "Children's achievement in specific subjects are correlated with the academic interest of the teacher's personality and such personality is in turn characterized by certain academic interest. The difference in academic interest appears to be sufficiently great to overcome weaknesses that may be present in the personality structure of the teacher and in the teacher's functioning" (Heil 1960, pg. 67).

Some research indicates that negative teacher attitudes may have significant affects on student attitudes. Negative teacher attitudes have been shown to result in decreased student achievement (Rist 1970; Pidgeon 1970, Van de Walle 1973). Stern and Keisler (1977) state that, "more fine grained analyses seem to indicate that, while a teacher with a positive attitude may have little influence, the

teacher with a negative attitude can have an aversive affect" (pg. 65). They state that a negative attitude toward change, per se is a major stumbling block of non-traditional subjects which many teachers are required to teach, such as sex, religion, career opportunities, and substance abuse. "In these non-traditional subject areas there is a great deal of teacher resistance, with accompanying negative attitudes" (Stern and Keisler 1977, pg. 65). To this list we might easily add wildlife or environmental education, noting that negative attitudes towards environmental education as a new and unfamiliar subject could be further compounded by those teachers with a highly negativistic attitude toward animals.

Kellert (1982) provides direct evidence that teachers broaden the child's range of attitudes. Kellert found that students (2nd through 12th) who had learned about animals in the previous two years had significantly higher naturalistic and scientistic attitudes than children without this experience. In the sample of 4800 7th through 12th graders in the Michigan public school system, Pomeranzt (1977) found that 70% of these students indicated that a teacher had influenced their interest in wildlife in some degree. In a similar study on young Michigan hunters, 58% indicated that a teacher had influenced their interest in wildlife (Langenau and Mellon-Coyle 1977). Because teachers have such potential to develop important attitudes and reduce others, Haney (1964) feels that an analysis of science teacher attitudes is especially important:

"Pupils cannot learn attitudes that their teachers

> don't have. It may be that the first step in meeting this challenge to science education will consist of an inward look upon our knowledge and value systems" (pg. 35).

However, more recent research (Schofield 1981) can be found which is contrary to this popularly held belief that, "teachers who like the subject and are good at it readily stimulate positive student attitudes necessary for learning, while teachers who dislike the subject or are not competent are likely to infect their pupils with similar feelings of dislike and a similar cognitive incompetence" (Schofield 1981, pg. 492). Schofield suggests that very little evidence actually supports this hunch. He sites Aiken (1970) as finding no evidence of this in a review of attitudes toward mathmatics. Some researchers have even found a negative correlation between the teacher's rank of attitudes toward subject material and the rank of pupil attitudes toward the same material (Gilbert and Cooper, 1976). Schofield's research results are consistent with the assumption that teacher enjoyment of the subject (math in this case) is positively related to student achievement. However, they do not support the idea that this occurs directly through the transmission of favorable attitudes. In fact, they directly oppose the idea that a favorable attitude is essential to master a subject and that teachers without the right attitude will be unable to transmit these attitudes to their pupils.

> "In summary, despite insufficient evidence and results at times contrary to expectations, the fervent conviction that there is a direct positive relationship emanating from teacher attitudes (and

> achievement) leading to pupil attitudes and thence to pupil achievement remains unshaken" (Schofield 1981, pg. 463).

Using Attitude Measures to Predict Behavior

Can a study like the one undertaken here reflect or predict actual classroom behavior? Encouragingly, recent research indicates that within given constraints it can. Research by Fishbein and Ajzen (1974) indicates that if the attitude measure is tailored to the degree of specificity which the experimenter wishes to probe, then the measure can be a fairly accurate predictor of behavior. In other words, general attitudes are predictive of general behaviors while specific attitudes are better predictors of specific behaviors. Work by Ajzen and Fishbein (1974, 1975) and Weigel (1976) supports this theory. Fishbein and Ajzen were instrumental in explaining why previous research showed such little attitude-behavior consistancy. Their work on specificity led to a "multiple act theory" which organized discouraging results into a predic table pattern. Stated briefly below, the theory holds that:

> "A person's attitude towards an object need not be related to any single behavior that may be performed with respect to the object (i.e., may not permit prediction of single act criteria). However, it should be related to the overall pattern of his behaviors (i.e., it should predict multiple-act criteria)" (Fishbein and Ajzen 1974, pg. 61).

Along with specificity, a number of other variables have been identified which affect the relationship between attitudes and behavior. Among these variables are: intentionality (Fishbein and Ajzen 1975), ambiguity (Fazio

and Zanna 1981), intensity (Sherif et al. 1973), self-monitoring (Snyder and Monson 1975), and vested interest (Sivacek and Crano 1972). If one considers these factors in designing an attitude measure, and evaluates study results in light of them, general behavioral predictions should be possible.

Influencing Teacher Attitudes

If teachers are found to have profiles strongly skewed toward some attitudes, or strongly lacking in others, it is important to determine if their attitudes can be strengthened or broadened to improve wildlife education. Research by George (1967) indicates that conservation attitudes in teachers could be altered by a 1 week workshop. "The three educational experiences analyzed showed that in each case significant change could be identified and associated with the experience" (pg. 206). This change was attributed to "interest, motivation, and exposure to conservation knowledge" (pg. 206). Post tests revealed that these attitude changes persisted as much as a year after the workshop. Such conclusions "indicate the value potential of extension type conservation as an integral part of the education experience for youth, students, and adults" (pg. 209).

Several other studies reveal the effectiveness of training programs in changing teacher attitudes and classroom behavior. Hounshell and Liggett (1976) report that a 10 week, four phase inservice training session did alter teacher

knowledge and attitudes in the 36 sixth grade teachers studied. Further, this change was shown to affect student learning. Teacher cooperation and enthusiasm were noted to be vital to training success. Similarly, Jous (1978) found that teachers who received a 60 hour course on environmental education had a much more positive attitude about teaching such materials than untrained teachers. Several other studies reveal the effectiveness of training programs in changing teacher attitudes and classroom behavior (Almase 1973, Andrews 1979, Milson 1973, Pempek and Blick 1973, Thelen and Litskey 1972).

Summary

Two hypotheses were tested in this study. The first holds that Michigan teachers are not representative of society in general. The second holds that at present, public classroom educators in Michigan do not have a balance of attitudes necessary to prepare students to rationally cope with wildlife management issues. The study involves several assumptions which are supported by the proceeding literature review.

1. An adequate means exists to assess and define the attitudes (reflecting values) which may be held towards wildlife.

2. Rational participation in wildlife management issues is facilitated by citizen s who possess a balanced awareness of the differing value perceptions in an issue, and the consequences of decisions based on those values.

3. The attitudes of teachers impact on teacher behavior and student learning; strong teacher biases may prevent achieving wildlife education goals.

4. Effective means exist to strengthen and broaden teacher attitude profiles towards animals and therefore to improve wildlife education efforts.

Kellert's national survey results indicate that Americans generally hold limited knowledge about animals and animal related issues. Their primary orientation towards animals is typically moralistic or humanistic, with relatively few individuals expressing strong naturalistic, ecologistic, or scientistic attitudes. His research also indicates that age, sex, race, residence, and animal related activities significantly affect these attitudes.

Extensive pretesting, revision, and statistical validation techniques indicate that Kellert's national survey instrument is a reasonable tool for assessing American's attitudes towards animals. Replication of Kellert's survey by Peyton (1985) also indicates that, with some reservation about the utilitarian scale, the instrument yields reliable results.

Research by Kellert and others indicates that imbalanced attitude profiles may inhibit effective wildlife management and issue resolution, because such profiles do not allow a careful prioritization of all opposing beliefs and values. The question of attitude balance is especially important in teachers, because of their potential influence on students.

This brief review of the literature does strongly indicate that teacher attitudes are important in teacher behavior and have "a profound influence directly upon the student" (Stern and Keislar 1977, pg. 63). It also indicates

that some actual behavior may be predicted if important variables are carefully considered during research. However, a similiar review of the educational and psychological literature reveals that much remains to be learned about the attitude-behavior link. Schofield (1981) reminds us that although we may be aware of the positive correlation between teacher attitudes and student achievement we still don't really understand the mechanism causing this phenomenon.

Finally, the literature contains a great deal of evidence showing that in-service training and workshops can create attitude change which may persist at least a year after training.

CHAPTER 3

METHODS

Research Objectives

The following are the research objectives , to be achieved through the collection and analysis of a mail survey.

1. Determine the profile of attitudes towards animals and attitude towards hunting held by Michigan K-12 teachers, as indicated by Kellert's (1980a) attitude categories.

2. Compare the attitudes of Michigan K-12 teachers with the attitudes of various groups in Kellert's (1980a) national survey:
   a. general public
   b. hunters, nonhunters,anti-hunters
3. Determine the relationships that exist between attitudes and:
   a. teaching discipline
   b. teaching grade level
   c. environmental education training
4. Determine the relationship between teacher attitudes toward animals and demographic variables including:
   a. age
   b. education level
   c. urban-rural background
   d. race

e. animal related activities

5. Discuss the teacher training and curriculum development implications of these findings for environmental educators, general educators, wildlife management agencies (I & E) and conservation organizations.

A Description of the Instrument

The actual survey instrument was an adaptation of the instrument used in Kellert's national study of American attitudes, knowledge, and behaviors towards wildlife (Kellert 1978) (Appendix 1). Of the five segments in Kellert's instrument, two were used: attitudes (towards animals, specific issues), and animal related activities. A third segment was adapted to obtain social demographic characteristics of Michigan teachers. Each of these 3 segments is discussed in further detail below.

Teacher Attitudes:

The bulk of the questionnaire consisted of questions probing teacher attitudes on animals and specific issues. The attitude segment consists of 69 questions which are used to classify a respondent's attitudes according to Kellert's typology of 8 basic (and statistically separable) attitude domains. Each attitude domain consisted of 6 to 13 questions (Table 2.1). Some of the questions were Likert type questions with 7 response alternatives; others were close-ended multiple choice questions. Questions from all 8 attitude scales were mixed throughout the survey. Questions

are itemized by attitude domain in Appendix 6.

The point score possible differed from scale to scale (Table 2.1, pg.15). Scale scores ranged from 0 to 11 for the ecologistic scale, to 0 to 27 for the utilitarian scale. Scale scores were then standardized for comparison.

Animal Related Activities:

Questions 48 through 70 were close-ended simple response questions concerning animal related activities. These questions allowed respondents to be classified as hunters, nonhunters, anti-hunters, anglers, club members, pet owners, and birdwatchers.

Social Demographic Information:

The last 15 questions of the survey were used to collect personal and professional background information. Demographic items were presented in a straight forward, simple response format. The survey included many of the demographic variables Kellert found to be important factors affecting attitude expression. Among the demographics gathered were: age, sex, race, education, and urban/rural background. In addition to these items several others were added to profile each teacher's professional background. Answers from these questions identified the teacher's grade level, discipline, college minors,college majors, environmental education training, and school district.

Selection of the Sample

The study population was defined as those Michigan

teachers who teach grades kindergarten through twelve. This population includes approximately 110,000 individuals in Michigan. Limited time and funds dictated that the data on this population be obtained through a small, yet representative sample. An optimal sample size of 1200 was determined by 2 factors.

First, the sample had to be large enough to allow reliable statistical analysis on sample subgroups. The study includes more than 10 such subgroups (i.e., race, sex, teaching discipline, etc.). Consultation with a resident statistician indicated that in order to assure ample subgroup membership for all analyses, approximately 700 useable returns were needed.

Second, the sample had to be large enough to allow for nonrespondents, and still provide the 700 useable returns necessary for analysis. Because response rate was estimated at approximately 60%, sample size was accordingly raised to 1200.

Obtaining the Sample

A statewide teacher sample was taken from 4 teacher listings. A majority of the sample was obtained from the Michigan Education Association (MEA), a teacher union with over 90,000 members statewide. From it's membership roster the MEA provided a computer generated random sample of 740 MEA members.

Originally, the sampling strategy called for the remaining subsample to come from the Michigan Federation of

Teachers (MFT), a teacher union including approximately 10,000 teachers in southeastern Michigan. However, the MFT does not presently record its enrollment by computer, and it could not provide staff to hand draw a random sample. Neither does it allow public access to its enrollment list, and so the remaining subsample was taken from other sources.

A subsample exclusively representing teachers of southeastern Michigan was obtained from 3 listings. To ensure representation of Detroit teachers a random sample of 220 teachers was obtained from the Detroit Federation of Teachers (DFT), which includes approximately 10,000 teachers in the Detroit school system. The sample was hand drawn, using a random numbers table (Steel and Torrie 1980).

To ensure adequate representation of areas surrounding Detroit, 2 suburban Detroit school districts were sampled. Random samples of 130 teachers were provided by both Livonia and Dearborn school districts. These 4 subsamples are itemized below.

Detroit Federation of Teachers (DFT)....220
Livonia School District.....130
Dearborn School District.....130
Michigan Education Association (MEA)....720

total.....1200

Administration of the Survey

The survey was administered through 3 mailings, including: an initial survey , postcard reminder, and a second survey for nonrespondents. All mailings were sent by bulk mail method. Return postage for the surveys was

guaranteed to assure an accurate estimate of undeliverables. Return postage was prepaid.

The first mailing was made on January 11, 1985. Each teacher in the sample was mailed a 6" by 9" envelope including a cover letter and a booklet form of the 12 page survey. The cover letter used several appeals to encourage response (Appendix 2). It emphasized the importance of the data, its value to the teacher, and its value to the student. Complete confidentiality was guaranteed.

On January 28, approximately 2 weeks after the first mailing, a postcard reminder was sent to all teachers in the sample. The postcard emphasized the importance of each respondent's views and participation regardless of his or her interest in wildlife education (Appendix 3).

Three weeks later, on February 19, a final letter and survey were mailed to nonrespondents. The cover letter enclosed again reassured the respondent of complete confidentiality, and reiterated his or her importance in assuring representative results, with real benefit for Michigan educators (Appendix 4).

Estimating Nonresponse Bias

A nonrespondent follow-up study was conducted with half of the 381 nonrespondents. On July 11, 1985 a cover letter and shortened form of the survey instrument were mailed to all 190 of the MEA's 205 nonrespondents (Appendix 5). Detroit, Dearborn and Livonia nonrespondents were not included because summer contact with these teachers through

their school addresses was questionable.

Data Analysis

Data were key punched on to computer cards by Michigan State University Key Punch Services. Data were analyzed with descriptive and inferential statistics utilizing the Statistical Package for the Social Sciences (SPSS) software. Statistical treatments are discussed by research question in chapter 4 (Results).

Scope and Limitations

To ensure generalizability of the results the sample was taken from across the state. However, because no single listing of all Michigan teachers was accessible, a sample was taken from separate listings of teachers across the state.

Unfortunately this sampling strategy may prove problematic when trying to generalize results. Because the MEA teacher list included more southern Michigan teachers than anticipated, the study sample includes an unexpectedly high number of teachers from southern Michigan, and relatively few teachers from the northern portions of the state. Generalizations about teachers in the northern part of the state are thus cautious and guarded.

Further, the rosters used in collecting the teacher sample also created some problems with the sampling frame. That is to say, some variation existed between the defined population (i.e., K-12 teachers), and the list of population members obtained in the sample. Because the 2 union rosters and 2 district payrolls included individuals other than K-12

teachers, any sample from those lists should include some individuals outside the sampling frame. In the sample drawn for this study, 72 individuals identified themselves as counselors, principals, professors, or librarians. To reduce the possibility of frame error the results from these 72 surveys were separated from the rest of the sample.

In one instance measurement error may have resulted from a typographical oversight. Because of this oversight survey question #26 was discarded from the analysis. Question 26 is one of several questions which determine what Kellert terms the utilitarian attitude domain (discussed in chapter 2). Its removal from the survey changes a respondent's possible score in this domain, and in doing so, hinders comparison of the utilitarian scores found here and those found in Kellert's 1980 national survey.

Later in the survey, loss of information resulted from the omission of an answer category in 3 questions. These questions inquired as to the population in the town where the respondent: grew up, lives, or teaches. Ten response categories were provided, ranging from below 500 to more than a million. However, the response category ranging from 25,000 to 49,999 was omitted. To compensate for the errors that may have resulted data from these questions were clumped into 4 groups for analysis: below 500; 5000-9999; 10,000-99,999; and 100,000 and above. Conclusions about the influence of urban-rural background on teachers' attitudes about animals must therefore be made cautiously for those

teachers who teach, live or grew up in areas of 10,000 to 100,000 residents.

A number of methods were used to minimize other errors inherent in survey research. Interviewer effects which would alter question response have been minimized by using a mail survey. The sponsor's name on the survey may have caused some response bias, but past research indicates that a survey's author may affect response rate more than response accuracy (Tull and Hawkins 1980). Also, Tull and Hawkins (1980) indicate that response bias of this type is reduced when the sponsor is a noncommercial source.

Errors related to questionnaire design have been minimized by an extensive amount of pretesting by Steve Kellert (1979,1980a,1980b). Kellert's research and questionnaire design are further discussed in chapter 2.

Repeated mailings and a follow-up nonrespondent study were used in an attempt to minimize nonrespondent bias. Nonrepondents were mailed a shortened form of the survey designed to encourage their response and gain some important insights on their characteristics.

Chapter 4

RESULTS

The Respondents

The survey instrument was mailed to 1200 members of 4 teacher associations. Eighty-one surveys were non-deliverable. The overall response rate was 65 % (738 returns). Seventy-two respondents were not active teachers (i.e., principles, counselors, etc.) and were deleted from the analysis. The response rate for useable teacher surveys was 64 % (666 returns). Teachers from the Michigan Education Association (MEA) and Dearborn listings had the highest response rate (69 %); Detroit Federation teachers (DFT) had the lowest response rate (42.4 %)(Table 4.1). The sample was 38 % male and 61 % female (Table 4.2). Ninety-one percent of the respondents were from the southern half of Michigan's lower penninsula (Figure 4.1).

Respondents were predominantly female (58.7 %), of urban or suburban residence (70 %), and white (89.5 %). All had at least a bachelor's degree; 68.5 % had a higher degree. Their mean age was 44 (median age = 43). About 1 in 5 respondents taught biological or earth science, and about 1 in 10 taught environmental education. Over 35 % had attended at least 1 short environmental education workshop. Most respondents (69.5 %) owned pets. Nearly half fished (48.3 %) and 45.5 % birdwatched in the last two years. Over a quarter (27.3 %) had belonged to some type of conservation club in the last two years. Thirteen percent of the respondents hunted as

Table 4.1. Survey response rates by sample group

Sample Group	Respondents	Non-Respondents	Percent Response
Detroit Fed. of Teachers	86	203	42.5 %
Livonia Schools	75	113	66.4 %
Dearborn Schools	83	119	69.7 %
Michigan Educ. Association (MEA)	422	612	69.0 %
Total	666	1047	65.0 %

Table 4.2. Sex ratios for respondents, nonrespondents, and teacher subsamples.

Group	Males		Females	
	n	%	n	%
Nonrespondent Subgroups				
Detroit	18	(17 %)	84	(80 %)
Livonia	22	(50 %)	22	(50 %)
Dearborn	18	(47 %)	20	(53 %)
M.E.A.	76	(37 %)	124	(60 %)
All Nonrespondents	134	(35 %)	250	(65 %)
All Respondents	272	(40 %)	391	(58 %)
Total Sample	406	(39 %)	641	(61 %)

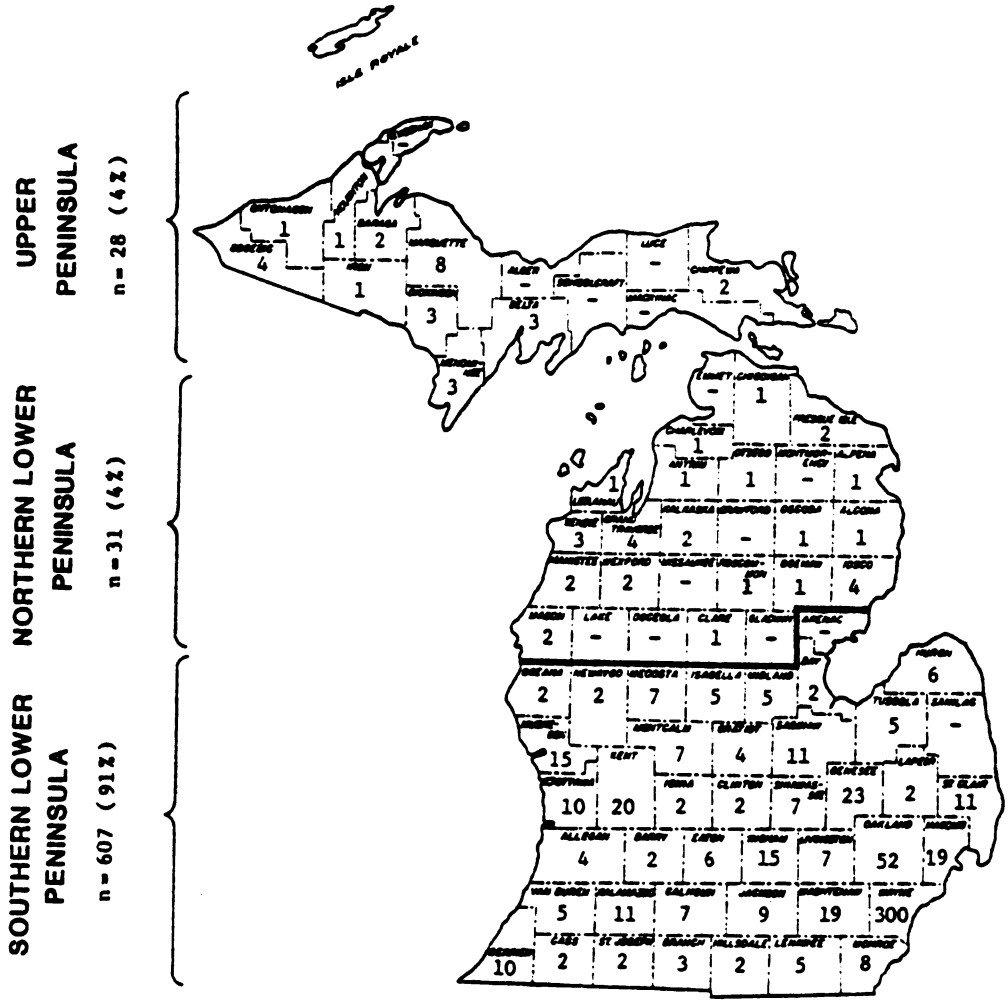

Figure 4.1. A map of response rate by county.

compared to 10 % of the general population who hunted in the Great Lakes region in 1980 (1980 Fish and Wildlife Survey). Twenty percent of the respondents were anti-hunters, as compared to 37 % in the Great Lakes Region generally (Kellert and Berry 1980b).

Mean Teacher Profile

The most frequent attitudes found in Michigan teachers were the naturalistic ($\bar{X}$=.29), ecologistic ($\bar{X}$=.25), humanistic ($\bar{X}$=.39), and moralistic ($\bar{X}$=.36) attitudes. The least frequent attitudes found were the scientistic ($\bar{X}$=.06), utilitarian ($\bar{X}$=.10), and dominionistic ($\bar{X}$=.08) attitudes.

When attitude scale scores were standardized and compared (using a chi square test at a .05 level of significance) Michigan teachers were significantly different from Kellert's (1980) sample of the general public in 7 of 8 domains (Table 4.3). Teachers held significantly higher naturalistic, moralistic and scientistic scores than the general public. They also held significantly lower utilitarian, dominionistic and negativistic scores than the general public (Figure 4.2). Humanistic attitudes were not significantly different.

In comparison to Bureau of Land Management biologists (Peyton 1985), teachers were also quite different (Figure 4.3).

The Nonrespondents

Three hundred and eighty-one members of the sample did

Table 4.3. A comparison of the general public (n=2759) (Kellert 1980) to K-12 Michigan teachers(n=666) by 95 % confidence intervals on 8 attitude domains.

Group	Mean	S	n	C.I.s
Naturalistic				
G. Public	3.1	2.6	52.5262	(3.002, 3.197)
Teachers	4.7	3.2	25.8069	(4.456, 4.937)
Ecologistic				
G. Public	3.1	2.2	52.5262	(3.018, 3.182)
Teachers	4.3	2.9	25.8069	(4.130, 4.564)
Humanistic				
G. Public	4.0	2.4	52.5262	(3.910, 4.089)
Teachers	4.3	2.8	25.8069	(4.052, 4.474)
Moralistic				
G. Public	5.5	4.5	52.5262	(5.332, 5.667)
Teachers	7.2	5.2	25.8069	(6.765, 7.559)
Scientistic				
G. Public	0.9	1.3	52.5262	(.0414, .9481)
Teachers	1.3	1.6	25.8069	(1.223, 1.464)
Utilitarian				
G. Public	5.3	3.8	52.5262	(5.158, 5.441)
Teachers	2.3	2.8	25.8069	(2.176, 2.596)
Dominionistic				
G. Public	2.0	2.1	52.5262	(1.921, 2.078)
Teachers	1.5	1.9	25.8069	(1.407, 1.689)
Negativistic				
G. Public	4.4	2.7	52.5262	(4.299, 4.500)
Teachers	3.2	2.4	25.8069	(2.995, 3.365)

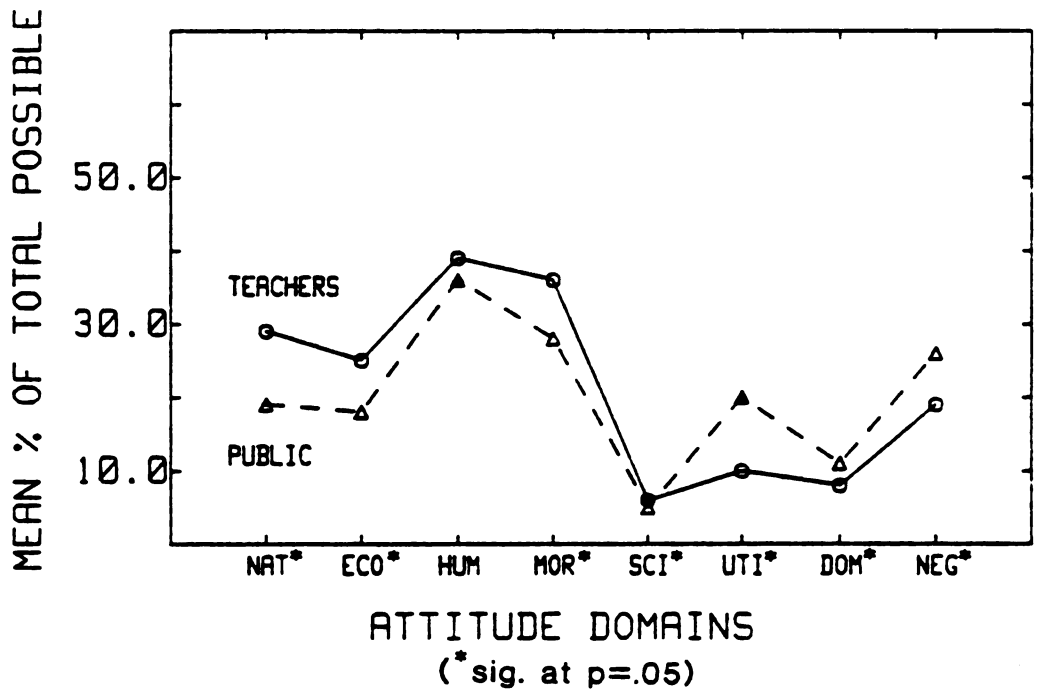

Figure 4.2. Mean attitude scores for teachers and the general public (Kellert 1980a).

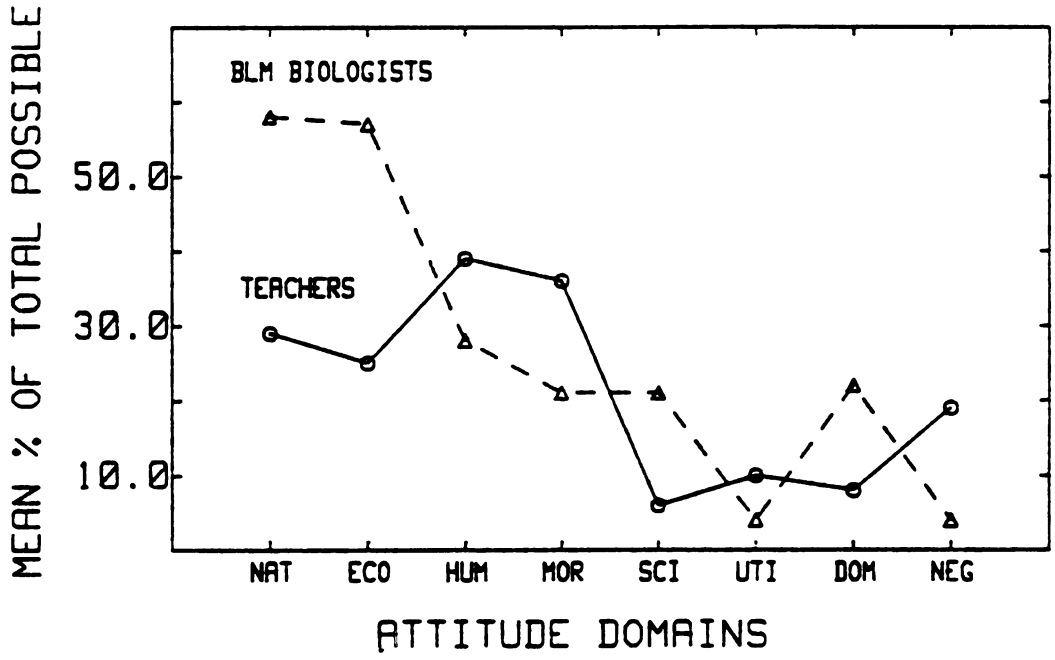

Figure 4.3. Mean attitude scores for teachers and BLM biologists (Peyton 1985).

not respond. A follow-up study was conducted on all 190 nonrespondents from the MEA listing (50 % of all nonrespondents). The remaining 191 nonrespondents could not be reached at their school addresses during the time of the nonrespondent study.

Eighty-four nonrespondents returned the shortened survey (22 % of all nonrespondents). These 84 returns indicated that nonrespondents were similiar to respondents in many respects. Chi square tests (alpha = .05) yielded no significant difference between respondents and nonrespondents on: age, sex, race, teaching discipline, population where the teacher grew up, reasons for hunting, participation in hunting or fishing, or conservation club membership (Table 4.4). Significantly fewer nonrespondents had birdwatched in the last 2 years, and nonrespondents were most interested in attractive, likeable animals while respondents were most interested in wild animals (Appendix 9).

The similiarity between respondents and this partial sample of nonrespondents suggests that sample bias due to nonrespondents was relatively low, thus statements about the entire sample, based on respondents, can be made with some confidence. However, judging by the types of animals they most prefer, nonrespondents may be less naturalistic and ecologistic, and more humanistic and moralistic than respondents. It also seems likely that nonrespondents were less interested in the survey, its content, or animals in general. To the degree that nonrespondents were less

Table 4.4. A comparison of select characteristics for respondents (n=666) and nonrespondents (n=96) (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	0.0479	1	.9900	
Age	-------	-	-----	
Race	0.3930	1	.7500	
Education	-------	-	-----	
E.E. Workshops	-------	-	-----	
Grade Level	4.7784	2	.1000	
Science Teaching	.3599	2	.9000	
Urban/Rural	2.6500	2	.5000	
Hunting	0.0480	1	.9900	
Angling	1.1700	1	.5000	
Birdwatching	10.1700	1	.0050	*
Club Membership	2.3300	1	.2500	
Pet Ownership	------	-	-----	
1st Reason to Hunt	4.4000	3	.2500	
2nd Reason to Hunt	4.5100	6	.7500	

interested in animals, their exclusion could have biased the results toward higher animal related activity rates, higher naturalistic and ecologistic, and lower humanistic, moralistic, and negativistic attitudes.

Demographic Variables

The following is a description of teacher subgroups as they fall into 9 categories: sex, race, age, education, science teaching, grade level, urban-rural residence, and region. Each subgroup is briefly described in so far as it differs from the entire sample and other subgroups within its specific category. Subgroup attitude means appear in Table 4.5. Significant differences were determined by chi square tests (a = .05). More detailed descriptive frequencies are provided for each subgroup in Appendix 7.

Demographic variables were then further analyzed to determine the extent to which each was associated with attitude differentiation. Significant differences were determined by analysis of variance (a = .05). All ANOVA results appear in Tables 4.6 - 4.28.

With a few noted exceptions, the following discussion involves only those relationships which were found to be statistically significant (a = .05).

Sex: Half the female respondents (n=391) taught at the primary level, compared to 19 % of the male respondents (n=272). A third of the females taught K - 3rd grade while only 3 % of the males taught K - 3rd grade. Males had slightly higher education levels than females, and more males

Table 4.5. Standardized attitude scale means for selected teacher groups

Group	n	Attitude Domain Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
All Teachers	666	.29	.25	.39	.36	.06	.10	.08	.19
Hunters	88	.45	.36	.33	.19	.08	.10	.21	.14
Nonhunters	336	.26	.25	.40	.28	.05	.11	.08	.19
Anti-hunters	135	.29	.22	.36	.63	.06	.08	.04	.20
Anglers	322	.36	.29	.39	.31	.07	.09	.11	.15
Pet owners	463	.30	.28	.44	.37	.06	.09	.08	.16
Birdwatchers	303	.38	.31	.42	.40	.08	.07	.07	.15
Club members	182	.39	.38	.44	.39	.09	.08	.09	.13
Blacks	48	.25	.18	.30	.34	.05	.14	.08	.29
Whites	596	.30	.26	.39	.36	.06	.10	.08	.16
Males	272	.34	.29	.31	.29	.06	.11	.11	.15
Females	391	.26	.23	.44	.40	.06	.09	.06	.18
1st-3rd Grade	126	.24	.23	.40	.36	.06	.10	.06	.20
4th-6th Grade	108	.34	.29	.43	.39	.07	.08	.07	.16
9th-12th Grade	196	.30	.25	.36	.33	.05	.09	.10	.19
Science(1st-6th)	108	.28	.26	.43	.37	.07	.08	.07	.16
Science(9th-12th)	32	.47	.47	.32	.30	.14	.07	.06	.08
Science	197	.34	.32	.36	.37	.09	.08	.07	.15
Nonscience	469	.27	.22	.38	.35	.05	.11	.08	.20
Educ. (B.S.)	201	.30	.26	.42	.33	.06	.10	.08	.16
Educ. (M.S.)	439	.29	.25	.37	.37	.06	.10	.08	.19
Educ. (Ph.D)	18	.26	.25	.35	.35	.09	.12	.11	.16

Table 4.5 (cont.)

Group	n	Attitude Domain Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
Region (U.P.)	24	.32	.26	.40	.32	.05	.10	.10	.13
Region (N.L.P.)	31	.43	.37	.35	.28	.08	.06	.14	.15
Region (S.L.P.)	574	.26	.25	.39	.36	.06	.10	.08	.19
Age (24-34)	105	.29	.26	.42	.36	.06	.08	.07	.18
Age (35-45)	272	.29	.26	.38	.37	.06	.10	.08	.18
Age (46-56)	203	.32	.26	.39	.33	.06	.11	.09	.18
Age (57-67)	58	.26	.23	.36	.35	.03	.10	.07	.22
Pop. (-5000)	164	.31	.25	.36	.30	.06	.11	.11	.18
Pop.(10-100,000)	202	.30	.28	.43	.38	.07	.08	.07	.18
Pop. (100,000+)	212	.26	.23	.37	.38	.06	.11	.08	.20
E.E. Workshop	313	.32	.28	.38	.35	.07	.10	.09	.18
No E.E. Workshop	349	.27	.24	.39	.36	.04	.10	.07	.19
E.E. Teachers	60	.40	.34	.43	.41	.10	.08	.08	.14
E.E. Training	40	.46	.41	.37	.41	.10	.09	.10	.11

Abbreviations stand for Michigan's upper peninsula, northern lower peninsula, and southern lower peninsula

Population of the town where a teacher grew up

Teachers who had attended at least 1 environmental education workshop

Table 4.6. A Summary of teacher subgroup comparisons by mean attitude scale score in 8 attitude domains

Subgroup Comparisons	Attitude Domain							
	Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
Hunters vs. Nonhunter vs. Anti-hunters	*	*	*	*	*	*	*	*
Male Hunters vs. Male Anti-hunters vs. Male Nonhunters	*	*	-	*	*	-	*	-
Males vs. females	*	*	*	*	-	-	*	*
Primary Science vs. Secondary Science	*	*	*	-	*	-	*	*
Female Prim. Sci. vs. Female Sec. Sci.	*	*	-	-	*	-	-	*
Science vs. Nonscience	*	*	-	-	*	*	-	*
Female Science vs. Female Nonscience	-	*	-	-	*	*	-	*
Population: (Below 5000 vs. 10,000-100,000 vs. Above 100,000)	*	*	*	*	-	*	*	-
Population Levels in Region 3: {(R3)Below 5000 vs. (R3)10,000-100,000 vs. (R3)Above 100,000}	-	*	-	*	-	*	-	-
Grade Level: (1st-3rd vs. 4th-6th vs. 9th-12th)	*	*	-	-	-	-	*	*
Females by Grade: (Female 1st-3rd vs. Female 4th-6th vs. Female 9th-12th)	*	-	-	-	-	-	-	*
Black vs. White	-	*	*	-	-	*	-	*

Table 4.6 (cont.)

Characteristic	Attitude Domain Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
Female whites vs. Female blacks	-	*	*	-	-	*	-	*
Region: (U.P. vs. N.L.P. vs. S.L.P.)	*	*	-	-	-	-	*	*
Regions for 1 pop.: (R1-below 5000 vs. R2-Below 5000 vs. R3-Below 5000)	*	*	-	-	-	-	*	-
Workshops vs. No workshops	*	*	-	-	-	-	*	*
Age Groups: (24-34 yrs. vs. 35-45 yrs. vs. 46-56 yrs. vs. 57-67)	-	-	-	-	-	-	-	-
Education: (B.S. degree vs. M.S. degree vs. Ph.D.)	-	-	-	-	-	-	-	-

Population where the teacher grew up

Abbreviations stand for Michigan's upper peninsula, northern lower peninsula, and southern lower peninsula

Teachers who have or have not attended at least one environmental education workshop

* Indicates that subgroups are significantly different in attitude scale mean at the p = .05 level

\- Indicates that subgroups are not significantly different in attitude scale mean at the p = .05 level

were hunters and anglers (Table 4.7 ; Appendix 7.2, 7.3).

Males and females also had very different attitude profiles. Males were significantly more naturalistic, ecologistic, and dominionistic. Females were characterized by higher humanistic, moralistic, and negativistic scores (Table 4.8 ; Figure 4.4).

The influence of teacher sex on ecologistic, humanistic, and dominionistic attitudes was further indicated by analysis of teaching discipline and grade level. When only females of various disciplines (primary and secondary science) and grade levels (1st-3rd, 4th-6th, 9th-12th) were compared, significant differences in the ecologistic, humanistic, and dominionistic scales were no longer seen. Similiarly, when only female science and nonscience teachers were compared, naturalistic differences were no longer significant.

Race: Black teachers (n=48) taught largely at the secondary level, and a higher percentage of black teachers held master's degrees. They were also a highly urban, female group. Blacks showed low participation in hunting (4.2 %), fishing (25 %), birdwatching (29.1 %), clubmembership (4.2 %) and pet ownership (41.6 %). The returns included only 48 black teachers, making interpretation of these findings tentative (Table 4.9 ; Appendix 7.4, 7.5).

Black teachers were characterized by significantly lower ecologistic and humanistic scores, and higher utilitarian and negativistic scores than whites (Table 4.10 ; Figure 4.5). Black/white differences persisted even when teachers of the

Table 4.7. A comparison of select characteristics for males (n=272) and females (n=391) (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	-------	-	-----	
Age	6.1326	3	.1053	
Race	2.6936	1	.1008	
Education	11.2889	2	.0035	*
E.E. Workshops	.4190	1	.5174	
Grade Level	94.0959	2	.0000	*
Science Teaching	.7218	1	.3955	
Urban/Rural	5.2964	2	.0708	
Hunting	37.7501	1	.0000	*
Angling	45.3102	1	.0000	*
Birdwatching	.5878	1	.4433	
Club Membership	.1929	1	.6605	
Pet Ownership	.4298	1	.5121	

Table 4.8. Analysis of variance on males(n=272) and females(n=391) for 8 attitude domains.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
Males	5.40	3.30	1	22.8431	.0000 *
Females	4.22	2.96			
Ecologistic					
Males	4.99	3.08	1	24.7288	.0000 *
Females	3.89	2.58			
Humanistic					
Males	3.44	2.42	1	43.6753	0 *
Females	4.85	2.87			
Moralistic					
Males	5.90	4.96	1	27.1182	0 *
Females	8.00	5.19			
Scientistic					
Males	1.34	1.53	1	.0013	.9715
Females	1.34	1.62			
Utilitarian					
Males	2.63	3.06	1	3.4631	.0632
Females	2.22	2.54			
Dominionistic					
Males	2.06	2.24	1	38.8503	0 *
Females	1.18	1.39			
Negativistic					
Males	2.64	2.22	1	23.4588	0 *
Females	3.55	2.49			

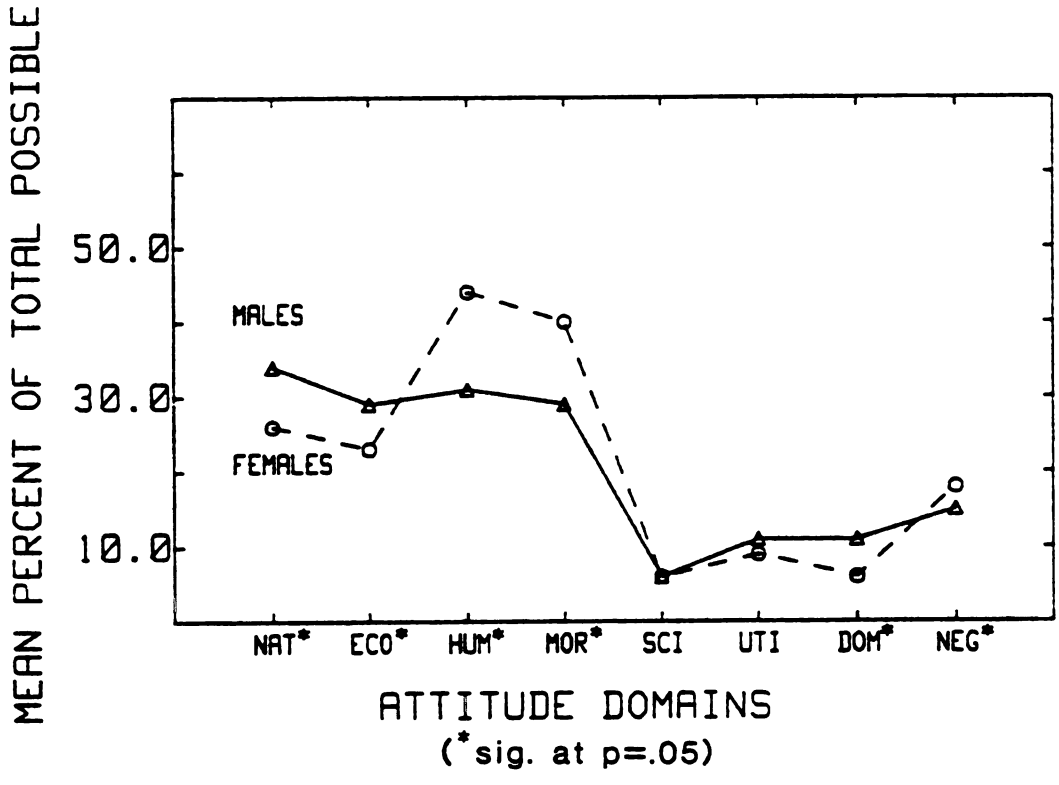

Figure 4.4. Mean attitude scores for male and female teachers.

Table 4.9. A comparison of select characteristics for black (n=48) vs. white (n=596) teachers (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	2.6936	1	.1008	
Age	1.2276	3	.1673	
Race	------	-	-----	
Education	6.0924	2	.0475	*
E.E. Workshops	.0520	1	.8196	
Grade Level	4.4478	2	.1082	
Science Teaching	.7265	1	.3940	
Urban/Rural	14.7698	2	.0006	*
Hunting	2.8996	1	.0886	
Angling	10.7112	1	.0011	*
Birdwatching	4.5289	1	.0333	*
Club Membership	12.3093	1	.0005	*
Pet Ownership	17.7977	1	.0000	*

Table 4.10. Analysis of variance of black(n=48) vs. white(n=596) teachers for 8 attitude domains.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
Blacks	4.04	2.58	1	2.3578	.1252
Whites	4.78	3.23			
Ecologistic					
Blacks	3.13	2.11	1	9.4758	.0022 *
Whites	4.48	2.89			
Humanistic					
Blacks	3.27	2.46	1	6.6452	.0102 *
Whites	4.34	2.78			
Moralistic					
Blacks	6.85	4.21	1	.1945	.6593
Whites	7.20	5.29			
Scientistic					
Blacks	1.21	1.54	1	.3647	.5461
Whites	1.35	1.59			
Utilitarian					
Blacks	3.29	2.90	1	5.2465	.0223 *
Whites	2.33	2.78			
Dominionistic					
Blacks	1.63	1.49	1	.1323	.7161
Whites	1.53	1.85			
Negativistic					
Blacks	4.90	2.94	1	26.9367	.0000 *
Whites	3.03	2.34			

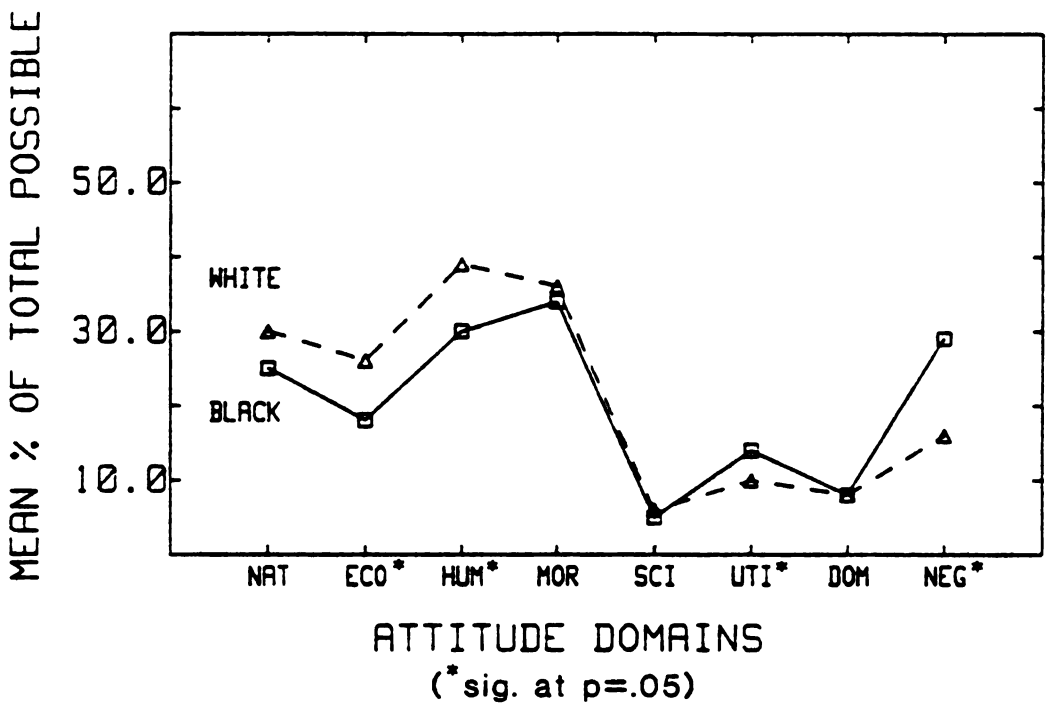

Figure 4.5. Mean attitude scores for black teachers and white teachers.

same sex or urban/rural background were compared.

Age: A large number of 23 to 34 year olds (n=105) were primary teachers (43 %) and fewer held advanced degrees relative to teachers of other ages (Appendix 7.6). Teachers age 35 to 45 (n=272) were likely to live and teach in a suburban community (Appendix 7.7). Teachers age 46 to 56 (n=203) held more advanced degrees and were more likely to teach in urban areas (Appendix 7.8). Older teachers (57 - 67)(n=58) predominantly lived and taught in suburban or urban areas (Appendix 7.9). However, these differences were not significant in chi square tests at a = .05 (Table 4.11).

No significant attitude differentiation was found among 4 designated teacher age groups. However, the oldest teachers (55 - 65 years old) were found to hold a slightly lower scientistic score than the youngest teachers (25 -35 years old)(Table 4.12 ; Figure 4.6).

Education: Generally, teachers with a B.S. degree (n=201) were less likely than respondents to teach 9th-12th grade. Teachers with a B.S. also had slightly higher hunting, angling, and pet ownership rates than teachers generally or teachers with a master's degree (n=439)(Appendix 7.10).

Teachers with advanced degrees were less likely to teach science, 1st-6th grade, or own pets (Appendix 7.11).

Teachers with a Ph.D. (n=18) were even more likely to be urban. They taught only at the secondary level and few taught

Table 4.11. A comparison of select characteristics for 24-34 (n=105), 35-45 (n=272), 46-56 (n=203), and 57-67 (n=58) year old teachers (p = .05).

Variable	Chi Sq.	D.f.	Sig.
Sex	6.1326	3	.1053
Age	------	-	-----
Race	1.2276	3	.7464
Education	11.5900	6	.0718
E.E. Workshops	5.2052	3	.1574
Grade Level	4.4025	6	.6224
Science Teaching	5.0627	3	.1673
Urban/Rural	8.0905	6	.2315
Hunting	5.8856	3	.1173
Angling	6.9533	3	.0734
Birdwatching	3.2498	3	.3547
Club Membership	2.8589	3	.4139
Pet Ownership	5.5699	3	.1345

Table 4.12. Analysis of variance of 24-34(n=105), 35-45(n=272),46-56(n=203), and 57-67(n=58) year old teachers for 8 attitude domains.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
24-34	4.56	3.28	3	2.0777	.1019
35-45	4.59	3.18			
46-56	5.13	3.20			
57-67	4.10	2.94			
Ecologistic					
24-34	4.51	2.90	3	.4944	.6863
35-45	4.36	2.90			
46-56	4.35	2.92			
57-67	3.95	2.46			
Humanistic					
24-34	4.62	2.95	3	.6590	.5775
35-45	4.24	2.73			
46-56	4.25	2.73			
57-67	4.07	2.83			
Moralistic					
24-34	7.26	5.23	3	.9670	.4078
35-45	7.50	5.29			
46-56	6.67	5.24			
57-67	7.12	4.99			
Scientistic					
24-34	1.41	1.62	3	2.5253	.0566
35-45	1.42	1.59			
46-56	1.39	1.66			
57-67	.81	1.00			
Utilitarian					
24-34	1.87	2.17	3	1.6817	.1697
35-45	2.39	2.89			
46-56	2.60	2.77			
57-67	2.33	2.89			
Dominionistic					
24-34	1.40	1.79	3	1.0680	.3620
35-45	1.50	1.92			
46-56	1.73	1.87			
57-67	1.40	1.43			
Negativistic					
24-34	3.14	2.38	3	.9810	.4012
35-45	3.14	2.50			
46-56	3.12	2.21			
57-67	3.71	3.11			

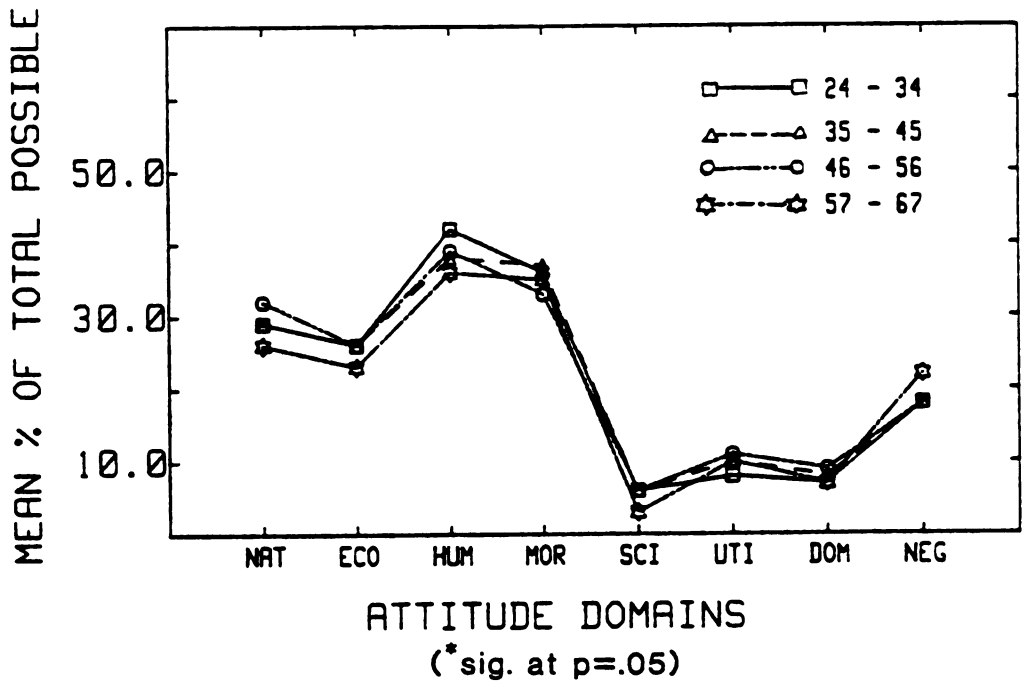

Figure 4.6. Mean attitude scores for 4 teacher age groups.

science (Table 4.13 ; Appendix 7.12).

Though Kellert (1980) found education to be one of the strongest factors associated with attitude differences, no significant differences were found between teachers with the least amount of education (B.S. degree) and the most education (M.S. or Ph.D.)(Table 4.14 ; Figure 4.7). Similiarly, teacher profiles could not be strongly differentiated by college major, though science majors had significantly higher ecologistic and scientistic scores than nonscience majors.

Science: Science teachers (n=197) were more likely to teach at the primary level and more likely to attend an environmental education workshop than nonscience teachers (n=469). Science teachers also exhibited higher rates of hunting(19 %), birdwatching(54 %), club membership(36 %), and pet ownership(76 %) (Table 4.15 ; Appendix 7.13, 7.14).

Primary science teachers (n=108) were predominantly female(77.8 %) (Appendix 7.15). Secondary science teachers (n=32) were predominantly male(78.1 %) and exhibited higher animal related activity rates than primary science teachers or teachers as a whole (Appendix 7.16). The small sample of secondary science teachers make these percentages difficult to interpret (Table 4.16).

Science teachers were found to have significantly higher naturalistic, ecologistic, and scientistic scores than nonscience teachers. Nonscience teachers held higher utilitarian and negativistic scores. Aside from

Table 4.13. A comparison of select characteristics for teachers with a B.S. degree (n=201), M.S. degree (n=439), or Ph.D (n=18) (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	11.2889	2	.0035	*
Age	11.5900	6	.0718	
Race	6.0924	2	.0475	*
Education	-------	-	-----	
E.E. Workshops	4.2146	2	.1216	
Grade Level	12.2977	4	.0153	*
Science Teaching	1.3621	2	.5061	
Urban/Rural	5.4953	4	.2401	
Hunting	4.6739	2	.0966	
Angling	4.7747	2	.0919	
Birdwatching	.7520	2	.6866	
Club Membership	.3740	2	.8294	
Pet Ownership	6.3810	2	.0411	*

Table 4.14. Analysis of variance of teachers with a B.S.(n=201), M.S.(n=439), or Ph.D(n=18), for 8 attitude domains.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
B.S	4.75	3.18	2	.2257	.7980
M.S.	4.70	3.19			
Ph.D.	4.22	2.44			
Ecologistic					
B.S.	4.41	2.92	2	.0572	.9444
M.S.	4.33	2.81			
Ph.D	4.28	3.41			
Humanistic					
B.S.	4.60	2.87	2	2.1853	.1133
M.S.	4.12	2.69			
Ph.D	3.94	2.75			
Moralistic					
B.S.	6.69	5.09	2	1.2508	.2870
M.S.	7.39	5.27			
Ph.D.	7.11	5.18			
Scientistic					
B.S.	1.31	1.60	2	1.1190	.3272
M.S.	1.33	1.57			
Ph.D	1.89	1.84			
Utilitarian					
B.S.	2.29	2.67	2	.3563	.7004
M.S.	2.38	2.69			
Ph.D.	2.83	3.69			
Dominionistic					
B.S.	1.63	2.04	2	.6394	.5279
M.S.	1.50	1.75			
Ph.D.	1.89	2.19			
Negativistic					
B.S.	2.97	2.27	2	1.5177	.2200
M.S.	3.30	2.50			
Ph.D.	2.83	2.64			

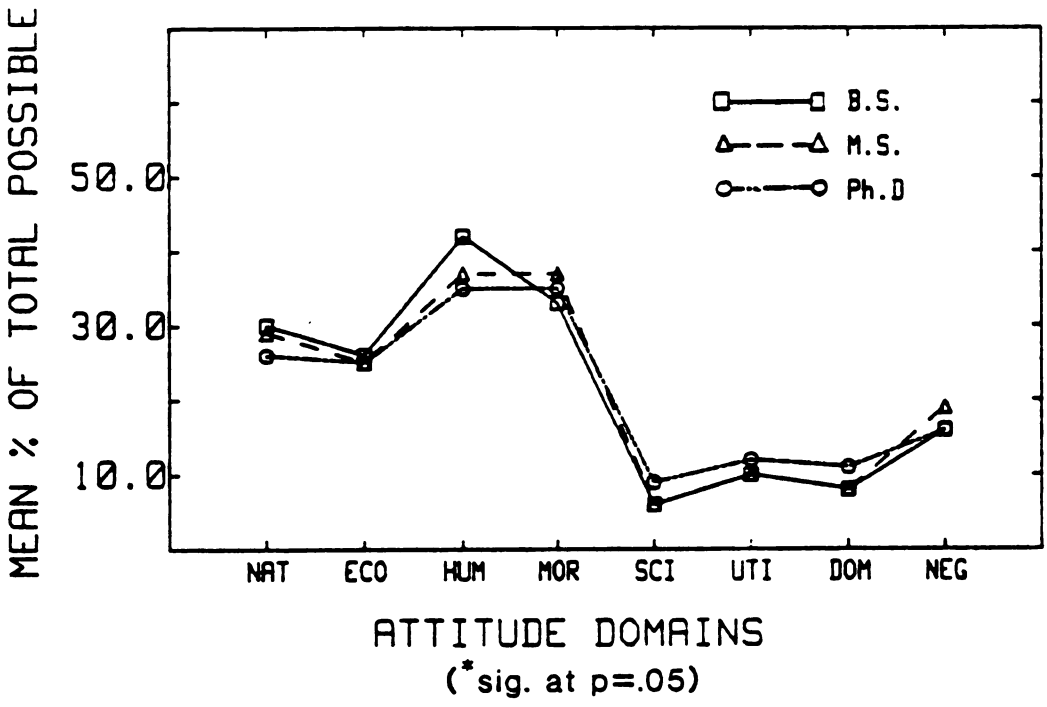

Figure 4.7. Mean attitude scores for teachers holding a B.S., M.S., or Ph.D.

Table 4.15. A comparison of select characteristics for science (n=197) vs. nonscience (n=469) teachers (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	.7218	1	.3955	
Age	5.0627	3	.1673	
Race	.7265	1	.3940	
Education	1.3621	2	.5061	
E.E. Workshops	16.5597	1	.0000	*
Grade Level	45.7118	2	.0000	*
Science Teaching	-------	-	-----	
Urban/Rural	3.3945	2	.1832	
Hunting	7.5668	1	.0059	*
Angling	1.7105	1	.1909	
Birdwatching	9.8932	1	.0017	*
Club Membership	11.6563	1	.0006	*
Pet Ownership	5.1140	1	.0237	

Table 4.16. A comparison of select characteristics for primary science (n=108) and secondary science (n=32) teachers (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	31.4975	1	.0000	*
Age	2.9444	3	.4003	
Race	.1138	1	.7358	
Education	5.4740	2	.0648	
E.E. Workshops	.0151	1	.9021	*
Grade Level	-------	-	-----	
Science Teaching	-------	-	-----	
Urban/Rural	.2110	2	.8999	
Hunting	8.6255	1	.0033	*
Angling	5.2309	1	.0222	*
Birdwatching	10.4456	1	.0012	*
Club Membership	19.2485	1	.0000	*
Pet Ownership	.6275	1	.4283	

naturalism, science/nonscience differences persisted in a comparison of all female respondents (Table 4.17 ; Figure 4.8).

Secondary science teachers held significantly higher naturalistic, ecologistic, scientistic, and dominionistic scores than primary science teachers. Primary science teachers were found to hold a significantly higher humanistic and negativistic scores (Table 4.18 ; Figure 4.9).

Several differences among science teachers and between science and nonscience teachers are explained by controlling for teacher sex. However, female science teachers were still more ecologistic, scientistic, and utilitarian than female nonscience teachers, and female secondary science teachers were still more ecologistic and scientistic than primary science teachers.

Grade Level: Early primary teachers (1st - 3rd) (n=126) were nearly all female (92 %) and a large percentage were involved in science teaching. They also had comparatively low rates of hunting (7.1 %) and angling (36.5 %)(Appendix 7.18)

Fourth through sixth grade teachers (n=108) were even more likely to teach science and more teachers at this level had attended environmental education workshops. They were also more likely to own pets (78.7 %) than other teachers (Appendix 7.19).

Relatively few secondary teachers (n=196) taught science or attended environmental education workshops. Secondary

Table 4.17. Analysis of variance of science(n=196) and nonscience(n=470) teachers for 8 attitude domains.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
Science	5.48	3.26	1	17.4907	.0000 *
Nonscience	4.37	3.06			
Ecologistic					
Science	5.39	3.17	1	39.0417	.0000 *
Nonscience	3.91	2.59			
Humanistic					
Science	4.47	2.74	1	1.6170	.2040
Nonscience	4.17	2.74			
Moralistic					
Science	7.44	5.04	1	.8087	.3688
Nonscience	7.04	5.29			
Scientistic					
Science	1.99	1.73	1	49.6324	.0000 *
Nonscience	1.07	1.43			
Utilitarian					
Science	1.87	2.19	1	9.7025	.0019 *
Nonscience	2.60	2.95			
Dominionistic					
Science	1.45	1.68	1	.7103	.3997
Nonscience	1.59	1.93			
Negativistic					
Science	2.48	2.05	1	23.4248	.0000 *
Nonscience	3.47	2.52			

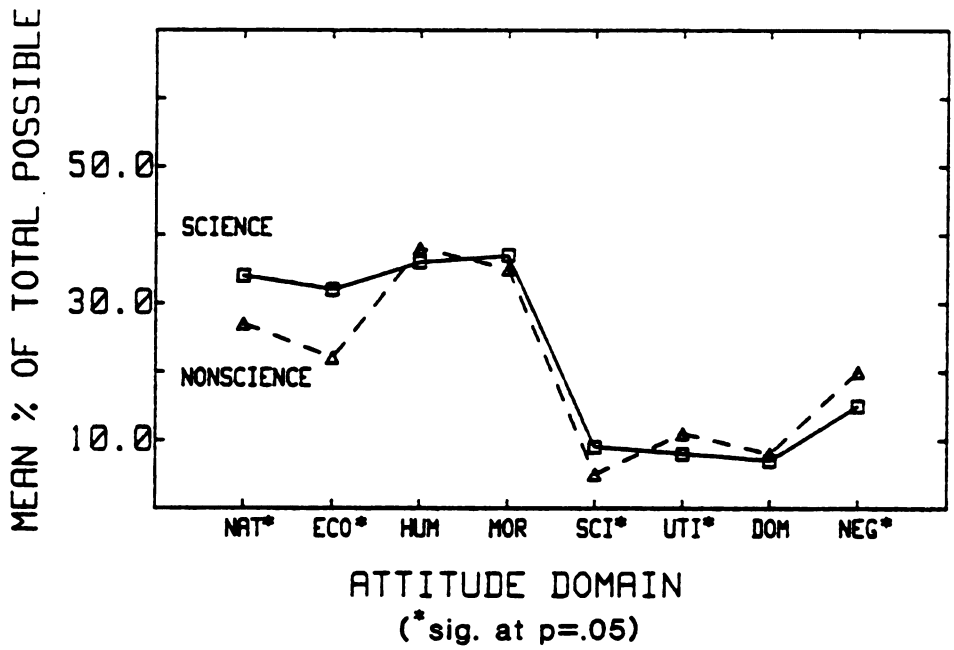

Figure 4.8. Mean attitude scores for science and nonscience teachers.

Table 4.18. Analysis of variance on primary(n=108) and secondary(n=32) science teachers for 8 attitude domains.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
Primary Sci.	4.53	2.75	2	28.7295	.0000 *
Secondary Sci.	7.59	3.15			
Ecologistic					
Primary Sci.	4.56	2.75	2	36.5874	.0000 *
Secondary Sci.	8.00	3.08			
Humanistic					
Primary Sci.	4.73	2.61	2	5.4456	.0211 *
Secondary Sci.	3.53	2.36			
Moralistic					
Primary Sci.	7.52	4.87	2	2.2591	.1351
Secondary Sci.	6.06	4.61			
Scientistic					
Primary Sci.	1.64	1.54	2	24.7885	.0000 *
Secondary Sci.	3.25	1.75			
Utilitarian					
Primary Sci.	1.97	2.25	2	.5090	.4768
Secondary Sci.	1.66	1.99			
Dominionistic					
Primary Sci.	1.28	1.53	2	5.0817	.0258 *
Secondary Sci.	2.00	1.80			
Negativistic					
Primary Sci.	2.81	2.03	2	11.8662	.0008 *
Secondary Sci.	1.50	1.34			

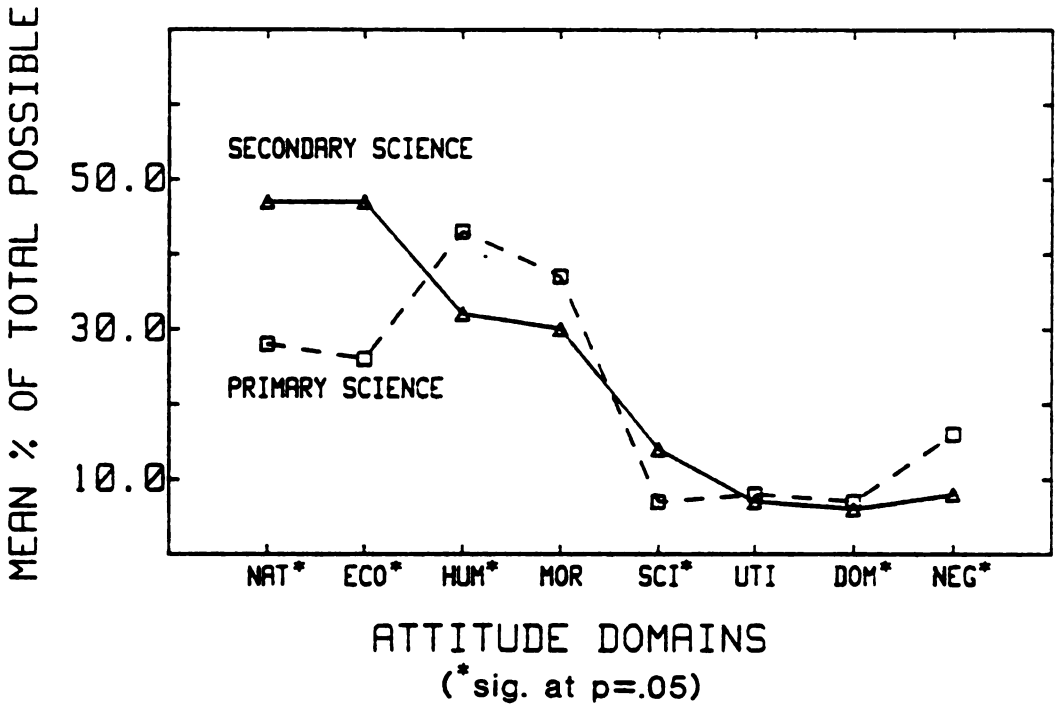

Figure 4.9. Mean attitude scores for primary and secondary science teachers.

teachers were predominantly male (60.1 %) and more likely than primary teachers to hold an advanced degree. They also exhibited a slightly higher rate of hunting (16.2 %) and angling (56.9%)(Appendix 7.20), but this may simply be attributed to their smaller sample size (Table 4.19).

Among 1st - 3rd, 4th - 6th and 9th - 12th teachers, 4th -6th grade teachers had the highest naturalistic and ecologistic scores. Ninth through twelfth grade teachers also held significantly higher dominionistic scores than 1st - 3rd grade teachers (Table 4.20 ; Figure 4.10).

Again, differences in ecologistic and dominionistic attitude scores were eliminated when teacher sex was controlled, indicating the importance of the male/female ratio in determining the profile of teacher subgroups.

Urban/Rural Background: Teachers were classified as having grown up in rural (below 5000 people), suburban (10,000 - 100,000 people), or urban (100,000 people or more) environments.

Teachers raised in a rural community (n=164) were also likely to live and teach in a rural area. The group contained more males (48.7 %) than other areas and a higher rate of hunting (23.3 %)(Appendix 7.21).

Teachers who grew up in a town of 10,000 to 100,000 (n=202) were also likely to live and teach in such a community. More of these teachers were conservation club members than teachers from urban or rural areas (Appendix 7.22).

Table 4.19. A comparison of select characteristics for 1st-3rd (n=126), 4th-6th (n=108) and 9th-12th (n=196) grade teachers (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	94.0959	2	.0000	*
Age	4.4025	6	.6224	
Race	4.4478	2	.1082	
Education	12.2977	4	.0153	
E.E. Workshops	13.0469	2	.0015	*
Grade Level	------	-	-----	
Science Teaching	45.7118	2	.0000	*
Urban/Rural	4.6436	4	.3259	
Hunting	5.9003	2	.0523	
Angling	12.7468	2	.0017	*
Birdwatching	.1373	2	.9336	
Club Membership	.7108	2	.7009	
Pet Ownership	7.4720	2	.0238	

Table 4.20. Analysis of variance of 1st-3rd(n=126), 4th-6th(n=108), and 9th-12th(n=197)grade teachers for 8 attitude domains.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
1st-3rd	3.94	2.55	2	7.3393	.0007 *
4th-6th	5.47	3.17			
9th-12th	4.80	3.34			
Ecologistic					
1st-3rd	3.94	2.44	2	3.7957	.0232 *
4th-6th	4.95	2.75			
9th-12th	4.44	3.02			
Humanistic					
1st-3rd	4.39	2.79	2	2.5655	.0781
4th-6th	4.72	2.64			
9th-12th	4.01	2.63			
Moralistic					
1st-3rd	7.27	4.67	2	2.1788	.1144
4th-6th	7.85	5.41			
9th-12th	6.59	5.32			
Scientistic					
1st-3rd	1.40	1.62	2	3.0352	.0491
4th-6th	1.64	1.51			
9th-12th	1.18	1.59			
Utilitarian					
1st-3rd	2.44	2.96	2	1.1567	.3155
4th-6th	1.89	2.37			
9th-12th	2.20	2.70			
Dominionistic					
1st-3rd	1.21	1.55	2	4.5330	.0113 *
4th-6th	1.33	1.45			
9th-12th	1.80	2.17			
Negativistic					
1st-3rd	3.40	2.34	2	3.0664	.0476 *
3rd-6th	2.69	2.08			
9th-12th	3.28	2.56			

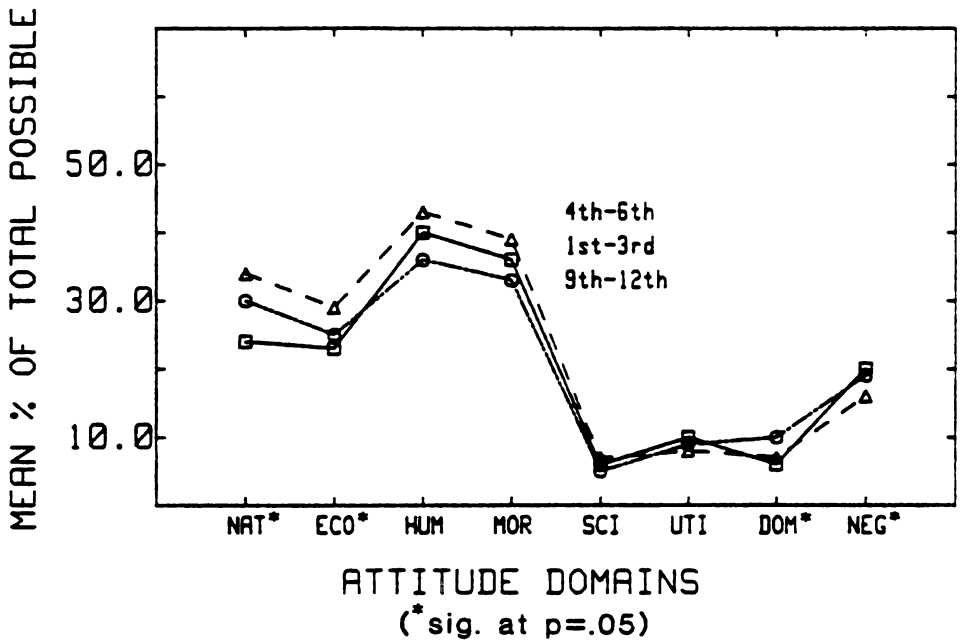

Figure 4.10. Mean attitude scores for 1st-3rd, 4th-6th, and 9th-12th grade teachers.

Teachers who grew up in areas of 100,000 persons or more (n=212) also tended to live and work in urban areas. Urban teachers were less likely to be science teachers and slightly less likely than other groups to hunt (10.2 %), fish(38.2 %), or own pets (64.7 %) Black teachers were almost exclusively from urban areas (Table 4.21 ; Appendix 7.23).

Teachers of rural background were more naturalistic than those of urban background. They were also less moralistic, more utilitarian, and more dominionistic than other teachers.

Teachers raised in suburban communities had significantly higher ecologistic and humanistic scores than those from larger cities.

Urban raised teachers held lower naturalistic and ecologistic scores than other teachers (Table 4.22 ; Figure 4.11).

When only teachers of region 3 (southern lower Michigan) were compared, naturalistic, humanistic, and dominionistic differences were no longer seen. This may be due to small, largely male samples in northern Michigan. When these small males groups are not in the comparison, differences associated with sex ratio do not appear. It seems most likely that urban/rural background is best associated with differences in ecologistic, moralistic, and utilitarian attitudes.

Region: Respondents from Michigan's upper peninsula (n=24) were all white and predominantly male (57.1 %). They were more likely to have grown up, lived, and taught in small

Table 4.21. A comparison of select characteristics for urban (n=212), suburban (n=202) and rural (n=164) teachers (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	5.2964	2	.0708	
Age	8.0905	6	.2315	
Race	14.7698	2	.0006	*
Education	5.4953	4	.2401	
E.E. Workshops	1.1678	2	.5577	
Grade Level	4.6436	4	.3259	
Science Teaching	3.3945	2	.1832	
Urban/Rural	------	-	-----	
Hunting	19.1623	2	.0001	*
Angling	11.7525	2	.0028	
Birdwatching	.9021	2	.6369	
Club Membership	4.2820	2	.1175	
Pet Ownership	6.5914	2	.0370	*

Table 4.22. Analysis of variance for 8 attitude domains on teachers who grew up in populations below 5000(n=164), 10,000-100,000(n=202), or above 100,000(n=212) people.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
Below 5000	4.96	3.43	2	4.0769	.0175 *
10-100,000	4.84	3.14			
100,000 +	4.14	2.77			
Ecologistic					
Below 5000	4.23	2.82	2	4.2234	.0151 *
10-100,000	4.66	2.88			
100,000 +	3.88	2.57			
Humanistic					
Below 5000	4.02	2.39	2	3.2961	.0377 *
10-100,000	4.67	2.95			
100,000 +	4.09	2.83			
Moralistic					
Below 5000	6.01	4.86	2	5.2735	.0054 *
10-100,000	7.58	5.32			
100,000 +	7.56	5.35			
Scientistic					
Below 5000	1.26	1.70	2	.6909	.5015
10-100,000	1.45	1.52			
100,000 +	1.32	1.58			
Utilitarian					
Below 5000	2.74	2.74	2	4.2787	.0143 *
10-100,000	2.00	2.65			
100,000	2.64	2.72			
Dominionistic					
Below 5000	1.88	2.15	2	3.2521	.0394 *
10-100,000	1.39	1.84			
100,000	1.50	1.71			
Negativistic					
Below 5000	2.96	2.15	2	2.1177	.1212
10-100,000	3.10	2.45			
100,000 +	3.46	2.61			

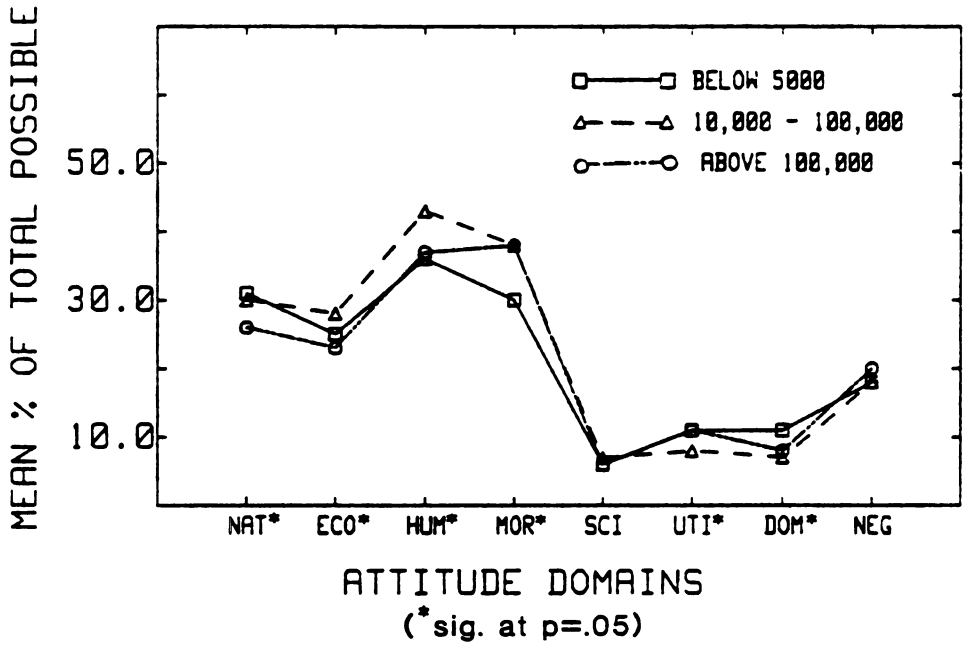

Figure 4.11. Mean attitude scores for teachers who grew up in a community below 5000, 10,000-100,000, or above 100,000 people.

communities, and less likely to hold an advanced degree, or teach science than teachers from the lower peninsula. Upper peninsula residents also had comparatively high animal activity rates, though their small sample size (n= 28) makes interpretation difficult (Appendix 7.24).

Similiarly, teachers from the upper half of the lower peninsula (n=31) were all white, strongly associated with small communities, largely male and relatively young (mean age = 36.8 years). They were less likely than more southern teachers to hold advanced degrees, but more likely than teachers of other state regions to participate in animal related activities, or environmental education workshops (Appendix 7.25).

Most (90 %) teachers were from southern Michigan (n=574) and so their statistics are nearly identical to those of the all teacher group (Table 4.23 ; Appendix 7.26).

Residents of the upper half of Michigan's lower peninsula were more naturalistic, ecologistic, and dominionistic than teachers of southern Michigan. Regional differences (except negativistic differences) persisted when only teachers from small communities were compared. However, it should be noted that small samples from both northern regions may not have allowed detection of all true differences (Table 4.24 ; Figure 4.12).

Environmental Education Workshops

Teachers who had attended at least 1 environmental education workshop (n=313) were more likely to work at the

Table 4.23. A comparison of select characteristics for teachers from Michigan's upper peninsula (n=24), northern lower peninsula (n=31) and southern lower peninsula (n=574) (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	4.3600	2	.1130	
Age	9.9940	6	.1249	
Race	4.8053	2	.0905	
Education	32.9150	4	.0000	*
E.E. Workshops	5.6502	2	.0593	
Grade Level	2.9642	4	.5638	
Science Teaching	6.0299	2	.0490	*
Urban/Rural	13.5253	4	.0090	*
Hunting	32.1568	2	.0000	*
Angling	9.0323	2	.0109	*
Birdwatching	5.2143	2	.0737	
Club Membership	14.6785	2	.0006	*
Pet Ownership	10.0959	2	.0064	*

Table 4.24. Analysis of variance for 8 attitude domains for Teachers who grew up in Michigan's upper penninsula(n=24),northern lower penninsula(n=31) or southern lower penninsula(n=574).

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
U.P.	5.17	2.79	2	8.1617	.0003 *
N.L.P.	6.93	3.55			
S.L.P.	4.12	3.14			
Ecologistic					
U.P.	4.54	2.72	2	7.9467	.0000 *
N.L.P.	6.29	2.99			
S.L.P.	4.24	2.80			
Humanistic					
U.P.	4.38	2.63	2	.3184	.7274
N.L.P.	3.90	2.94			
S.L.P.	4.30	2.77			
Moralistic					
U.P.	6.42	4.69	2	1.5608	.2108
N.L.P.	5.74	4.70			
S.L.P.	7.30	5.31			
Scientistic					
U.P.	1.13	1.29	2	1.2580	.2849
N.L.P.	1.74	1.71			
S.L.P.	1.33	1.58			
Utilitarian					
U.P	2.42	1.74	2	1.4198	.2426
N.L.P.	1.55	1.88			
S.L.P.	2.38	2.76			
Dominionistic					
U.P	1.79	2.30	2	4.8177	.0084 *
N.L.P.	2.52	3.00			
S.L.P.	1.49	1.73			
Negativistic					
U.P.	2.29	1.90	2	3.2148	.0408 *
N.L.P.	2.52	1.93			
S.L.P.	3.28	2.48			

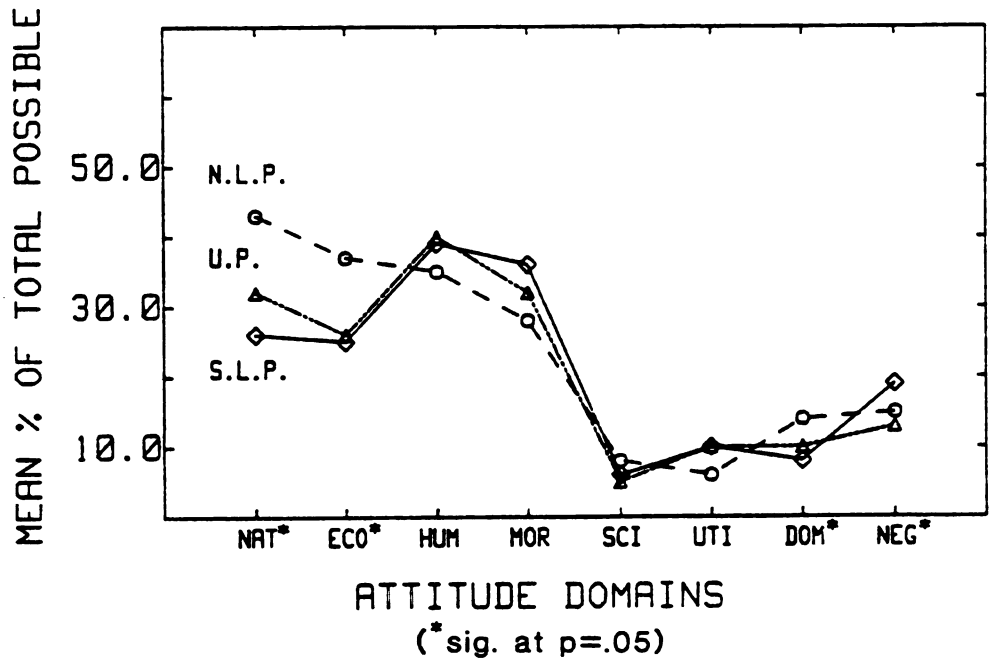

Figure 4.12. Mean attitude scores for teachers in Michigan's upper peninsula, northern lower peninsula, and southern lower peninsula.

primary level, teach science, and participate in animal related activities than teachers without such workshop attendance (n=349)(Tables 4.25 ; Appendix 7.28, 7.29).

Teachers who had attended at least 1 environmental education workshop were significantly more naturalistic, ecologistic, and scientistic than teachers who had not attended such a workshop(Table 4.26 ; Figure 4.13).

Animal Related Activity Groups

Five groups of participants in animal related activities were analyzed,including: hunters (n=88), anglers (n=322), pet owners (n=463), birdwatchers (n=303), and clubmembers (n=182). Antihunters (n=135) and nonhunters (n=336) were also analyzed for comparison with hunters. These 7 groups were not mutually exclusive.

Anti-hunters, Nonhunters, and Hunters: Teachers who disapproved of all 4 types of hunting suggested in the survey (hunting for sport, meat, recreation, or trophy) were classified as anti-hunters. Anti-hunting teachers were largely female (74 %) and held a slightly higher level of education than hunters and nonhunters. They were comparatively more urban than hunters and a higher portion were black. Anti-hunters showed a lower participation rate in angling (27 %) than other activity groups or teachers as a whole (Appendix 7.30).

Teachers who approved of at least 1 type of hunting but had not hunted in the last 2 years were classified as nonhunters. Nonhunting teachers were similar to the teacher

Table 4.25. A comparison of select characteristics for teachers with (n=317) vs. without (n=349) an environmental education workshop experience (p = .05)

Variable	Chi Sq.	D.f.	Sig.	
Sex	.4190	1	.5174	
Age	5.2052	3	.1574	
Race	.0520	1	.8196	
Education	4.2146	2	.1216	
E.E. Workshops	------	-	-----	
Grade Level	13.0469	2	.0015	*
Science Teaching	16.5597	1	.0000	*
Urban/Rural	1.1678	2	.5577	
Hunting	3.8938	1	.0485	*
Angling	8.0252	1	.0046	*
Birdwatching	15.3738	1	.0001	*
Club Membership	13.6400	1	.0002	*
Pet Ownership	6.4576	1	.0111	

Table 4.26. Analysis of variance on 8 attitude domains of teachers with vs. without an environmental education workshop experience.

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
Workshop	5.12	3.29	1	11.5323	.0007 *
No Workshop	4.30	2.99			
Ecologistic					
Workshop	4.76	2.94	1	12.9147	.0004 *
No Workshop	3.97	2.72			
Humanistic					
Workshop	4.22	2.84	1	0.1179	.7314
No Workshop	4.29	2.71			
Moralistic					
Workshop	7.16	5.33	1	.0001	.9930
No Workshop	7.16	5.12			
Scientistic					
Workshop	1.65	1.65	1	24.8891	.0000 *
No Workshop	1.05	1.46			
Utilitarian					
Workshop	2.40	2.69	1	.0172	.8958
No Workshop	2.37	2.83			
Dominionistic					
Workshop	1.71	1.87	1	5.1695	.0233 *
No Workshop	1.39	1.82			
Negativistic					
Workshop	3.04	2.57	1	1.9793	.1599
No Workshop	3.30	2.30			

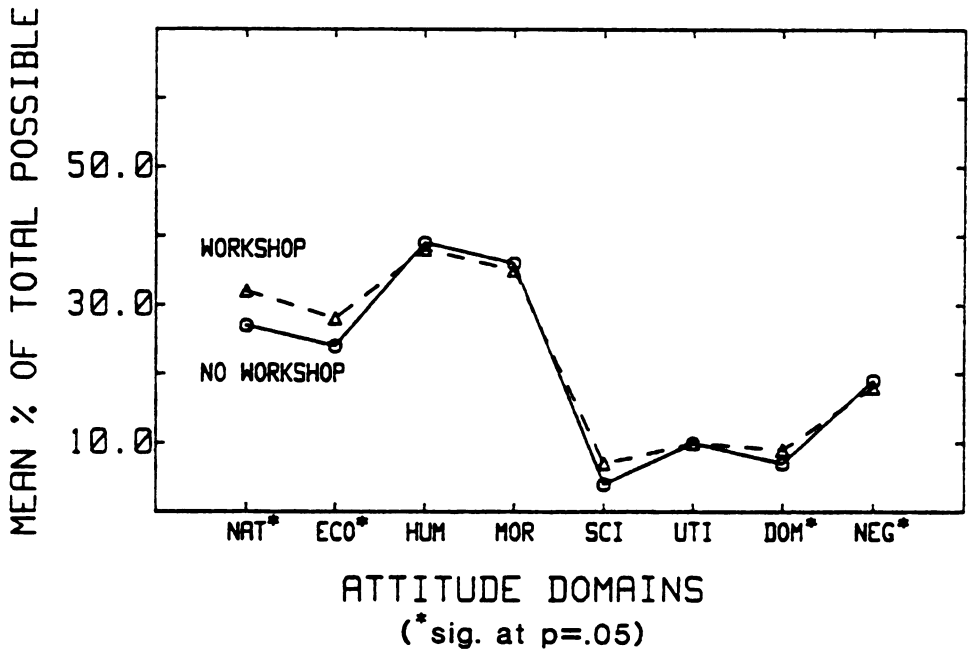

Figure 4.13. Mean attitude scores for teachers who have, or have not attended an environmental education workshop.

sample as a whole (Appendix 7.31).

Teachers which indicated they had hunted in the last 2 years were classified as hunters. Most hunters were male (73.5 %), and nearly all were also anglers (94.1 %). Many hunters were also pet owners (76 %) and clubmembers (54 %). They were more rural and less likely to hold an advanced degree than other teachers,and had the highest environmental education workshop attendance of any group (Table 4.27 ; Appendix 7.32).

Significant differences existed among hunting, nonhunting, and anti-hunting teachers in all domains. Hunters were more naturalistic, ecologistic, and dominionistic than nonhunting or anti-hunting teachers.

Anti-hunting teachers were characterized by their high moralistic and negativistic, combined with low ecologistic scores.

Nonhunters were significantly different from hunters in most domains. They were less distinguishable from anti-hunters, differing significantly in only the moralistic and dominionistic domains (Table 4.28 ; Figure 4.14).

Anglers Many teachers who had fished in the last 2 years were also hunters (26.6 %) and birdwatchers (51.5 %). About a third (34.9 %) also belonged to conservation clubs and 55.7 % were male (Table 4.29 ; Appendix 7.5).

Birdwatchers Birdwatchers showed a strong rate of club membership (41.2 %), but only an average rate of hunting (16.3 %) (Appendix 7.6).

Table 4.27. A comparison of select characteristics for hunters (n=88), nonhunters (n=336), and anti-hunters (n=135) (p = .05).

Variable	Chi Sq.	D.f.	Sig.	
Sex	47.0920	2	.0000	*
Age	5.5539	6	.4750	
Race	13.6293	2	.0011	*
Education	10.5677	4	.0319	*
E.E. Workshops	4.0854	2	.1297	
Grade Level	6.7431	4	.1501	
Science Teaching	8.6206	2	.0134	*
Urban/Rural	34.4371	4	.0000	*
Hunting	-------	-	------	
Angling	97.7134	2	.0000	*
Birdwatching	4.6594	2	.0973	
Club Membership	45.3163	2	.0000	*
Pet Ownership	3.9635	2	.1378	

Table 4.28. Analysis of variance on hunting (n=88), nonhunting (n=336), and anti-hunting(n=1350) teachers for 8 attitude domains

Subgroup	Mean	Std. dev.	D.f	F	Sig.
Naturalistic					
Anti-hunters	4.61	3.09	2	36.5293	.0000 *
Nonhunters	4.15	2.88			
Hunters	7.24	3.43			
Ecologistic					
Anti-hunters	3.79	2.56	2	25.1787	.0000 *
Nonhunters	4.15	2.55			
Hunters	6.23	3.36			
Humanistic					
Anti-hunters	4.46	2.92	2	3.5897	.0282 *
Nonhunters	4.36	2.72			
Hunters	3.55	2.51			
Moralistic					
Anti-hunters	12.56	4.59	2	159.7114	.0000 *
Nonhunters	5.57	4.06			
Hunters	3.92	4.27			
Scientistic					
Anti-hunters	1.38	1.60	2	4.9020	.0078 *
Nonhunters	1.17	1.44			
Hunters	1.74	1.87			
Utilitarian					
Anti-hunters	1.98	2.35	2	2.3906	.0085 *
Nonhunters	2.58	2.91			
Hunters	2.36	2.44			
Dominionistic					
Anti-hunters	.68	.92	2	92.2320	.0000 *
Nonhunters	1.52	1.57			
Hunters	3.76	2.70			
Negativistic					
Anti-hunters	3.44	2.69	2	5.5955	.0039 *
Nonhunters	3.16	2.27			
Hunters	2.40	1.93			

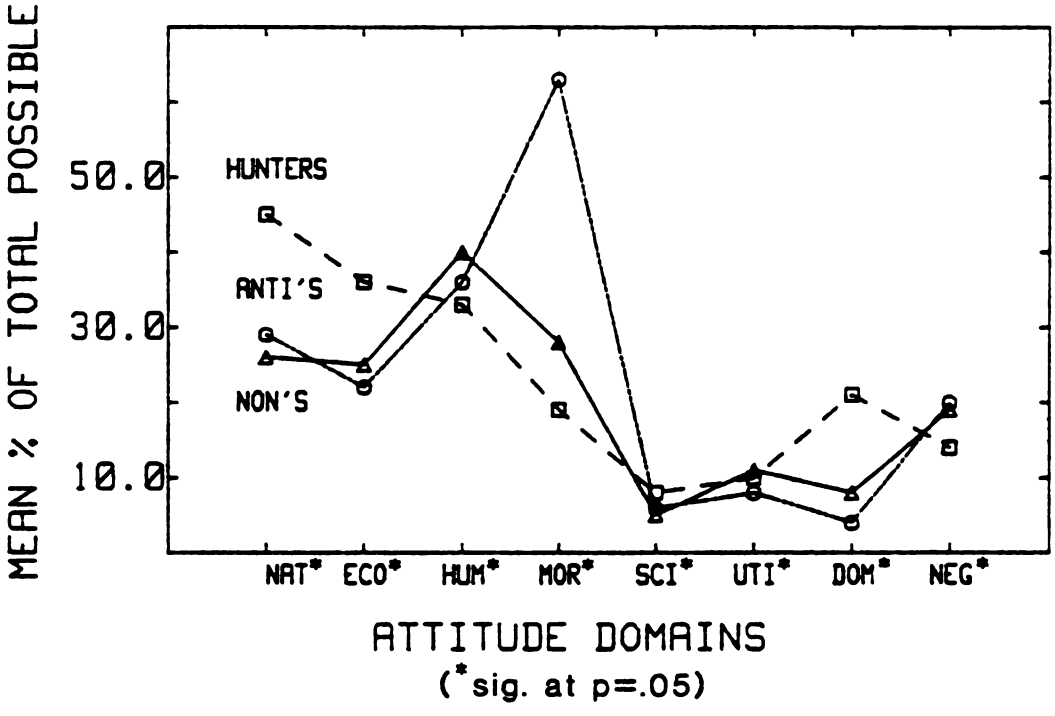

Figure 4.14. Mean attitude scores for hunting, nonhunting, and anti-hunting teachers.

Table 4.29. A comparison of animal related activity rates for 5 activity groups and 2 nonactive groups

Group	n	Activity(%) hunt	fish	bird watch	club member	own pets
Anti-hunters	135	0	27.0	42.9	23.7	62.9
Nonhunters	336	0	50.5	42.4	21.1	69.2
Hunters	88	100	94.1	53.9	53.9	76.1
Anglers	332	26.6	100	51.5	34.9	75.3
Birdwatchers	303	16.3	55.2	100	41.2	76.0
Club Members	182	26.8	61.5	67.8	100	82.9
Pet Owners	463	14.5	53.6	49.7	32.4	100

Club members Teachers who had belonged to a conservation club in the last 2 years were more likely than hunting or angling teachers to birdwatch (67.8 %), or own a pet (82.9 %). Clubmembers also had relatively strong rates of hunting (26.8 %) and angling (61.5 %).

Mean Attitude Scale Scores For Select Teacher Subgroups

The attitude scale scores of specific teacher subgroups are presented below. The extreme scores for each domain are presented and compared with the general public (Kellert and Berry 1980) and BLM biologists (Peyton 1984)

The Naturalistic Domain: The teachers with the highest naturalistic scores were those involved in animal related activities (hunting, conservation club membership, birdwatching, and fishing). The teachers with the lowest naturalistic scores were females, nonhunters, those of urban background, and blacks.

All teachers had naturalistic scores higher than the general public, but lower than BLM biologists (Figure 4.15).

The Ecologistic Domain: The ecologistic subgroup scores were similiar to the naturalistic subgroup scores. Hunters, science teachers, and birdwatchers held the highest ecologistic scores. Females, 1st - 3rd grade teachers, anti-hunters and blacks held the lowest ecologistic attitudes.

Again, all teachers held higher scores than the general public, but considerably lower than BLM biologists (Figure

NATURALISTIC DOMAIN

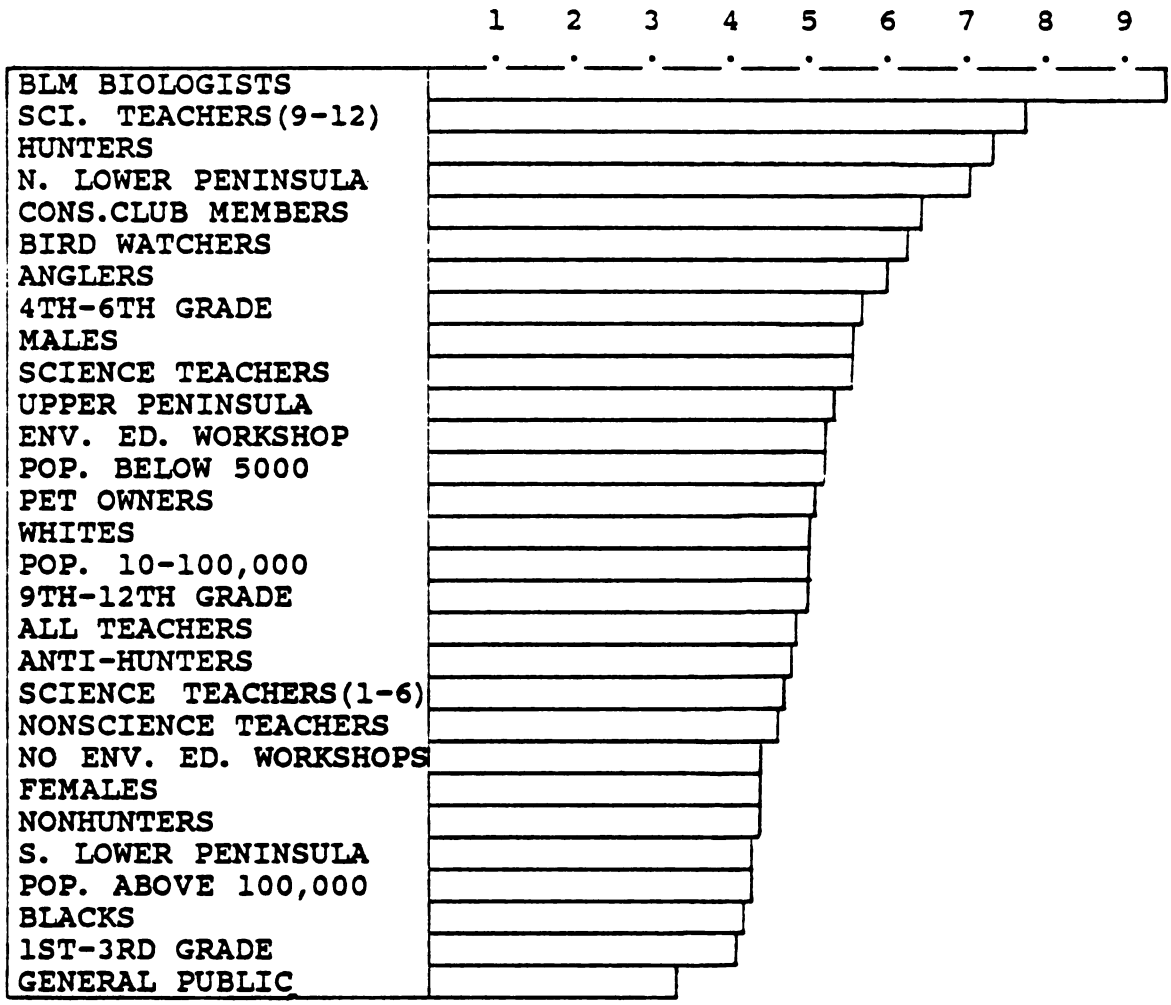

Figure 4.15. Mean naturalistic scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980a).

4.16).

The Humanistic Domain: Pet owners, females, and 4th - 6th grade teachers had the highest humanistic scores. Closely following were birdwatchers, anti-hunters, those with a B.S. degree, and those who grew up in towns of 10,000 to 100,000. The lowest humanistic scores were held by hunters, males, and blacks.

All teachers held slightly higher humanistic scores than BLM biologists, but as a whole teachers were not significantly different from the general public (Figure 4.17).

The Moralistic Domain: Anti-hunting teachers obtained an extremely high moralistic score, separating them widely from other teacher subgroups. Birdwatchers, females, and conservation club members also received high moralistic scores. Anglers, those of rural background, and males held the lowest moralistic scores.

The general public and BLM biologists both held moralistic scores lower than any teacher subgroup (Figure 4.18).

The Scientistic Domain: Scale scores indicated that scientistic interest in animals was weakly present or completely absent in most teachers. Nearly half (46 %) the sample scored 0 on the scientistic scale. All teacher subgroups held relatively low scientistic attitudes, though all were slightly higher than the general public. Science

ECOLOGISTIC DOMAIN

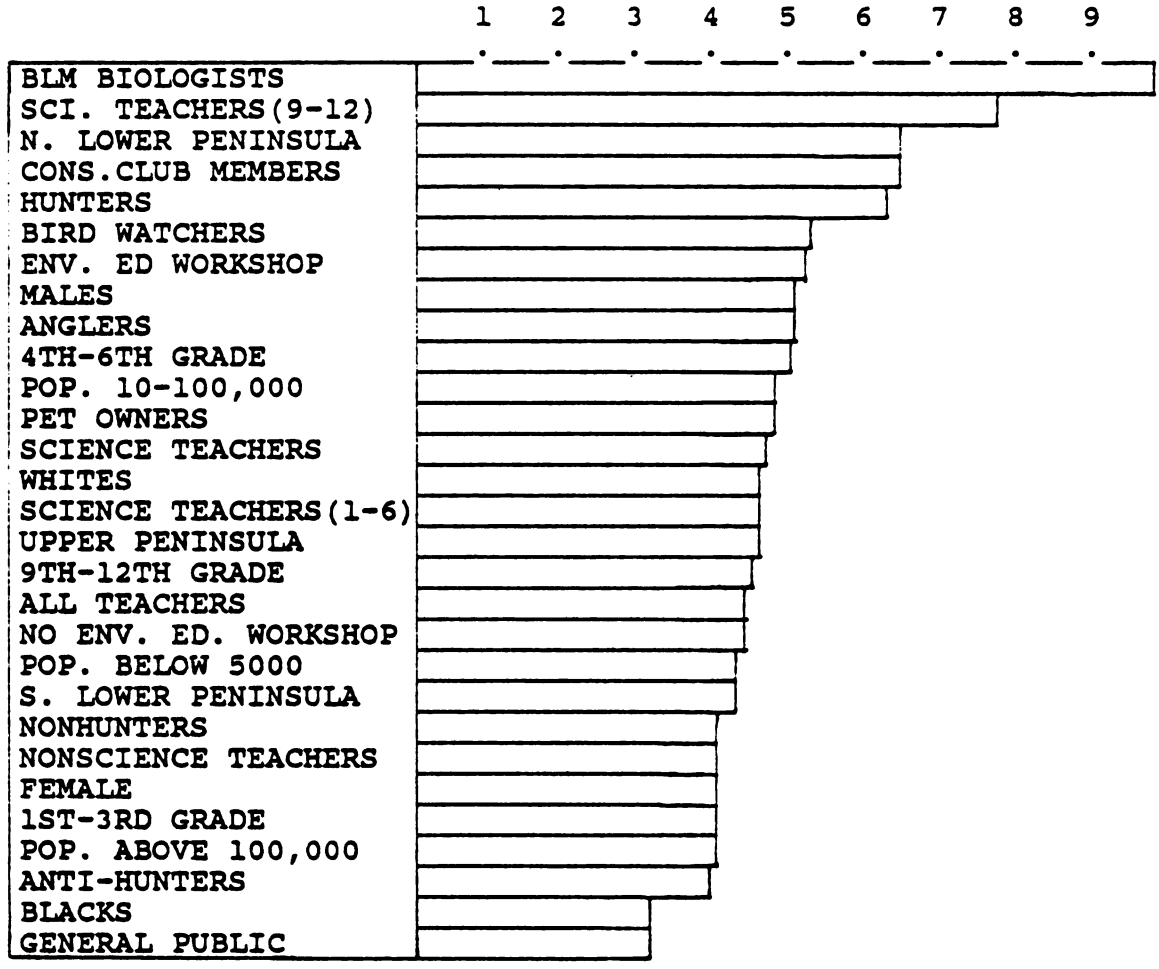

Figure 4.16. Mean ecologistic scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980a).

HUMANISTIC DOMAIN

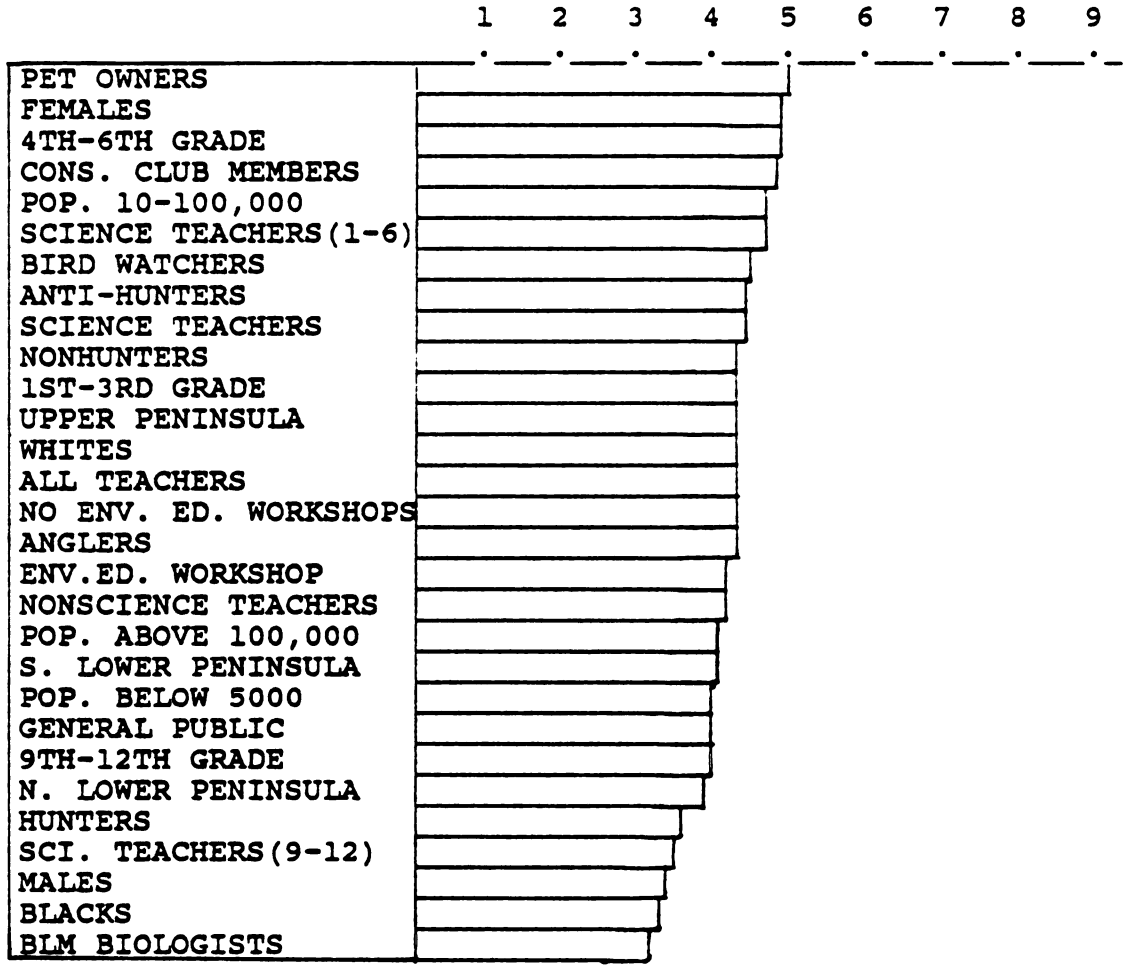

Figure 4.17. Mean humanistic scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980a).

MORALISTIC DOMAIN

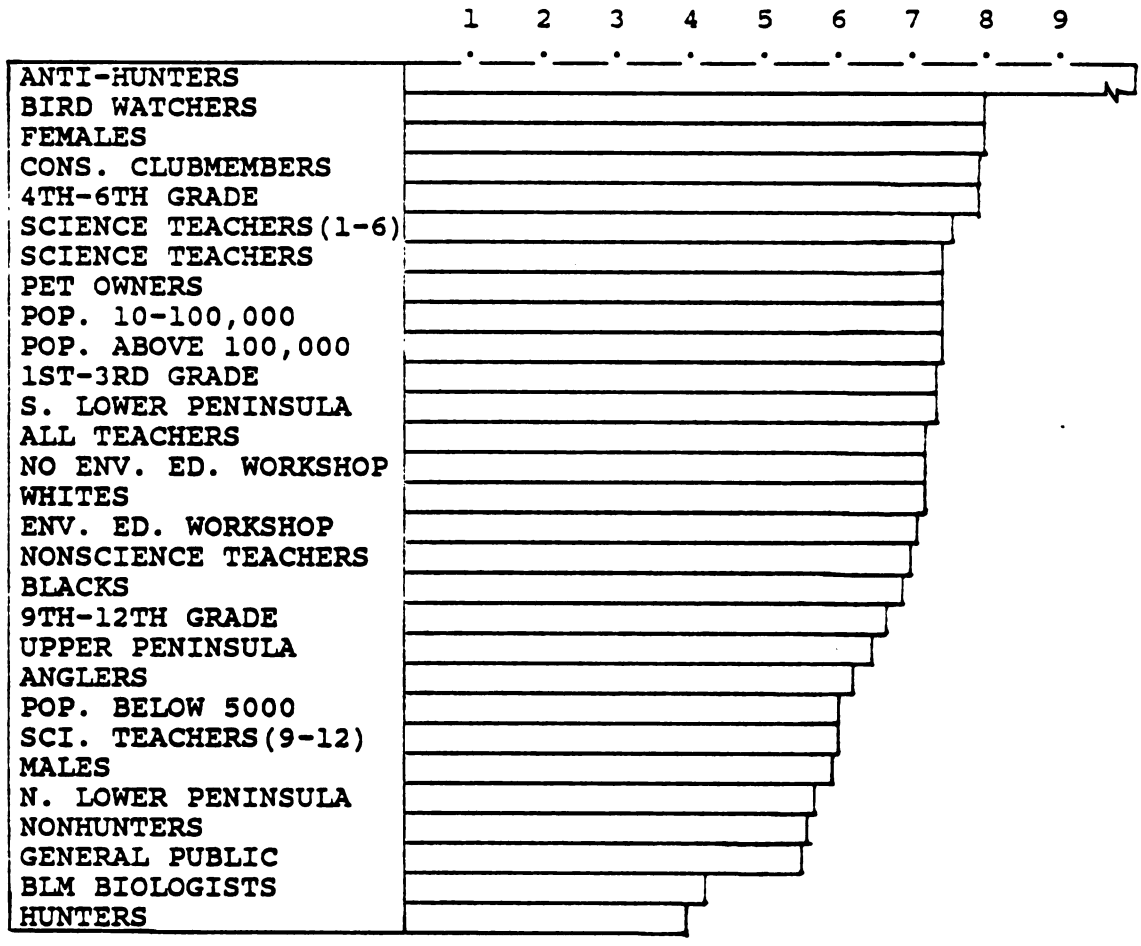

Figure 4.18. Mean moralistic scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980a).

teachers had the highest scientistic score; nonscience teachers held the lowest. All groups held lower scores than BLM biologists (Figure 4.19).

The Utilitarian Domain: Blacks, those of rural or urban background, and males had the highest utilitarian scores, while anti-hunters, birdwatchers and conservation club members held the lowest utilitarian scores. Overall, scores were uniformly low and all subgroups scored lower than the general public and higher than BLM biologists (Figure 4.20).

The Dominionistic Domain: Most teachers also held lower dominionistic scores than the general public. The exceptions to this were hunters and males. Females, primary teachers, and anti-hunters had the lowest dominionistic scores (Figure 4.21).

The Negativistic Domain: Most teacher subgroups held lower negativistic scores than the general public. Black teachers were significantly more negativistic than other groups, and females, anti-hunters, and urban teachers also held high negativistic scores. Birdwatchers, science teachers, hunters and clubmembers held the lowest negativistic scores (Figure 4.22).

A Conceptual Framework for Estimating the Frequency and Composition of Distinct Attitude Profiles in the Teacher Population

In order to better approximate and describe the types of profiles in the teacher population, teachers were categorized

SCIENTISTIC DOMAIN

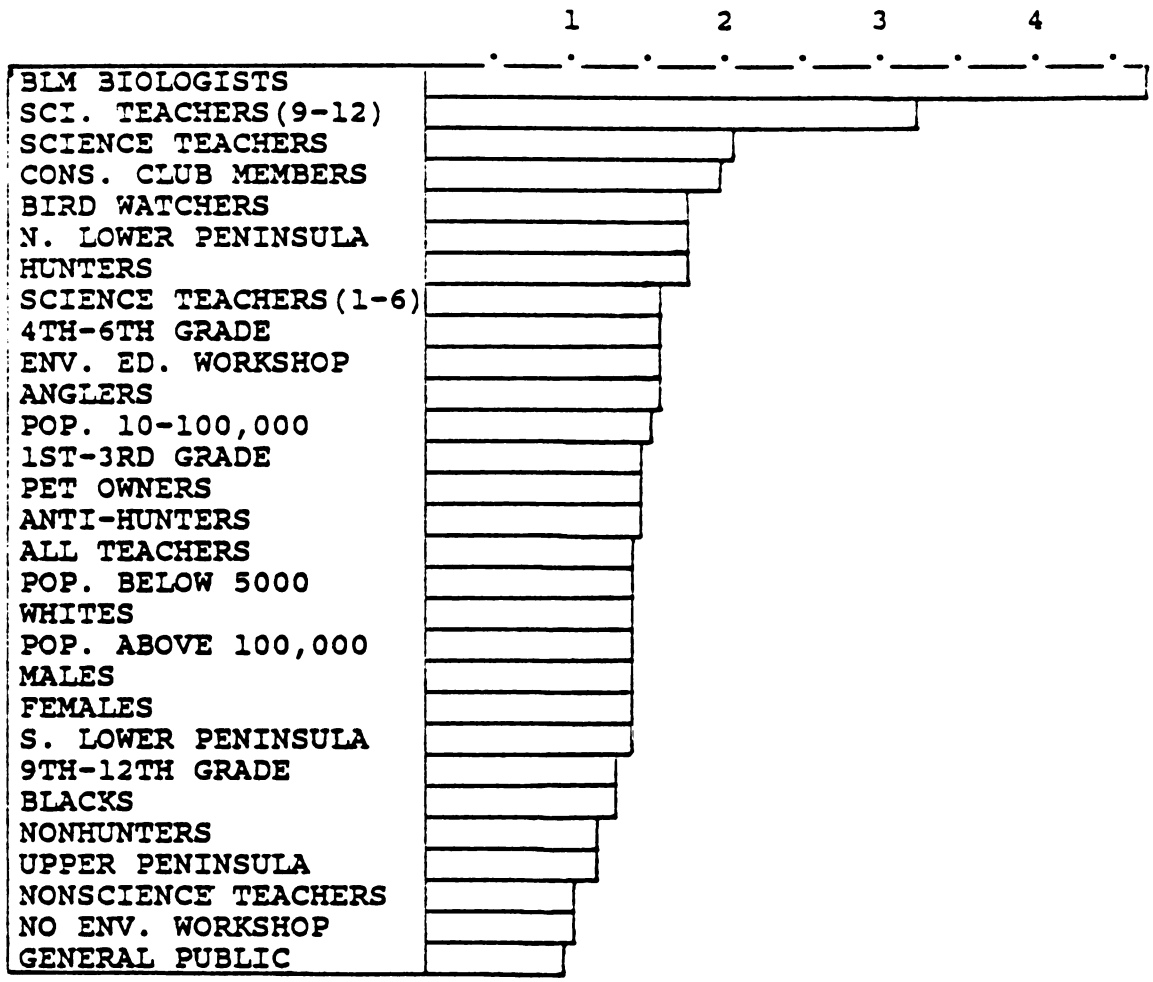

Figure 4.19. Mean scientistic scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980a).

UTILITARIAN DOMAIN

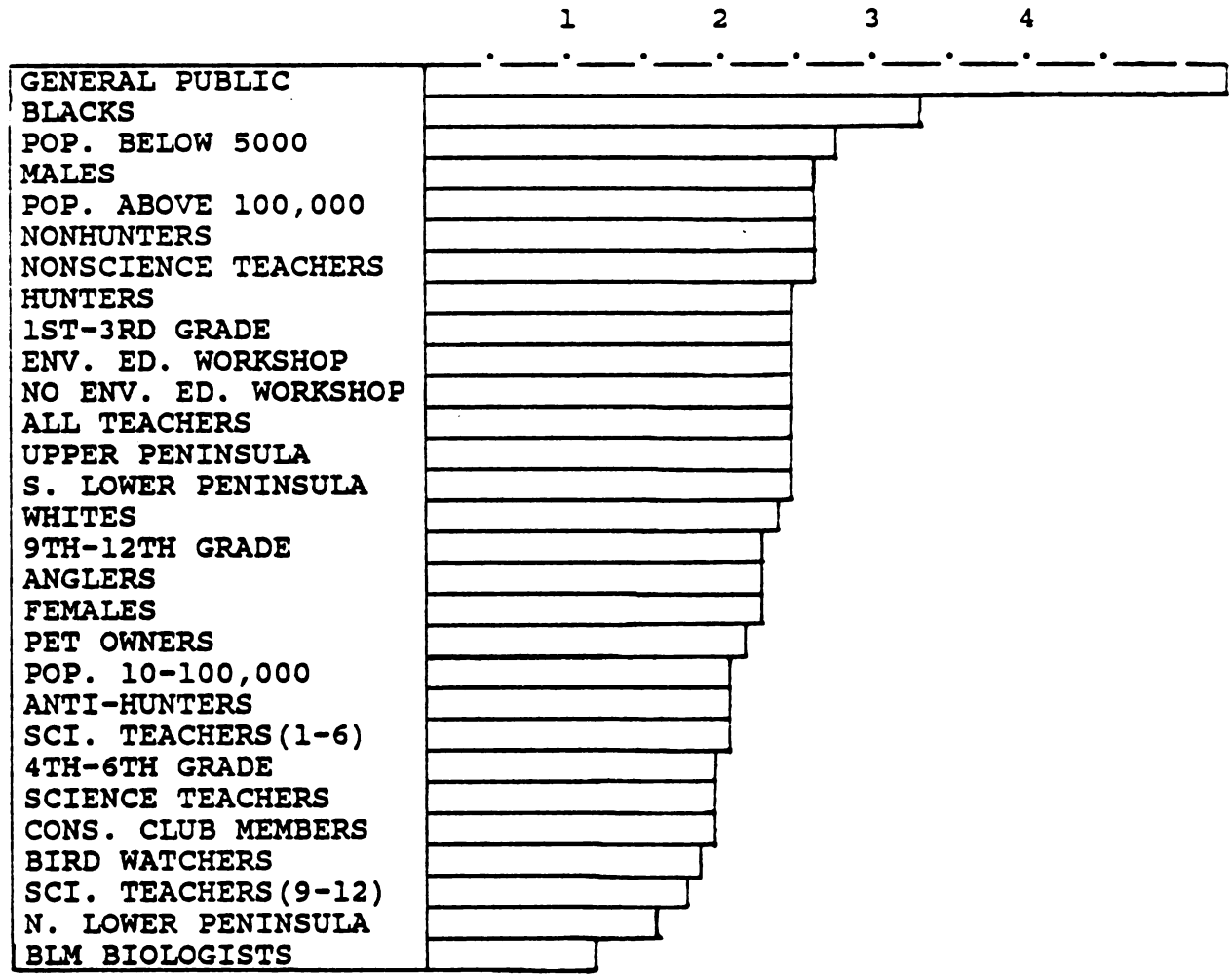

Figure 4.20. Mean utilitarian scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980a).

DOMINIONISTIC DOMAIN

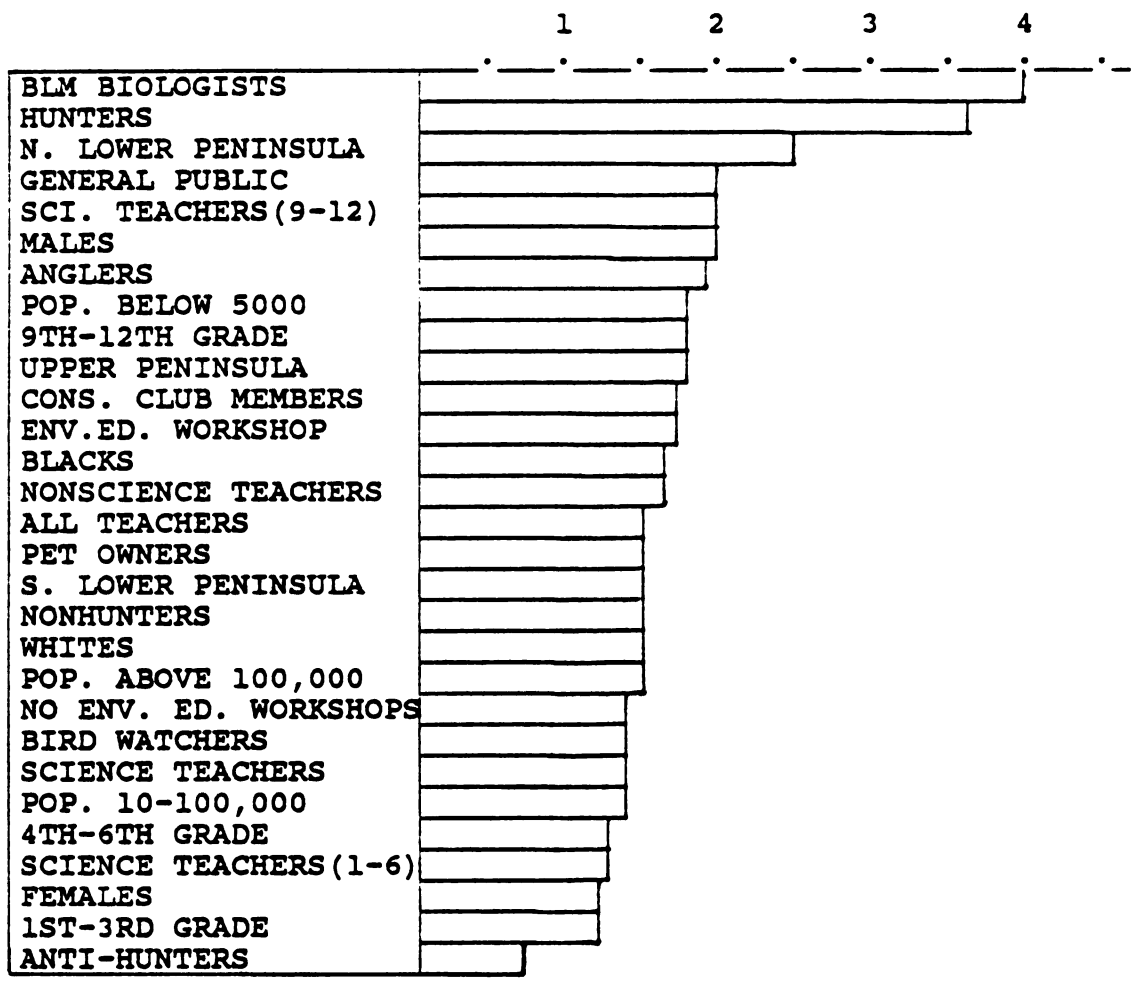

Figure 4.21. Mean dominionistic scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980).

NEGATIVISTIC DOMAIN

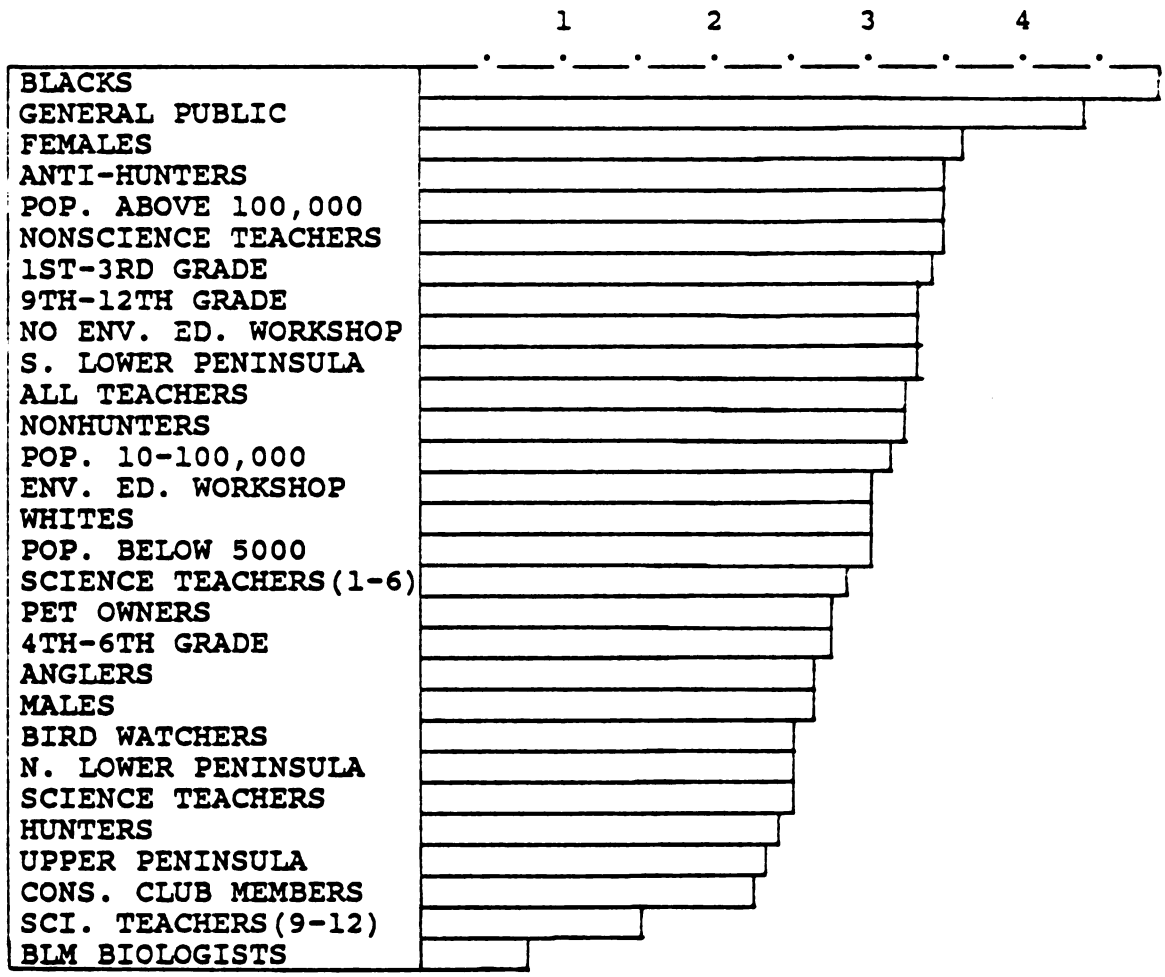

Figure 4.22. Mean negativistic scores for all respondents, teacher subgroups, BLM biologists(Peyton 1985), and the general public (Kellert 1980).

according to the strengths and weaknesses of the four most frequent attitudes in the population. According to the strength of the overall mean, and the presence of the attitude across individual respondents, the most frequent attitudes are the naturalistic, ecologistic, humanistic, and moralistic.

Respondents were grouped using the mean scale scores of all teachers (n=666). Those at or below the mean were assigned a neutral sign (-) for that scale, while those above the mean were assigned a positive value (+). For example, using this classification about 9 % of the population was above the mean on all four scales (++++), and might be labelled as having a "uniformly strong primary profile".

The first four attitudes in the profile were chosen because of their frequency and distribution in the population. Their lower frequency and uniformity of scoring made the scientistic and dominionistic scales more difficult to analyze with this method and they were not used. Further, the scientistic domain has fewer implications for wildlife managers, though it may be an important domain by some other criterion. The utilitarian scale was not employed because of an error in the survey which altered the tabulation of the utilitarian score. Further, some reservation about the validity of the utilitarian scale has been expressed earlier (Peyton 1985).

The use of these four attitudes does not imply that other attitudes are less important or that profiles developed around the strengths and weaknesses of other scales would not

be useful. They were selected simply because of the nature of the data, the researcher's interest in naturalistic and ecologistic attitudes, and because it was possible to simply categorize most teachers in the population based on these four attitudes. They serve to illustrate the utility of this type of analysis.

The following are brief descriptions of the characteristics of 13 distinct attitude profiles in the population (summarized in table 4.30). Ninety percent of all respondents fall into one of these profiles, which range in size from 2 % to 16 % of the population.

Uniformly Low Primary Profile(- - - -): The most frequenty occurring profile (n=113 , or 17 % of all respondents) was made up by teachers at or below the mean on all four primary attitudes. They held higher than average dominionistic and negativistic scores. The group closely resembled respondents generally in sex ratio, education, grade level, teaching discipline, workshop attendance, and urban/rural background. However, fewer taught science, hunted (8 %), fished (32 %), birdwatched (25 %), owned pets (47 %) or belonged to conservation clubs (4 %). Eleven percent of the members were black. Twenty-five percent of all black respondents were found here.

This profile represents a large part of the population who seem relatively uninterested in and detached from animals. Their scores were lower than the general public on 6 scales (naturalistic through utilitarian), and higher than

Table 4.30. A general description and frequency estimate of 13 profile types in the teacher population.

Primary Profile N E H M *	n	% of Pop.	General Group Characteristics
- - - -	113	16.9	LOW PRIMARY PROFILE (high neg.) 58 % female. This mean group resembles the all teacher group in sex ratio, race, education, grade level, and urban/rural background. But, fewer teach science and they are less likely to participate in animal related activities.
+ + + +	58	8.7	HIGH PRIMARY PROFILE (low neg.) 64 % female. High rates of fishing, birdwatching, club membership and pet ownership. 1 in 10 hunt. More than the average number teach science. (Active Females)
+ + - -	49	7.4	HIGH NATURALISM-ECOLOGISM (high dom.) 86 % male. Typically a highly involved male, likely to hunt, fish, birdwatch, and belong to cons. clubs. More likely than the average teacher to attend env. ed. workshops and teach science, but less likely to have an advanced degree or come from an urban background. (Dominionistic Hunters)
- - + +	43	6.5	HIGH HUMANISM-MORALISM (low dom.) 81 % female. Most own pets, but are unlikely to attend workshops or participate in other animal related activities. Fewer than average are science teachers. None hunt. Typically they are suburban nonscience teachers. (Uninvolved Females - Antihunters)
+ - - -	52	7.8	HIGH NATURALISM (high uti,dom,neg) 75 % female. Typically a nonscience teacher who does not hunt or belong to cons. clubs, but does own a pet. Isn't highly involved, but secondary attitudes indicate approval of these activities by others. (Humanistic nonhunters)

Table 4.30 (cont.)

Primary Profile N E H M *	n	% of Pop.	General Group Characteristics
- + - -	35	5.2	HIGH ECOLOGISM (High uti,dom,neg) 60 % male. High rate of hunting and fishing; other activity rates low.
- - + -	64	9.6	HIGH HUMANISM (high uti, dom, neg) 75 % female. Typically a nonscience teacher. Most own pets, but other activity rates are low. (Low Interest Nonhunters)
- - - +	42	6.3	HIGH MORALISM (low dom., high neg.) 74 % female. Typically an urban nonscience teacher with low activity rates. 1 in 5 are black teachers. (Moralistic Anti-hunters)
- + + +	15	2.2	LOW NATURALISM (low uti., dom.) 80 % female. None hunt and only 1 in 4 fish, but all own pets, and more than half birdwatch and belong to cons. clubs. Most are young and urban, with only a B.S. degree. (Nonconsumptive Activists)
+ - + +	32	4.8	LOW ECOLOGISM (low uti., dom.) 78 % female. Most are urban, own pets, and teach primary grades. Fewer than 1 in 10 hunt or belong to cons. clubs.
+ + - +	29	4.4	LOW HUMANISM (low uti., dom., neg.) 52 % female. More active than the average teacher in hunting, fishing, birding, workshop attendance, and cons. club membership, but about average in pet ownership. (Ecologistic Hunters)
+ + + -	29	4.4	LOW MORALISM(low uti., dom.) 55 % female. The typical member has high participation rates in hunting, fishing, birding, club membership and workshop attendance. All own pets and a higher number than average are science teachers. (Naturalistic Hunters)

Table 4.30 (cont.)

Primary Profile N E H M *	n	% of Pop.	General Group Characteristics
- + - +	12	1.8	HIGH ECOLOGISM - MORALISM (high sci, low dom) 50 % female. Typically white, young, with at least a master's degree. Few have a rural background. Low animal related activity rates and workshop attendance. None hunt. (Ecologistic Anti-hunters, Nonhunters)

* The attitudes comprising the primary profile are the naturalistic, ecologistic, humanistic, and moralistic. They are symbolized by the letters N, E, H, and M respectively.

\+ Indicates that individuals in the group scored above the sample mean on this attitude scale

\- Indicates that individuals in the group scored at or below the sample mean on this attitude scale

the general public in the negativistic scale. As a group, blacks, nonscience teachers and teachers age 57 to 67 also held this type of profile.

Uniformly High Primary Profile (+ + + +): Approximately 9 % (n=58) of the respondents were above the mean on naturalistic, ecologistic, humanistic and moralistic scales. They held higher scientistic, and lower dominionistic and negativistic scores than the average teacher or the general public. Thirty-eight percent taught science. Fewer than average hunted (10 %), but they held high rates of fishing (60 %), birdwatching (79 %), clubmembership (50 %), and pet ownership (95 %). They include a strong female component (64 %). Birdwatchers, science teachers, 4th-6th grade teachers, and suburban raised teachers also held this type of mean profile ,and all were more than half female.

High Naturalistic - Ecologistic (+ + - -): About 7 % of the respondents held high naturalistic and ecologistic scores combined with mean or lower humanistic and moralistic attitudes. Teachers of this profile also held higher scientistic and dominionistic scores than the average teacher or the general public. They held the highest hunting (47 %) and fishing (76 %) rates of any profile type, and were also more likely than the average teacher to birdwatch (67 %), belong to conservation clubs (61 %), and attend environmental education workshops. In comparison to the mean group , fewer had an urban background or held advanced degrees. Other

groups who held mean profiles of this type included: hunters, males, secondary teachers, secondary science teachers, and teachers from the northern lower peninsula. All these groups are more than 50 % male.

High Humanistic - Moralistic (- - + +): Approximately 6 % (n=43) of the respondents held low naturalistic and ecologistic scores combined with high humanistic and moralistic scores. Members held low dominionistic and a high negativistic means. Most members were female (81 %) and all were non or anti-hunters. Relatively few taught biology (5 %) or environmental education (5 %), and few attended environmental education workshops. Nearly half (48 %) lived and taught in a suburban population (10,000 - 100,000). They had low fishing (28 %), club membership (21 %), and birdwatching (40 %) rates, but a high pet ownership rate. The groups whose mean scores fell in this profile were all predominantly female, and included: 1st-3rd grade teachers, females, and anti-hunters.

High Naturalistic (+ - - -): Nearly 8 % (n=52) of the respondents had high naturalistic attitudes, but mean or lower ecologistic, humanistic and moralistic attitudes. These teachers also had high dominionistic scores. Many were male (58 %), hunted (25 %), and fished (73 %). But, fewer than average were pet owners (60 %) or biology teachers (10 %). The only group found to have this type of mean profile were teachers raised in towns of less than 5000 people.

High Ecologistic (- + - -): Five percent (n=35) of the respondents held high ecologistic scores but average or lower scores on the other primary attitudes. Their mean utilitarian and dominionistic scores were also high. Sixty percent were male, 77 % had master's degrees, and 35 % were biology teachers. They had above average rates of hunting (20 %) and fishing (57 %), but other activity rates were below average. They were less likely than the average teacher to live or work in an urban community.

High Humanistic (- - + -): Nearly 10 % (n=64) of the respondents had profiles whose only high primary attitude was humanism. Most (75 %) were female nonscience teachers. Members also held above average utilitarian, dominionistic, and negativistic scores. Few attended environmental education workshops, hunted (5 %), birdwatched (25 %), or belonged to conservation clubs (11 %). However, 89 % were pet owners. Their profile would indicate that while they don't become very involved with animals, except as pets, they probably don't strongly oppose use of animals for sport, food, or other products.

High Moralistic (- - - +): Similiarly, taachers whose only strong primary attitude was moralism also tended to be female (74 %). About 6 % (n=42) of all respondents held this type of profile, which was accompanied by low dominionistic and very high negativistic scores. None of them hunted and all were opposed to some kind of hunting. They were less likely than the average teacher to be anglers (14 %),

birdwatchers (29 %) or club members (43 %), and less than half owned pets. About half were of urban background, and few taught science or attended environmental education workshops. Nineteen percent were black. As a group, teachers who grew up in urban populations (above 100,000) exhibited this type of profile.

Low Naturalistic (- + + +): Only 2 % (n=15) of the respondents had a low naturalistic score while other primary scales were above average. Most were young ($\bar{X}$=36), urban females (80 %). They did not hunt and few fished (27 %), but they did have high participation rates in other activites, especially pet ownership (100 %). Teachers age 24 - 34 and primary science teachers held this mean profile.

Low Ecologistic (+ - + +): Approximately 5 % (n=32) of the respondents held high primary attitudes except on the ecologistic scale. Members of this profile held utilitarian and dominionistic scores below the mean. Most members were female (78 %) and of suburban or urban background. Few hunted (6 %) or belonged to conservation clubs (9 %), but most owned pets (84 %). They were likely to teach primary grades and 31 % taught biology, but their environmental education workshop attendance was below average.

Low Humanistic (+ + - +): Aproximately 8 % (n=52) of the respondents held low humanistic scores with otherwise high primary attitudes. These teachers also held low utilitarian, dominionistic and negativistic means. Their sex

ratio was about evenly spilt between males and females. The group held above average animal activity rates, except as pet owners (67 %). Their workshop attendance was above average and 27 % taught biology.

Low Moralistic (+ + + -): Twenty-nine teachers (4 %) held low moralistic combined with high naturalistic, ecologistic and humanistic scores. About half were female (55 %). The group held more science teachers than average. They exhibited high participation rates in environmental education workshops as well as the other forms of animal related activity covered by the survey. Their low utilitarian and dominionistic scores, along with high naturalistic and ecologistic scores suggest hunters with this profile might be "naturalistic hunters" (Kellert and Berry 1980b). They seem to feel strongly about animal suffering (humanistic), but don't seem to see hunting as morally wrong based on that suffering.

High Ecologistic - Moralistic (- + - +): The smallest group selected contained only 12 (2 % of all) respondents. These teachers might be labelled "ecologistic anti-hunters". They were equally likely to be male or female, and most (83 %) had a master's degree or higher. They had low rates of fishing (33 %), birdwatching (17 %), club membership (8 %), pet ownership (42 %), and workshop attendance. None hunted. As a group they were white, young ($\bar{X}$=34) and suburban or urban. Their primary profile was combined with high scientistic, and low dominionistic and negativistic scores.

They appear to have a rather detached, if scientifically informed view towards animals.

Summary of Important Findings

* 13 % of all respondents hunted. 20 % were anti-hunters.

* The most frequent teacher attitudes were the naturalistic, ecologistic, humanistic, and moralistic.

* The typical male teacher profile was highly naturalistic, ecologistic, and dominionistic. The typical female teacher profile was highly humanistic, moralistic, and negativistic. These patterns were strong and consistent throughout the study.

* The typical black teacher held low ecologistic and humanistic, and high dominionistic and negativistic scores. Most were urban and uninvolved in animal related activities.

* Whether science or nonscience instructors, most primary teachers were female (77%). Most secondary teachers were male (78 %).

* An urban background was associated with low naturalistic and ecologistic attitudes. Teachers with a rural background had high naturalistic, utilitarian, and dominionistic, and lower moralistic attitudes than urban raised teachers. The highest ecologistic scores were seen in teachers who had grown up in a population of 10,000-100,000.

* Hunters differed from non or anti-hunters in most attitude domains. Hunters were highly naturalistic, ecologistic, and dominionistic. Anti-hunters were strongly moralistic and negativistic, but weak in the ecologistic attitude. Most hunters were male (74 %), while most anti-hunters were female (74 %).

* Hunting, fishing, birdwatching, conservation club membership, env. ed. workshop attendance, and special training in env. ed. were associated with high naturalistic and ecologistic scores.

* Most groups with high naturalistic and ecologistic scores, combined with low humanistic and moralistic scores were predominantly male.

* Highly humanistic and moralistic groups were predominantly female. Anti-hunters were significantly more moralistic than any other group.

* Despite higher mean education, teachers were no more humanistic than the general public.

* All teachers held relatively low utilitarian scores in comparison to the general public, but blacks and males were the most utilitarian subgroups.

* Males and hunters held dominionistic scores higher than other teacher subgroups or the general public.

* Black teachers held negativistic scores significantly higher than any other group. Females and anti-hunting teachers also held high negativistic scores.

* The mean teacher profile closely resembled the profile of those with a college education in Kellert and Berry's national survey (1980a).

* Teachers with special environmental education training had higher naturalistic, ecologistic, and scientistic about the same humanistic and dominionistic, and lower negativistic attitudes than the general public.

* Biology and environmental education teachers also had high naturalistic, ecologistic, scientistic, and low utilitarian and negativistic scores.

Chapter 5

DISCUSSION

Finding 1:

The similiarity between respondents and a partial sample (22 %) of nonrespondents suggests that nonrespondent bias was low, and statements about the entire sample can be made with some confidence. However, judging by the types of animals they most prefer, nonrespondents may be less naturalistic and ecologistic, and more humanistic and moralistic than respondents. It also seems likely that nonrespondents were less interested in the survey and animals in general. To the degree that nonrespondents were less interested in animals, their exclusion could have biased the results toward higher animal related activity rates, higher naturalistic and ecologistic, and lower humanistic, moralistic, and negativistic attitudes.

Finding 2:

The results found here were quite consistent with those reported by Kellert et al. (1978b, 1980a, 1980b) concerning the relationship between attitudes and animal related activities, and between attitudes and demographic characteristics. These consistencies support Kellert's instrument as a valid and reliable tool for measuring attitudes towards animals.

Activities: The review of literature suggested that Michigan teachers might have low participation rates in

animal related activities, especially hunting. A study by Hooper (1983) indicated that teachers in California were largely uninvolved in or opposed hunting. However, this may simply reflect the generally low level of hunting in California (7 % according to the U.S. Dept. Int. 1982). Michigan teacher respondents were found to have a slightly higher rate of hunting (13 %) than midwesterners in general (10 % ; USDI 1982). Only 20 % of the respondents opposed all types of sport hunting, compared with 37 % of the public in the midwest region (Kellert and Berry 1980b).

Some of the strongest attitudinal differences in the study occurred between hunters, nonhunters, and anti-hunters. Both sets of data indicate that of the variables analyzed, a person's status in this activity may be the best single predictor of his or her attitudes and behaviors toward animal related issues in general. Further, the present analysis of individual profiles support Kellert's (1980b) description of hunter and anti-hunter types. Specifically, the attitude profiles presented here suggest that the highly utilitarian and dominionistically oriented hunters are much more common than naturalistic hunters. And, as Kellert would suggest, most anti-hunting teachers appear to oppose hunting on moralistic grounds. Very few appear to oppose hunting based on strong ecological concerns.

For managers, this information strengthens the contention that resolving conflicts between hunters and anti-hunters demands more than an information campaign designed to alter existing knowledge. Judging by their attitude profile,

people either hunt or oppose hunting in part because of fundamentally different attitudes, values, and beliefs. The attitude research we have at present indicates that the most important areas of conflict involve disparate feelings on the utilization of animals, animal rights, and man's control of animals. The implication for wildlife managers is that lasting conflict resolution between hunters and anti-hunters can only occur if campaigns to alter existing beliefs (information campaigns) are combined with efforts to increase each faction's tolerance of conflicting value priorities. Values education and cooperative citizen involvement programs are two of the techniques that might be employed to achieve this end.

Findings suggest that Michigan teachers may be reflecting the national increases in nonconsumptive wildlife activities, especially birdwatching, suggested by the 1980 national survey of hunting and fishing (U.S. Fish and Wildlife Service 1982). Their attitude profiles are consistent with the high naturalistic and ecologistic scores which Kellert and Berry's (1980) data predict for groups with high animal related activity rates.

Teachers who fished, birdwatched, or belonged to conservation organizations all had high naturalistic and ecologistic attitudes. Their naturalistic and ecologistic scores suggest that contact with wildlife, whether consumptive or nonconsumptive, is associated with strong concern, interest, and affection for animals and their

natural environment. To the degree that increased levels of naturalistic and ecologistic attitudes encourage better wildlife stewardship, incorporating direct contact with wildlife may be an important way to improve wildlife education experiences.

Demographics: The present data were consistent with the attitudinal tendencies Kellert and Berry (1980) suggested for males and females. Male/female differences were the strongest and most consistent found in the study. Any teacher subgroup with high naturalistic and dominionistic attitudes was likely to include more than 50 % males. Groups with high humanistic, moralistic, and negativistic scores were likely to include more females. Sex, like hunting status, appeared to be a very reliable indicator of a respondent's attitude profile.

Blacks were found to participate in few animal related activities, and hold low ecologistic and high negativistic attitudes. These characteristic differences are noted elsewhere in the literature (Kellert and Berry 1980; Nilon 1985) and should represent an important concern to wildlife managers and environmental educators.

The data also supported Kellert and Berry's (1980) findings relating to urban/rural background. In both studies respondents of rural background were more naturalistic and less negativistic than respondents of urban background. High ecologistic and low utilitarian scores were found when respondents were associated with suburban residence

(population 10,000-100,000).

Kellert contends that the rural resident's closer link with the land may explain these attitudinal differences. The rural resident is part of a community that directly earns its living from the land and animals. Deep humanistic and moralistic concern would have to be reduced to accommodate the strong utilitarian nature of individual livelihoods and the local economy. Familiarity with animals in agricultural or natural settings would also serve to reduce negative feelings.

The urban resident , on the other hand, probably has little contact with the land or animals, and his or her lower utilitarianism and increased moralism may reflect this. The urbanites' high negativism may be based only on experience with captive, domestic, or pest animals.

Finally, the suburban resident experiences a mixture of influences. He/she has access to more open space and at least semi-natural land, but does not earn a living directly from utilization of that land. Kellert and Berry (1980) suggest that the relationship may allow the higher ecologistic and lower utilitarian scores of suburban respondents.

Age and education were associated with significant attitude profile differences in the general public, but similiar changes were not seen between various age and education groups in Michigan teachers. However, since teachers represent a highly educated group, and occupy a narrower range of ages than the general public, there is

little reason to expect variance in attitudes to be explained by age or education variables. Moreover,the high overall naturalistic and ecologistic scores of teachers in Michigan are predicted well by education, and to a lesser degree, by age.

Kellert noted that ,"region emerged as an extremely sensitive differentiator of public perceptions and understanding of animals", and that these strong differences "suggested the value of designing management programs in ways consistent with the particular views and needs of diverse sections of the country" (Kellert and Berry 1980a, pg. 89).

The differences were not as dramatic when teachers from 3 regions of Michigan were compared. Residents from the 2 northern regions (northern lower, and upper peninsula) of Michigan were more naturalistic, ecologistic, and dominionistic than teachers from the southern region. However, regional differences may have occurred because small northern samples were more than half male, and contained highly active members. When only male respondents were compared between regions, dominionistic differences dissappeared.

In summary, Kellert's findings on age, education, sex ratio, income, residence, race, and animal related activity rates were largely supported by similiar analysis of Michigan teachers. Further, the data again suggest that of the factors examined to date, participation in (or opposition to) hunting, level of education , and sex seem to be the most

consistent and important predictors of attitudes towards animals.

Finding 3:

The data suggest that Michigan teachers are a unique group with an overall attitude profile significantly different from the one identified for the general public by Kellert and Berry (1980a). Their profile does, however, bare a strong resemblance to the highly educated respondents in Kellert's study.

Kellert's highly educated respondents held high naturalistic, ecologistic, humanistic, and moralistic attitudes, combined with low utilitarian, dominionistic and negativistic attitudes. In similiar fashion, Michigan teacher's strongest attitudes were naturalistic, ecologistic, humanistic, and moralistic. Their scientistic score was also significantly higher than the mean score of the general public. Teachers and the general public were significantly different in all but the humanistic attitude. Kellert reported that education accounted for no significant differences on the humanistic scale. The consistency among humanistic scores would support Kellert and Berry's contention that "increasing education largely effects interest, affection [i.e., naturalism] and knowledge of wildlife, but has minimal impact on emotional [humanistic] attachment" (Kellert and Berry 1980, pg. 75).

Their similarity in racial composition and sex ratio make it unlikely that the attitudinal differences between

teachers and the general public were related to these variables (both groups were approximately 58 % female, 89 % white, and 8 % black). However, their uniform income, education, and age strongly differentiated teachers from the general public. Their overall profile was very similar to young and college educated respondents in Kellert and Berry's national study, and their low utilitarian scores were comparable to those respondents with a similar annual income.

Education is arguably the primary factor influencing teachers' strong feelings toward the environment as a system and their interest for wildlife and the outdoors. Yet, other plausible explanations for this profile can be made based on methodological errors or extraneous variables.

One possibility is that respondents' answers were influenced by their knowledge of the survey's sponsor. Michigan State's Dept. of Fisheries and Wildlife was clearly identified as the sponsor, as were its intentions to use the information gathered to improve teacher effectiveness. Their desire to provide responses which the sponsors would find favorable, may have induced respondents to show an artificially high interest in animals and animal related activities.

A second possibility is that in the 7 years that have passed since Kellert and Berry's national survey in 1978, Americans as a society have changed their basic perceptions toward animals, and teachers are reflecting that change.

Finding 4:

It is proposed here that in order to give students opportunities to objectively consider all value dimensions of wildlife issues, teachers would be more effective if they themselves recognized the broad range of values represented by Kellert's attitude domains. Such a broad perspective would also enhance a teacher's ability to objectively consider and discuss value conflicts in wildlife management situations. If teachers were found to have strongly skewed profiles or profiles weak in all domains, there would certainly be reason for concern.

But when viewed as a group, the profile of attitudes exhibited by the sample is encouraging. Concern for the health of the environment and the well being of individual animals are both well represented , and negativistic attitudes are low in the sample.

Mean profiles for environmental educators, and science teachers generally were also encouraging. Their high moralistic concern for animals was accompanied by a strong interest in and concern for natural habitats and animals as components of larger environmental systems. Their negativistic scores also indicated less fear of, and/or indifference to animals than expressed in the general public.

Almost half of the respondents (n=313) said they had attended at least one environmental education workshop, and many of these were nonscience teachers. Interestingly, they showed higher than average naturalistic and ecologistic attitudes, though the other components of their profile were

not unlike teachers as a whole.

Most interesting was the profile of teachers with special training in environmental education (i.e., 3 or more credit hours, but less than a college minor). Though it contains several strongly developed attitude domains, their overall profile seems reasonably balanced. They exhibit very strong naturalistic, ecologistic and moralistic and scientistic attitudes. But these are complemented by levels of dominionism and humanism as strong as those expressed by the general public.

When the respondent group was broken down by sex, subject and grade level taught, attitude profiles were not always so well balanced and well developed. Female, primary and nonscience teachers were comparatively weak in the naturalistic and ecologistic attitudes, while male teachers were comparatively weak in the humanistic and moralistic attitudes. While evidence exists that most attitudes are represented in Michigan teachers statewide, in some groups the opportunity exists for teachers to display a broader range of attitude perspectives to their students.

The opportunity to expose teachers to new or broader attitude perspectives is more evident when teachers are grouped according to strengths and weaknesses in their primary profile (i.e., naturalistic, ecologistic, humanistic, and moralistic domains; Table 4.30, pg. 119). Michigan teachers appear to hold a wide variety of profiles for these four attitudes, with no profile representing a large

proportion of the population. About a fourth of the respondents were strongly developed in one of the four attitude perspectives. About a sixth were primarily concerned with two of these attitudes. Still another sixth seemed comparatively disinterested in animals, and showed low scores in all four domains. This range of perspectives suggests that most teachers could undergo a broadening of attitudes which would better enable them to present their students with alternate viewpoints and a value-fair learning environment.

Conclusions:

The results and discussion presented here lead to two conclusions.

First, Kellert's survey instrument seems basically sound. Many of the findings and relationships discussed for Michigan teachers were also found to hold true in Kellert's original study, indicating that the instrument is reliable. The instrument's design also allows for quick and easy replication by other researchers. Further, it appears to be a useful tool for at least the next few years, and one that can provide valuable baseline data on our perceptions towards animals and the changing frequencies of those perceptions in society.

Second, it can be concluded that Michigan teachers are a distinct demographic group who's attitude profiles are not reflective of the general populus, although some of their characteristics, behaviors, and influences are similiar.

Michigan teachers were not unlike the general population in age, sex, and race. They also reflected the general public's interest in hunting, fishing, birdwatching, and pet ownership. The attitude profiles associated with these variables appeared in teachers just as they had in the general public, and both groups showed about the same level of humanistic attitudes.

Yet, Michigan teachers held an attitude profile quite unlike the mean profile of the general public. Their uniqueness was expressed as scores significantly different in all but the humanistic attitude domain. As a group they showed high naturalistic, ecologistic, and moralistic attitudes, and correspondingly low utilitarian, dominionistic, and negativistic attitudes. There is a strong probability that differences in education, occupation, and/or income contribute to the unique attitude profile of the teacher group. Their similiarity to Kellert's college educated respondents supports the hypothesis that education largely explains the attitude profile seen in Michigan teachers.

Implications for Workshop Development

The research related here measured actual attitudes held by Michigan teachers towards animals. It cannot be assumed that holding a skewed attitude profile necessarily means an individual is unaware of other attitude components and could not present these for consideration by students. However, there is reason to suspect that this may sometimes be the

case and that teachers with good representation in all attitude domains might be better able to function in value fair educational processes.

The ethics of attempting to modify teacher attitudes towards animals may certainly be questioned, but the ethical considerations are beyond the scope of this report. Whether or not they should be changed, the findings of this study provide some evidence of where changes may be implemented.

Correlation matrices indicate that there is an upper limit to the amount of attitude change that can occur in a given individual. For example, there was a negative correlation between the moralistic and dominionistic scales (Table 5.1), indicating that even if it were desirable to strengthen both of these perspectives, strengthening one may weaken the other.

It can be assumed that many teachers holding weak attitudes are less likely to be aware of the role of those attitudes in wildlife resource issues, and an important implication of this study is that room exists for increasing awareness of all 8 attitude domains in many teacher subgroups. Therefore, the findings may be useful in developing curricula and workshops with the intention of encouraging teachers to expose their students to the whole range of possible attitudes and their roles in natural resource issues.

If curricula developers and environmental educators incorporate only one of these findings into their curricula, workshops or thinking, it should be the strong attitudinal

Table 5.1. Attitude Scale Pearson Correlation Matrices For Michigan Teachers (above slashes) and The General Public (below slashes)(Kellert and Berry 1980a)

	NAT	ECO	HUM	MOR	SCI	UTI	DOM	NEG
NAT	||||||	.488	.020	.199	.379	-.232	.052	-.429
ECO	.405	||||||	.006	.105	.344	-.145	.019	-.400
HUM	.142	.027	||||||	.259	.015	-.264	-.228	-.211
MOR	.339	.170	.333	||||||	.142	-.239	-.448	-.090
SCI	.369	.282	.051	.196	||||||	-.151	-.075	-.267
UTI	-.290	-.176	-.257	-.285	-.190	||||||	.345	.300
DOM	-.040	.044	-.210	-.376	-.045	.320	||||||	.099
NEG	-.418	-.279	-.249	-.146	-.272	.348	.113	||||

differences between males and females. Female groups consistently held strong humanistic, moralistic, and negativistic attitudes. Groups made largely of females always showed these tendancies. Likewise, male dominated groups reflected the male tendancy toward higher naturalistic, ecologistic, and dominionist scores. These clear, extensive divisions suggest the potential success of workshops designed to accomodate differences in attitude types.

If the sample is representative, it appears that most primary teachers in the state are female (77 %),while most secondary teachers are male (78 %). These relationships also hold true for primary and secondary science teachers. Because they are so distinctly different in sex composition, when preparing curricular materials or workshop experiences it may be as fruitful to segment teachers by grade level as it would be to separate them by sex.

For example, in order to encourage the acceptance and use of curricular materials by primary science teachers, the content and marketing strategies could appeal to the stronger humanistic and moralistic attitudes of this group. However, the curricula could also be designed to include the naturalistic and ecologistic perspectives weakly represented or lacking in female teachers. Most importantly, this would expose the female teacher to alternate value perspectives. A secondary use of this strategy is that it may also bring about an actual change in the teacher's attitudes, by a

gradual process where new information is tailored and accomodated to fit with existing belief and value systems.

Attitude associations also exist with race, participation in hunting, urban/rural background, and region. The data indicated that attitudinal differences associated with race and state region were less extensive than those associated with teacher sex. The relationship of attitudes to urban/rural background also appears important but the exact nature of its influence still needs to be defined.

However the information is used in designing workshops, these associations between attitudes and various teacher characteristics do seem to hold value for making workshop experiences more effective in teacher training.

Future Research

As one of few assessments of teachers' attitudes towards animals this study provided an approximate mean attitude profile for teachers, it strengthened some of the assertions Kellert and others made about the factors associated with attitude expression, and it provided some insights for creating more effective, personalized environmental education workshop experiences. But important gaps in knowledge remain to be filled by future research.

The Kellert survey seems reliable and the proposed attitude domains can be shown to have considerable utility in many resource management and educational aspects. However, some work may be needed to refine the validity of the scale constructs.

When the instrument was used with teachers some of the correlations between attitude scale scores were relatively high. Four correlations were above .40 (i.e., naturalistic - ecologistic, naturalistic - negativistic, ecologistic - negativistic, and moralistic - dominionistic).

Further, the validity of several scale scores is weakened by particular items. For example, the moralistic scale includes two items which were also used to classify anti-hunters, and the naturalistic scale includes items on hunting and fishing. The interdependence between scales created by these types of items should be investigated. The instrument could be improved and made a more valid measure of independent scales if new items and/or scoring systems were developed.

Though concern was expressed earlier in regard to the utilitarian scale (Peyton 1985), no obvious anomalies or contradictory patterns occurred here, and no argument for or against the validity of the scale can be made from the present study. An error in the utilitarian scale of the teacher survey also precluded confident statements of scale comparison.

The profile types presented at the end of chapter 4 were only an approximation of the attitude sets in the population and the characteristics associated with a given profile. The hypothesis that only a few basic attitude profile types would emerge was not supported by the analysis technique used here, but the characteristics associated with the wide range of profiles in the population have some interesting implications

for managers and environmental educators. Further description of attitude types is needed to determine where true profile clusters exist, and if they are meaningful as ways to develop a small number of individualized teacher training experiences.

Though samples of black teachers and those from northern Michigan were limited, the differences that did emerge were similiar to those Kellert found, and suggest that important racial and regional differences exist and are worth exploring further.

Further research is also needed on the relationship between the attitude profiles which teachers express, and the range of attitudes of which they are aware. It is possible that an individual may not express certain attitudes, and yet be aware that those attitudes exist. For example, a teacher who expresses a weak utilitarian attitude may still be aware of that attitude in others. Even so, it remains to be determined whether that teacher is as likely to present the utilitarian perspective as a teacher with a strong utilitarian attitude. It is important to establish whether teachers who express a narrow range of attitudes towards animals are still aware of other attitude perspectives, and to what extent they can effectively present these alternate viewpoints to their students.

Perhaps most importantly, more research is needed on the relationship between teacher attitudes, student attitudes, and cognitive learning. It seems generally accepted in the

education community that teachers' attitudes affect students' attitudes and behavior, but clear documentation of this relationship is very limited. The availability of Kellert's instrument may provide an opportunity to investigate these relationships for at least this group of attitudes.

One fruitful study would be an analysis of the attitude orientation stressed by teachers in the use of widely accepted wildlife curricular packages. For example, primary science teachers could be analyzed to determine the attitudes they stress in their presentation of "Project Wild" activities. If primary teachers were found to emphasize humanistic and moralistic attitudes towards wildlife, this would add validity to the recommendations offered here. Further, a measurement of their students' attitude profiles might help clarify the association of teacher attitudes and student attitudes.

By continuing to monitor attitude changes through the future, resource managers and environmental educators will be better able to provide teachers and the general public with experiences that better prepare them to make informed resource decisions, decisions which optimize the quality of life and the quality of the environment. Continuing assessment of our societies' changing perceptions of animals represents an important component of environmental management that accurately reflects the needs and wants of society.

LIST OF REFERENCES

Aiken, L.R. 1970. Attitudes towards mathmatics. Review of Ed. Research. 40: 551-596.

Almaze, A.G. 1973. Modification of teacher behavior through an inservice biology methods course. Dissertation Abstracts. 34: 6, p. 3173A.

Andrews, D.M. 1979. Effect of a values-oriented environmental education unit on the attitudes of preservice education. Dissertation Abstracts. 40: 6, p. 3216A. 222 p.

Ashby, M.S. and B.C. Wittmaier. 1978. Attitude changes in children after exposure to stories about women in traditional or nontraditional occupations. J. of Ed. Psych. 70: 945-949.

Bart, W.M. 1972. A hierarchy of attitudes toward animals. J. of Env. Ed. 3: 4-6.

Bybee, R.W. 1973. The teacher I like best: perceptions of advantaged, average, and disadvantaged science students. School Science and Math. 73: 384-390.

Campbell, J.R. 1973. Pattern analysis - a macroscopic development for interaction analysis. Paper presented at the annual meeting of the Nat. Asso. for Research in Sci. Teaching. Detroit.

Crano, W.D. and P.M. Mellon. 1978. Causal influence of teacher's expectations on children's academic performance: a cross-lagged panel analysis. J. of Ed. Psych. 70: 39-49.

Fazio, R.H. and M.P. Zanna. 1981. Direct experience in attitude - behavior consistancy. In L. Berkowitz (ed.). Advances in Experimental Social Psychology.

Fishbein, M. and I. Ajzen. 1974. Attitudes towards objects as predictors of single act criteria. Psych Review. 81: 59-74.

----- 1975. Belief, attitude, intention, and behavior: an introduction to theory and research. Reading, Mass: Addison-Wesley.

Gilbert, C.D. and D. Cooper. 1976. The relationship between teacher/student attitudes and the competency levels of sixth grade students. School Sci. and Math. 6: 469-476.

George, R.W. 1967. A comparative analysis of conservation

attitudes where conservation education is a part of the educational experience. Trans. of the 32nd N. Am. Wildl. and Nat. Res. Conf. pp.199-210.

Haney, R.E. 1964. The development of scientific attitudes. The Science Teacher. 31: 33.

Heil,L.M., Powell, M. and I. Feifen. 1960. Characteristics of teacher behavior and competancy related to the achievement of different kinds of children in several elementary grades. New York: Office of Testing and Research, Brooklin College.

Hess,R.D. and J.V. Torney. 1967. The development of political attitudes in children. Anchor Books, Doubleday and Company, New York.

Hooper, J. 1983. Hunting - an American tradition. American Hunter. April: 18-19.

Hounshell, P.B. and L. Liggett. 1976. Inservice education: it can make a difference. School Sci. and Math. 76: 493-498.

Jous, H.H. 1978. The effect of environmental education. Science Education. 62: 79-84.

Kasperson,R.E. 1969. Political behavior and the decision making process in the allocation of water resources between recreational and municipal use. Natural Resources Journal. 9: 176-211.

Kearney, J.F. 1984. The transformation of the Bay of Fundy herring fisheries 1976-1978: an experiment in fisherman-government co-management. In Atlantic Fisheries and Coastal Communities: Fisheries Decision-Making Case Studies. Ed. C. Lamson and A.J. Hanson. Dahlhousie Ocean Studies Programme. Nova Scotia Canada.

Kellert, S.R. 1976. Perceptions of animals in American society. Proc. N. Am. Wildl. and Nat. Res. Conf. 41: 533-545.

----- 1978a. Policy implications of a national study of American attitudes and behavioral relations to animals. Govt. Printing Office #024-010-00482-7.

----- 1978b. Attitudes and characteristics of hunters and anti-hunters and related policy suggestions. Trans. N. Am. Wildl. and Nat. Res. Conf.. 43:

----- 1979. Public attitudes toward critical wildlife and natural habitat issues. Govt. Printing Office #024-010-00-624-2.

----- 1980. Contemporary values of wildlife in American society. In Shaw, W.W. and E.H. Zube (ed.). Wildlife Values. Center for Assessment of Noncommodity Natural Resource Values, Inst. Series Report # 1.

Kellert,S.R. and J.K. Berry. 1980a. Knowledge, affection, and basic attitudes towards animals in American society. Govt. Printing Office #204-101-00-625-1.

----- 1980b. Activities of the American public relating to animals. National Technical Information Service, accession # PB-80-194525.

Kellert, S.R. and M.O. Westervelt. 1981. Trends in animal use and perception in 20th century America. U.S. Fish and Wildl. Service.

----- 1982. Children's attitudes, knowledge and behaviors towards animals. U.S. Fish and Wildl. Service.

Langenau, E.E. Jr. and P.M. Mellon-Coyle. 1977. Michigan's young hunter. Mich. Dept. of Nat. Res. Wildl. Div. Report # 2800.

Lichter, J.H. and D.W. Johnson. 1969. Changes in attitude toward negroes of white elementary school students after use of multi-ethnic readers. J. of Ed. Psych. 60: 148-152.

McArthur,L.Z. and S.V. Eisen. 1976. Achievements of male and female storybook characters as determinants of achievement behavior in boys and girls. J. of Pers. and Soc. Psych. 33: 467-473.

Milson, J.L. 1973. Change as a result of a short course on environmental quality. Paper at the annual meeting of the Nat. Asso. Research in Sci. Teaching. Detroit, Mi. ED 077 683.

Murch, S.W. 1971. Public concern for environmental pollution. Public Opinion Quarterly. 35: 100-106.

Nash, R. 1973. Measuring teacher attitudes. Ed. Research. 14: 141-146.

Nilon,C. 1985. Access to urban greenspace and urban black's attitudes toward wildlife. Presentation at the 47th Midwest Fish and Willife Conference. Grand Rapids, Michigan, Dec. 18.

Palardy, J. 1969. What teachers believe - what children achieve. Elem. School J. 69: 370-374.

Pempek, L.C. and D.J. Blick. 1973. An Evaluation of elementary teacher's behaviors and attitudes in the use

of inquiry-oriented science programs. School Sci. and Math. 73: 414-419.

Pettus, A.M., Frary, R.B., and T.G. Teates. 1978. The attitudes of science and social science teachers toward environmental issues. J. of Research in Sci. Teaching. 15: 367-372.

Peyton, R.B. 1984. A typology of natural resource issues with implications for resource management and education. Paper presented to the Michigan Academy of Science, Wildlife Section, March 23.

----- 1985. Mechanisms affecting public acceptance of resource management policies and strategies. Int. Symposium on Stock Assessment and Yield Prediction (ASPY), Great Lakes Fish. Comm.. Quetico Centre, Atikokan, Ontario. Michigan AES Journal #11809.

Peyton, R.B. and E.E. Langenau Jr. 1985. A comparison of attitudes held by BLM biologists and the general public towards animals. Wildl. Soc. Bull. 13: 117-120.

Pidgeon, D.A. 1970. Expectaions and pupil performance. Slough: NFER.

Pomeranz, G.A. 1977. Young people's attitudes toward wildlife. Mich. Dept. Nat. Res., Wildl. Div. Report #2781.

Ramsey, C.E. and R.E. Rickson. 1976. Environmental attitudes. J. of Env. Ed. 8: 10-18.

Rankin, R.E. 1969. Air pollution control and public apathy. J. of the Air Pollution Asso. Aug.: 565-569.

Rist, R. 1970. Student social class and teacher expectation: the self-fulfilling prophecy in ghetto education. Harvard Ed. Review. 40: 411-412.

Rosenthal, R. and L. Jacobson. 1968. Pygmalion in the classroom. New York; Holt, Rhinehart, and Winston.

Rubovitz, P.C. and M.L. Maehr. 1971. Pygmalion analyzed: towards an explanation of the Rosenthal-Jacobson findings. J of Pers. and Soc. Psych. 19: 197-203.

Ryans, D.G. 1953. The investigation of teacher characteristics. Ed. Record. pp. 371-376.

Schatzow, S. 1977. The influence of the public on federal environmental decision-making in Canada. In Sewell, W.R.D. and J.T. Coppock (ed.). Public Participation in Planning. John Wiley and Sons. London. pp. 140-158.

Schofield, H.L. 1981. Teacher effects on cognitive and affective pupil outcomes in elementary school mathmatics. J. of Ed. Psych. 73: 462-471.

Seaver, W.B. 1973. Effects of naturally induced teacher expectancies. J. of Pers. and Soc. Psych. 28: 333-342.

Sherif, C.W., Kelly, M., Rodgers, H., Sarup, G. and B.I. Tittler. 1973. Personal involvement, social judgement, and action. J. of Pers. and Soc. Psych. 27: 311-327.

Shrigley, R.L. 1973. The correlation of science attitude and science knowledge of preservice elementary teachers. Paper, annual meeting of Nat. Sci. Teachers Asso., Detroit, Mi..

Sivacek, J. and W.D. Crano. 1972. Vested interest as a moderator of attitude-behavior consistency. J. of Pers. and Soc. Psych. 43: 210-221.

Snyder, M. and T.C.Monson. 1975. Persons, situations, and the control of social behavior. J. of Pers. and Soc. Psych. 32: 637-644.

Steel, G.D. and J.H.Torre. 1980. Principals and procedures of statistics: a biometrical approach, 2nd ed. McGraw-Hill Book Company. New York. 633 pp.

Stern, C. and E.R. Keislar. 1977. Teacher attitudes and attitude change: a research review. J of Res. and Dev. in Ed. 10: 63-76.

Taylor, A.L. 1965. Teacher attitudes, pupil behavior, and content attributes in relation to the use of programmed science materials at the 4th grade level. V. Microfilms, Ann Arbor, Mi..

Taylor, M.C. 1979. Race, sex, and the expression of self-fulfilling prophecies in a laboratory teaching situation. J. of Pers. and Soc. Psych. 37: 897-912.

Taylor, S.E. and D.E. Samuel. 1975. Wildlife knowledge and attitudes of public school teachers. Proc. 29th Conf. Southeastern Asso. Game and Fish Comm. 29: 759-765.

Thelen, L.J. and W. Litsky. 1972. Teacher attendance at a summer institute and high school student achievement. Sci. Ed. 56: 293-302.

Tichenor, P.J., Donohue, G.A., Olien, C.N., and J.K. Bower. 1971. Environment and public opinion. J. of Env. Ed. 2: 38-42.

Tull, D.S. and D.I. Hawkins. 1980. Marketing research: measurement and method, 2nd ed.. Macmillan Publishing

Co., New York. 795 pp..

U.S. Dept. of Interior, Fish and Wildlife Service and U.S. Bureau of Census. 1982. 1980 National survey of fishing, hunting, and wildlife associated recreation. U.S. Govt. Printing Office, Washington D.C..

Van de Walle, J.A. 1973. Attitudes and perceptions of elementary mathmatics possessed by 3rd and 6th grade teachers as related to student attitude and achievement in mathmatics. Paper presented at the annual meeting of the National Council of Teachers of Mathmatics. Houston, Texas. Ed 076 425.

Weigel, R. H. and L.S. Newman. 1976. Increasing attitude-behavior correspondence by broadening the scope of the behavioral measure. J. of Pers. and Soc. Psych. 33: 793-802.

Appendix 1

COMPLETE SURVEY INSTRUMENT

A SURVEY OF

EDUCATORS' ATTITUDES TOWARDS WILDLIFE RESOURCES

A PROJECT OF:

Department of Fisheries and Wildlife
Michigan State University
East Lansing, Michigan 48824-1222

Adapted from a survey (American Attitudes, Knowledge and Behaviors Toward Wildlife and Natural Habitats)
Developed by Dr. S.R. Kellert, Yale University

Please indicate the two types of animals which interest you the most. Indicate which of the types below would be your first and second choice by placing the letters on the appropriate line. Note that the emphasis is on the type of animal, not the specific examples.

_____1. FIRST CHOICE
_____2. SECOND CHOICE

A. I AM NOT INTERESTED IN MOST ANIMALS

B. BEAUTIFUL ANIMALS, FOR EXAMPLE, BUTTERFLIES, PEACOCKS

C. USEFUL ANIMALS, FOR EXAMPLE, COWS, SHEEP

D. SCIENTIFICALLY FASCINATING ANIMALS, FOR EXAMPLE, DESERT PUPFISH, ARMY ANTS

E. ATTRACTIVE AND LIKEABLE ANIMALS, FOR EXAMPLE, COCKER SPANIELS, CHIPMUNKS

F. COMPETITIVE, SPORTING, TROPHY ANIMALS, FOR EXAMPLE BUCKING BRONCOS, BIG HORN SHEEP

G. ANIMALS IN THE WILD, FOR EXAMPLE, ANTELOPE, HAWKS

H. ANIMALS IMPORTANT TO PARTICULAR ECOSYSTEMS, FOR EXAMPLE TURKEY VULTURES, DUNG BEETLES

I. NO OPINION

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. If you have a strong opinion about the statement, you should circle "STRONGLY AGREE" or "STRONGLY DISAGREE". If you agree or disagree with the statement in general but not completely, you should circle "AGREE", "SLIGHTLY AGREE", "DISAGREE" or "SLIGHTLY DISAGREE". If you do not have an opinion, circle "NO OPINION".

	STRONGLY AGREE	AGREE	SLIGHTLY AGREE	SLIGHTLY DISAGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
3. If I were going camping, I would prefer staying in a modern campground than in a isolated spot where there might be wild animals around.	1	2	3	4	5	6	7

	STRONGLY AGREE	AGREE	SLIGHTLY AGREE	SLIGHTLY DISAGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
4. I find most large dogs frightening.	1	2	3	4	5	6	7
5. I have little desire to study vertibrate zoology or population genetics.	1	2	3	4	5	6	7
6. I think love is an emotion which people should feel only for other people, not for animals.	1	2	3	4	5	6	7
7. I admire a person who works hard to shoot a big trophy animal like a 600-pound bear.	1	2	3	4	5	6	7
8. I would be afraid to touch a snake.	1	2	3	4	5	6	7
9. I am generally more interested in pet animals than wild animals.	1	2	3	4	5	6	7
10. I think rats and cockroaches should be eliminated.	1	2	3	4	5	6	7
11. I care more about the suffering of individual animals than I do about species population levels.	1	2	3	4	5	6	7
12. I have owned pets that were as dear to me as another person.	1	2	3	4	5	6	7
13. I dislike most beetles and spiders.	1	2	3	4	5	6	7
14. I think a person sometimes has to beat a horse or dog to get it to obey orders properly.	1	2	3	4	5	6	7
15. I have little interest in learning about the taxonomic classification of animals.	1	2	3	4	5	6	7

	STRONGLY AGREE	AGREE	SLIGHTLY AGREE	SLIGHTLY DISAGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
16. I have little desire to see wild animals in places like the jungles of South America or New Guinea.	1	2	3	4	5	6	7
17. A dog trained at a task, like herding sheep, is generally a better dog than one owned just for companionship.	1	2	3	4	5	6	7
18. I know little about ecosystems or the population dynamics of wild animals.	1	2	3	4	5	6	7
19. I dislike having most animals physically close to me.	1	2	3	4	5	6	7
20. Watching birds as a hobby strikes me as a waste of time.	1	2	3	4	5	6	7
21. I approve of firmly disciplining a dog so that it strictly obeys every command.	1	2	3	4	5	6	7
22. I find most insects fascinating.	1	2	3	4	5	6	7
23. A large coastal city has an unemployment problem. A major manufacturer wants to build a new plant on a marsh it owns which could employ 1,000 people, but conservationists claim this will destroy land needed by a rare bird. Do you agree that this plant should be built, even if it endangers the bird species?	1	2	3	4	5	6	7
24. I see nothing wrong with using steel traps to capture wild animals.	1	2	3	4	5	6	7
25. I think its all right to kill whales for a useful product as long as the animals are not threatened with extinction.	1	2	3	4	5	6	7

	STRONGLY AGREE	AGREE	SLIGHTLY AGREE	SLIGHTLY DISAGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
26. If oil were discovered in Yellowstone Park, it would have to be destroyed even if it meant harm to the Park's wildlife.	1	2	3	4	5	6	7
27. Before the government permits the trapping of wild animals, there should be proof that these animals will not be endangered by this trapping.	1	2	3	4	5	6	7
28. Zoos should provide more natural conditions for their animals even if this means much higher entrance fees.	1	2	3	4	5	6	7
29. I approve of building on marshes that ducks and other non-endangered wildlife use if the marshes are needed for housing development.	1	2	3	4	5	6	7
30. The Federal government should spend very little time and money on trying to educate the public about wildlife issues and problems.	1	2	3	4	5	6	7
31. We must even use pesticides harmful to wildlife if they are needed to maintain the country's food production at present levels.	1	2	3	4	5	6	7
32. I think it's all right to kill an animal to make a fur coat as long as the species is not endangered.	1	2	3	4	5	6	7

33. It has been suggested that 5 million acres of national forest land be set aside so that the endangered grizzly bear remain undisturbed. The timber industry objects, saying that jobs and needed lumber will be lost. Would you agree to protect the endangered grizzly bear even if it resulted in the loss of some jobs and building material?

1 2 3 4 5 6 7

	STRONGLY AGREE	AGREE	SLIGHTLY AGREE	SLIGHTLY DISAGREE	DISAGREE	STRONGLY DISAGREE	NO OPINION
34. I see nothing wrong with farmers shooting golden eagles if the eagles kill their sheep.	1	2	3	4	5	6	7
35. Natural resources must be developed even if the loss of wilderness results in much smaller wildlife populations.	1	2	3	4	5	6	7
36. I would rather pay a higher price for tuna fish than see the tuna industry continue killing porpoises in their nets.	1	2	3	4	5	6	7
37. The goals of most environmentalists are a threat to the continued economic prosperity of our country.	1	2	3	4	5	6	7

Some ranchers claim substantial economic loss because coyotes kill their sheep. Which methods would you approve of using to correct this situation?

	STRONGLY APPROVE	APPROVE	SLIGHTLY APPROVE	SLIGHTLY DISAPPROVE	DISAPPROVE	STRONGLY DISAPPROVE	NO OPINION
38. Shooting or trapping as many coyotes as possible.	1	2	3	4	5	6	7
39. Poisoning, because it is the least expensive solution even though other animals besides coyotes may be killed.	1	2	3	4	5	6	7

Of the following reasons for hunting, which do you approve of or oppose?

		STRONGLY APPROVE	APPROVE	SLIGHTLY APPROVE	SLIGHTLY OPPOSE	OPPOSE	STRONGLY OPPOSE	NO OPINION
40.	Hunting game animals such as deer for recreation and sport.	1	2	3	4	5	6	7
41.	Hunting waterfowl such as ducks for recreation and sport.	1	2	3	4	5	6	7
42.	Hunting for recreation and meat.	1	2	3	4	5	6	7
43.	Hunting for a trophy, such as horns or a mounted animal.	1	2	3	4	5	6	7

Various kinds of fish have been threatened with extinction because of dams, canals and other water projects. Please indicate if you would approve of the following water uses if they were to endanger a species of fish.

		STRONGLY APPROVE	APPROVE	SLIGHTLY APPROVE	SLIGHTLY DISAPPROVE	DISAPPROVE	STRONGLY DISAPPROVE	NO OPINION
44.	Water diverted to cool industrial plant machinery.	1	2	3	4	5	6	7
45.	Water dammed to provide hydroelectric power.	1	2	3	4	5	6	7

Please indicate the first and second most important reasons for the endangerment and extinction of the greatest number of wild species in the United States during the <u>past 25 years</u>.

____46. MOST IMPORTANT REASON
____47. SECOND MOST IMPORTANT REASON

A. CHEMICAL AND INDUSTRIAL POLLUTION
B. HUNTING AND TRAPPING
C. LOSS OF WILD LAND TO LOGGING, MINING, OIL AND OTHER NATURAL RESOURCE INDUSTRIES
D. ELIMINATION OF PREDITORS SUCH AS EAGLES AND WOLVES
E. HUMAN OVERPOPULATION RESULTING IN LOSS OF LAND TO COMMERCIAL AND HOUSING DEVELOPMENT
F. SPREAD OF AGRICULTURE
G. INTRODUCTION OF NON-NATIVE ANIMALS

48. Have you personally owned any pets in the past two years (excluding birds and horses)?

____NO ⟶ Go to question 53
____YES
↓

In general, what were your first and second main reasons for owning a pet in the past two years?

PET ONE:

____49. FIRST REASON
____50. SECOND REASON

PET TWO:

____51. FIRST REASON
____52. SECOND REASON

A. GOOD FOR FAMILY AND CHILDREN
B. SPORT OR SHOW
C. COMPANIONSHIP AND AFFECTION
D. BEAUTY OF THE ANIMAL
E. WORK
F. PROFIT
G. PROTECTION
H. BREEDING
I. GIFT FROM SOMEONE
J. OTHER

53. Have you personally owned a pet bird in the past two years?

____NO ⟶ Go to question 56
____YES
↓

In general, what were your first and second most important reasons for having a pet bird?

____54. FIRST REASON
____55. SECOND REASON

A. GOOD FOR FAMILY AND CHILDREN
B. PROFIT
C. COMPANIONSHIP AND AFFECTION
D. SCIENTIFIC STUDY
E. BEAUTY OF BIRD
F. UNUSUAL OBJECT
G. BREEDING
H. GIFT FROM SOMEONE
I. OTHER

56. Have you personally owned a horse at any time in your life?

____NO ⟶ Go to question 59
____YES
↓

In general, what were your first and second most important reasons for owning a horse?

____57. FIRST REASON
____58. SECOND REASON

A. BEAUTY OF THE ANIMAL
B. SPORT OR SHOW
C. PROFIT
D. COMPANIONSHIP AND AFFECTION
E. RECREATIONAL RIDING
F. WORK
G. TO GET CLOSE TO NATURE
H. GOOD FOR FAMILY AND CHILDREN
I. BREEDING
J. OTHER

59. Have you hunted in the <u>past two years</u>?

____ NO ⟶ Go to question 62
____ YES
↓

What were your first and second most important reasons for hunting in the <u>past two years</u>?

____60. FIRST REASON
____61. SECOND REASON

A. FOR MEAT
B. TO ELIMINATE PROBLEM ANIMALS
C. TO BE WITH FAMILY OR FRIENDS
D. FOR SPORT OR RECREATION
E. TO GET CLOSE TO NATURE OR SOLITUDE
F. TO OBTAIN A TROPHY
G. OTHER

62. Have you gone fishing in the <u>past two years</u>?

____ NO ⟶ Go to question 65.
____ YES
↓

What were your first and second most important reasons for fishing in the past two years?

____63. FIRST REASON
____64. SECOND REASON

A. TO CATCH A BIG FISH
B. TO GET CLOSE TO NATURE OR SOLITUDE
C. FOR SPORT OR RECREATION
D. TO EAT FRESH FISH
E. TO CATCH A LOT OF FISH
F. FOR PROFIT
G. TO BE WITH FRIENDS OR FAMILY
H. FOR RELAXATION
I. OTHER

65. Have you gone birdwatching in the past two years?

____ NO ⟶ Go to question 68
____ YES
↓

What were your first and second most important reasons for bird watching in the past two years?

____67. FIRST REASON
____68. SECOND REASON

A. BIRDS ARE PRETTY TO LOOK AT
B. HOBBY
C. SCIENTIFIC STUDY
D. TO SEE AS MANY BIRDS AS POSSIBLE
E. TO BE CLOSE TO NATURE OR SOLITUDE
F. TO DO SOMETHING WITH FAMILY OR FRIENDS
G. GOOD FOR THE CHILDREN
H. PERSONALLY FASCINATED BY BIRDS
I. OTHER

68. Have you or your spouse belonged to any conservation or animal related organization(s) in the past two years?

____ NO ⟶ Go to question 71
____ YES
↓

What are your first and second most important reasons for belonging to these organizations?

____69. FIRST REASON
____70. SECOND REASON

A. EDUCATIONAL
B. SCIENTIFIC STUDY
C. PRESERVE WILDLIFE HABITAT
D. TO FURTHER SPORTING INTERESTS
E. LOVE ANIMALS
F. ETHICAL OR MORAL CAUSE
G. TO GET MAGAZINE
H. TO BE WITH FRIENDS OR FAMILY
I. GOOD FOR CHILDREN
J. OTHER

____71. Please indicate the grade level(s) which you instruct.

____	A. KINDERGARTEN	H.	7th
____	B. 1st	I.	8th
	C. 2nd	J.	9th
	D. 3rd	K.	10th
	E. 4th	L.	11th
	F. 5th	M.	12th
	G. 6th		

____72. Indicate the discipline(s) which you instruct.

____	A. BIOLOGICAL SCIENCE	F.	LANGUAGE ARTS
____	B. EARTH SCIENCE	G.	MATHEMATICS
	C. ENVIRONMENTAL EDUCATION	H.	PHYSICAL EDUCATION
	D. FINE ARTS	I.	SOCIAL SCIENCE
	E. INDUSTRIAL ARTS	J.	OTHER (specify) _____

____73. What is the highest level of education you have attained?

A. B.A. OR B.S.
B. M.A. OR M.S.
C. PH.D. OR ED.D.

Of the following disciplines, in which did you major or minor during college or graduate studies?

_____74. MAJOR(S)
_____75. MINOR(S)

A. BIOLOGICAL SCIENCE	F. LANGUAGE ARTS
B. EARTH SCIENCE	G. MATHEMATICS
C. ENVIRONMENTAL EDUCATION	H. PHYSICAL EDUCATION
D. FINE ARTS	I. SOCIAL SCIENCE
E. INDUSTRIAL ARTS	J. OTHER (specify) _____

____76. In which of the following disciplines do you have special training (3 courses or more) other than a major or minor?

A. BIOLOGICAL SCIENCE	F. LANGUAGE ARTS
B. EARTH SCIENCE	G. MATHEMATICS
C. ENVIRONMENTAL EDUCATION	H. PHYSICAL EDUCATION
D. FINE ARTS	I. SOCIAL SCIENCE
E. INDUSTRIAL ARTS	J. OTHER (specify) _____

How many workshops have you attended of various lengths which dealt with some aspect of environmental education?

____77. WORKSHOPS LASTING LESS THAN 1 DAY
____78. WORKSHOPS LASTING 1 TO 3 DAYS
____79. WORKSHOPS LASTING OVER 3 DAYS

____80. Approximately how many people lived in the town where you spent the most time growing up (before 16)?

A. FEWER THAN 500	G. 50,000 - 99,999
B. 500 - 1,999	H. 100,000 - 249,000
C. 2,000 - 4,999	I. 250,000 - 999,999
D. 5,000 - 9,999	J. 1 MILLION AND OVER
E. 10,000 - 24,999	K. DON'T KNOW

____81. Approximately how many people live in the town where you presently live?

A. FEWER THAN 500	G. 50,000 - 99,000
B. 500 - 1,999	H. 100,000 - 249,000
C. 2,000 - 4,999	I. 250,000 - 999,999
D. 5,000 - 9,999	J. 1 MILLION AND OVER
E. 10,000 - 24,999	K. DON'T KNOW

____82. Approximately how many people live in the town where you presently teach?

A.	FEWER THAN 500	G.	50,000 - 99,000
B.	500 - 1,999	H.	100,000 - 249,000
C.	2,000 - 4,999	I.	250,000 - 999,999
D.	5,000 - 9,999	J.	1 MILLION AND OVER
E.	10,000 - 24,999	K.	DON'T KNOW

____83. What is your sex?

A. MALE
B. FEMALE

84. What is your age? ____

____85. What is your race?

A. BLACK
B. WHITE
C. ORIENTAL
D. OTHER (specify) _____

86. What is the name of your school district?

_____

YOUR COMMENTS ARE WELCOME

Thank you for your cooperation. To return this form, please staple and mail - no envelope is needed.

Appendix 2

COVER LETTER 1

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
NATURAL RESOURCES BUILDING
(517) 355-4477

EAST LANSING • MICHIGAN • 48824-1222

January 11, 1985

Dear Colleague:

We need your help. As a professional educator you are aware that the most important resource in educating our youth is the teacher. To be effective, a good curriculum must meet the needs of the teacher as well as the student. We are conducting a study of Michigan educators to guide us in designing environmental education curricula and teacher training experiences. We are asking you and a small sample of Michigan teachers to fill out the enclosed survey. We need your cooperation, whether or not you have an active interest in environmental education.

The enclosed questionnaire was adapted from a larger survey which has been used nationally to assess public attitudes toward wildlife resources. It should take less than 20 minutes to complete. We are aware of your busy schedule and appreciate your time and effort in responding. If we did not have reason to believe this information will be valuable to the education of Michigan's youth we would not ask you to participate.

You are guaranteed complete confidentiality. No attempt will be made to associate your name with any of the responses.

To return the instrument, simply staple or tape it closed and mail it. Postage is prepaid.

Thank you in advance for your cooperation. If you wish information on the outcome of this project or on other environmental education matters, please do not hesitate to contact us.

Sincerely,

Ben Peyton

R. Ben Peyton
Associate Professor
Environmental Education

Bill Siemer

Bill Siemer
Research Assistant

RBP:mg

Enc.

Appendix 3

POST CARD REMINDER

POST CARD REMINDER

Dear Educator:

Recently a questionnaire seeking your attitudes about wildlife resources was mailed to you.

If you have already completed and returned it to us, please accept our sincere thanks. If not, please fill out the survey today. The survey was sent to only a small but representative sample of educators in the state. Thus, it is important that your views are also included in this study. This is true, whether or not you have an active interest in wildlife education!

Thank you for your assistance.

Ben Peyton

R. Ben Peyton
Environmental Education

Appendix 4

COVER LETTER 2

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
NATURAL RESOURCES BUILDING
(517) 355-4477

EAST LANSING • MICHIGAN • 48824-1222

February 4, 1985

Dear Colleague:

Several weeks ago we wrote you seeking your attitudes regarding wildlife resources. As of today we have not received your completed questionnaire.

We are writing you again because your response to "Educator's Attitudes Towards Wildlife Resources" is so important. Your participation in this study is necessary to assure that our results are truly representative of Michigan educators. The main purpose of this survey is to guide us in designing curricula and teacher training experiences adapted to your special needs and attitudes. We can only achieve that goal with your help.

Enclosed is another questionnaire in case the first one was misplaced. Please be assured that your responses are completely confidential. This is strict university policy. When we receive your completed questionnaire, all means of identifying you individually will be destroyed.

We sincerely believe this information will help us design better environmental education and teacher training experiences. We thank you again for your cooperation, and we hope to hear from you soon.

Sincerely,

R. Ben Peyton

R. Ben Peyton
Associate Professor

Bill Siemer
Research Assistant

Bill Siemer

RBP:mg

Appendix 5

NONRESPONDENT COVER LETTER AND SURVEY

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FISHERIES AND WILDLIFE
NATURAL RESOURCES BUILDING
(517) 355-4477

EAST LANSING • MICHIGAN • 48824-1222

July 23, 1985

Dear Educator,

Please, we need your help.

We understand your busy schedule did not allow you to complete the lengthy survey we sent you last January. However, we desperately need to get your responses to just a few items, so that our study of Michigan educators will be effective.

On the back of this letter you will find a very brief set of survey questions. Please take the time to respond to these questions and drop them in the mail at your earliest convenience. The survey will take just a few minutes to complete, and it will help insure that our results are truly useful for educational planners in Michigan.

Sincerely,

Ben Peyton

R. Ben Peyton
Associate Professor

Bill Siemer

Bill Siemer
Research Assistant

RBP/BS:cb

Please indicate the two types of animals which interest you the most. Indicate which of the types below would be your first and second choice by placing the letters on the appropriate line. Note that the emphasis is on the type of animal, not the specific example.

___ 1. FIRST CHOICE
___ 2. SECOND CHOICE

A. I AM NOT INTERESTED IN MOST ANIMALS

B. BEAUTIFUL ANIMALS, FOR EXAMPLE, BUTTERFLIES, PEACOCKS

C. USEFUL ANIMALS, FOR EXAMPLE, COWS, SHEEP

D. SCIENTIFICALLY FASCINATING ANIMALS, FOR EXAMPLE, DESERT PUPFISH, ARMY ANTS

E. ATTRACTIVE AND LIKEABLE ANIMALS, FOR EXAMPLE, COCKER SPANIELS, CHIPMUNKS

F. COMPETITIVE, SPORTING, TROPHY ANIMALS, FOR EXAMPLE, BUCKING BRONKOS, BIG HORN SHEEP

G. ANIMALS IN THE WILD, FOR EXAMPLE, ANTELOPE, HAWKS

H. ANIMALS IMPORTANT TO PARTICULAR ECOSYSTEMS, FOR EXAMPLE TURKEY VULTURES, DUNG BEETLES

I. NO OPINION

3. Have you gone birdwatching in the past two years?
___ NO
___ YES

4. Have you or your spouse belonged to any conservation or animal related organization(s) in the past two years?
___ NO
___ YES

5. Have you gone fishing in the past two years?
___ NO
___ YES

6. Have you hunted in the past two years?
___ NO ——→ Go to question 9
___ YES

___ 7. FIRST REASON FOR HUNTING
___ 8. SECOND REASON FOR HUNTING

A. FOR MEAT
B. TO ELIMINATE PROBLEM ANIMALS
C. TO BE WITH FAMILY OR FRIENDS
D. FOR SPORT OR RECREATION
E. TO GET CLOSE TO NATURE OR SOLITUDE
F. TO OBTAIN A TROPHY
G. OTHER

___9. Please indicate the grade level(s) which you instruct.

A.	KINDERGARTEN	H.	7th
B.	1st	I.	8th
C.	2nd	J.	9th
D.	3rd	K.	10th
E.	4th	L.	11th
F.	5th	M.	12th
G.	6th		

___10. Indicate the discipline(s) which you instruct.

A.	BIOLOGICAL SCIENCE	F.	LANGUAGE ARTS
B.	EARTH SCIENCE	G.	MATHEMATICS
C.	ENVIRONMENTAL EDUCATION	H.	PHYSICAL EDUCATION
D.	FINE ARTS	I.	SOCIAL SCIENCE
E.	INDUSTRIAL ARTS	J.	OTHER (Specify) _____

___11. Approximately how many people lived in the town where you spent the most time growing up (before 16)?

A.	FEWER THAN 500	G.	50,000 - 99,999
B.	500 - 1,999	H.	100,000 - 249,000
C.	2,000 - 4,999	I.	250,000 - 999,999
D.	5,000 - 9,999	J.	1 MILLION OR MORE
E.	10,000 - 24,999	K.	DON'T KNOW
F.	25,000 - 49,999		

___12. What is your sex?

A. MALE
B. FEMALE

13. What is your age? ___

___14. What is your race?

A. BLACK
B. WHITE
C. ORIENTAL
D. OTHER (Specify)

15. What is the name of your school district? _____

Appendix 6

SURVEY QUESTIONS BY ATTITUDE SCALE

Appendix 6

An itemized list of the questions used to determine each of the 8 attitude scale scores (The number before each item corresponds to its appearance in the actual survey instrument. Each question includes only the responses used to score the domain in which it appears)

Naturalistic Domain Items: items 1,3,9,16,20,22,60,63

Please indicate the two types of animals which interest you the most. Note that the emphasis is on the type of animal, not the specific examples.

____ 1. First Choice
(second not used)

G. Animals in the wild, for example, antelope, hawks

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

3. If I were going camping, I would prefer staying in a modern campground than in an isolated spot where there might be wild animals (SD,D).

9. I am generally more interested in pet animals than wild animals (SD,D).

16. I have little desire to see wild animals in places like the jungles of South America or New Guinea (SD,D).

20. Watching birds as a hobby strikes me as a waste of time (SD,D).

22. I find most insects fascinating (SA,A).

What were your first and second most important reasons for hunting in the past two years?

____ 60. First Reason
(second reason not used)

E. To get close to nature

What were your first and second most important reasons for fishing in the past two years?

____ 63. First Reason
(second reason not used)

B. To get close to nature or solitude

Appendix 6 (cont.)

Ecologistic Domain Items: items 1,2,11,18,46,47,69,70

Please indicate the two types of animals which interest you the most. Note that the emphasis is on the type of animal, not the specific examples.

____ 1. First Choice
____ 2. Second Choice

H. Animals important to particular ecosystems, for example, turkey vultures, dung beetles

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

11. I care more about the suffering of individual animals than I do about species population levels (SD,D,SLD).

18. I know little about ecosystems or the population dynamics of wild animals (SD,D,SLD).

Indicate the first and second most important reasons for the endangerment and extinction of the greatest number of wild species in the United States during the past 25 years.

____ 46. Most Important Reason
____ 47. Second Most Important Reason

C. Loss of wild land to logging, mining, oil and other natural resource industries
E. Human overpopulation resulting in loss of land to commercial and housing development

What are your first and second most important reasons for belonging to a conservation organization?

____ 69. First Reason
____ 70. Second Reason

C. Preserve wildlife habitat

Appendix 6 (cont.)

Humanistic Domain Items: items 1,6,12,49,51,57

Please indicate the two types of animals which interest you the most. Note that the emphasis is on the type of animal, not the specific examples.

____ 1. First Choice
(second reason not used)

E. Attractive and likeable animals, for example cocker spaniels, chipmunks

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

6. I think love is an emotion which people should feel only for other people, not for animals (SD,D).

12. I have owned pets that were as dear to me as another person (SA,A).

In general, what were your first and second main reasons for owning a pet in the past two years?

Pet One:
____ 49. First Reason
(second reason not used)
Pet Two:
____ 51. First Reason
(second reason not used)

C. Companionship and affection

In general, what were your first and second main reasons for owning a horse in the past two years?

____ 57. First Reason
(second reason not used)

D. Companionship and affection

Appendix 6 (cont.)

Moralistic Domain Items: items 24,25,27,28,32,36,38,40,41,42

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

24. I see nothing wrong with using steel traps to capture wild animals (SD,D).

25. I think its all right to kill whales for a useful product as long as the animals are not threatened with extinction (SD,D).

27. Before the government permits the trapping of wild animals, there should be proof that these animals will not be endangered by this trapping (SA).

28. Zoos should provide more natural conditions for their animals even if this means much higher entrance fees (SA).

32. I think it's all right to kill an animal to make a fur coat as long as the species is not endangered (SD,D).

36. I would rather pay a higher price for tuna fish than see the tuna industry continue killing porpoises in their nets (SA).

Some ranchers claim substantial economic loss because coyotes kill their sheep. Which methods would you approve of to correct this situation? (7 response alternatives ranging from strongly approve to strongly disapprove, or no opinion)

38. Shooting or trapping as many coyotes as possible (SD,D).

Of the following reasons for hunting, which do you approve of or oppose? (7 response alternatives range from strongly approve to strongly oppose, or no opinion)

40. Hunting game animals such as deer for recreation and sport (SO,O).

41. Hunting waterfowl such as ducks for recreation and sport (SO,O).

42. hunting for recreation and meat (SO,O).

Appendix 6 (cont.)

Scientistic Domain Items: items 1,2,5,15,54,55,66,67,69,70

Please indicate the two types of animals which interest you the most. Note that the emphasis is on the type of animal, not the specific examples.

____ 1. First Choice
____ 2. Second Choice

D. Scientifically fascinating animals, for example desert pupfish, army ants

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

5. I have little desire to study vertebrate zoology or population genetics (SD,D,SLD).

15. I have little interest in learning about the taxonomic classification of animals (SD,D,SLD).

In general, what were your first and second main reasons for owning a pet bird in the past two years?

____ 54. First Reason
____ 55 Second Reason

D. Scientific study

What were your first and second most important reasons for bird watching in the past two years?

____ 66. First Reason
____ 67. Second Reason

C. Scientific study

What are your first and second most important reasons for belonging to a conservation organization?

____ 69. First Reason
____ 70. Second Reason

B. Scientific study

Appendix 6 (cont.)

Utilitarian Domain Items: items 1,17,23,26,29,31,33, 34,35,37,39,44,45

Please indicate the two types of animals which interest you the most. Note that the emphasis is on the type of animal, not the specific examples.

____ 1. First Choice
(second choice not used)

C. Useful animals, for example cows, sheep

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

17. A dog trained at a task, like herding sheep, is generally a better dog than one owned just for companionship (SA,A,SLA).

23. A large coastal city has an unemployment problem. A major manufacturer wants to build a new plant on a marsh it owns which would employ 1,000 people, but conservationists claim this will destroy land needed by a rare bird. Do you agree that this plant should be built, even if it endangers the bird species (SA,A,SLA)?

29. I approve of building on marshes that ducks and other non-endangered wildlife use if the marshes are needed for housing development (SA,A,SLA).

31. We must even use pesticides harmful to wildlife if they are needed to maintain the country's food production at present levels (SA,A,SLA).

33. It has been suggested that 5 million acres of national forest land be set aside so that the endangered grizzly bear remain undisturbed. The timber industry objects, saying that jobs and needed lumber will be lost. Would you agree to protect the endangered grizzly bear even if it resulted in the loss of some jobs and building material (SA,A,SLA)?

34. I see nothing wrong with farmers shooting golden

eagles if the eagles kill their sheep (SA,A,SLA).

35. Natural resources must be developed even if the loss of wilderness results in much smaller wildlife populations (SA,A,SLA).

37. The goals of most environmentalists are a threat to the continued economic prosperity of our country (SA,A,SLA).

Some ranchers claim substantial economic loss because coyotes kill their sheep. Which methods would you approve of to correct this situation? (7 response alternatives ranging from strongly approve to strongly disapprove, or no opinion)

39. Poisoning, because it is the least expensive solution even though other animals besides coyotes may be killed (SA,A,SLA).

Various kinds of fish have been threatened with extinction because of dams, canals and other water projects. Indicate whether you would approve of the following water uses if they were to endanger a species of fish. (7 response alternatives ranging from strongly approve to strongly disapprove, or no opinion).

44. Water diverted to cool industrial plant machinery (SA,A).

45. Water damned to provide hydroelectric power (SA,A).

Appendix 6 (cont.)

Dominionistic Domain Items: items 1,2,7,14,21,24,32,43

Please indicate the two types of animals which interest you the most. Note that the emphasis is on the type of animal, not the specific examples.

____ 1. First Choice
____ 2. Second choice

F. Competitive, sporting, trophy animals, for example, bucking broncos, big horn sheep

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

7. I admire a person who works hard to shoot a big trophy animal like a 600-pound bear (SA,A,SLA).

14. I think a person sometimes has to beat a horse or dog to get it to obey orders properly (SA,A,SLA).

21. I approve of firmly disciplining a dog so that it strictly obeys every command (SA,A).

24. I see nothing wrong with using steel traps to capture wild animals (SA,A,SLA).

32. I think it's all right to kill an animal to make a fur coat as long as the species is not endangered (SA,A,SLA).

Of the following reasons for hunting, which do you approve of or oppose? (7 response alternatives range from strongly approve to strongly oppose, or no opinion)

43. Hunting for a trophy, such as horns or a mounted animal (SA,A,SLA).

Appendix 6 (cont.)

Negativistic Domain Items: items 1,2,4,8,10,13,19,30

Please indicate the two types of animals which interest you the most. Note that the emphasis is on the type of animal, not the specific examples.

____ 1. First Choice
____ 2. Second choice

A. I am not interested in animals

The next set of questions asks your opinion about various animal-related issues. There are no right or wrong answers. Indicate your opinion by circling one of the 7 response alternatives provided (ranging from strongly agree to strongly disagree, or no opinion).

4. I find most large dogs frightening (SA,A,SLA).

8. I would be afraid to touch a snake (SA,A,SLA).

10. I think rats and cockroaches should be eliminated (SA,A,SLA).

13. I dislike most beetles and spiders (SA,A,SLA).

19. I dislike having most animals physically close to me (SA,A,SLA).

30. The federal government should spend very little time and money on trying to educate the public about wildlife issues and problems (SA,A,SLA).

Appendix 7

CHARCTERISTICS OF TEACHER SUBGROUPS

Appendix 7. Characteristics of Teacher Subgroups

Table 7.1. Characteristics of all respondents (n=666)

Sex and Age		Race	
Male	40.8 %	White	89.5 %
Female	58.7 %	Black	7.2 %
Mean Age	44.0	Other	1.1 %

Highest Degree		Environmental Education
B.S.	30.2 %	35.6 % have attended a short workshop
M.S.	65.9 %	10.5 % have attended a 1-3 day workshop
Ph.D.	2.7 %	7.9 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	5.1 %	19.4 % teach biological science
1st - 3rd	18.9 %	19.0 % teach earth science
4th - 6th	16.2 %	8.9 % teach environmental ed.
7th - 9th	11.9 %	
9th -12th	29.6 %	
1st - 6th	35.1 %	
7th - 12th	50.1 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	24.6 %	19.7 %	18.2 %
10,000 - 100,000	30.3 %	35.9 %	32.1 %
100,000 or more	31.8 %	29.9 %	34.8 %

Animal Related Activity Rates	
Hunting	13.5 %
Fishing	48.3 %
Birdwatching	45.5 %
Club Membership	27.3 %
Pet Ownership	69.5 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.2. Characteristics of males (n=272)

Sex and Age

Male	100.0 %
Female	0.0 %
Mean Age	45

Race

White	92.2 %
Black	5.5 %
Other	1.0 %

Highest Degree

B.S.	21.7 %
M.S.	71.5 %
Ph.D.	5.5 %

Environmental Education

38.5 % have attended a short workshop
9.8 % have attended a 1-3 day workshop
9.4 % have attended a 3+ day workshop

Grade Level

Kindergarten	0.0 %
1st - 3rd	3.2 %
4th - 6th	16.1 %
7th - 9th	16.1 %
9th -12th	44.9 %
1st - 6th	23.9 %
7th - 12th	71.7 %

Science Teaching

17.8 % teach biological science
15.2 % teach earth science
5.8 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	28.8 %	22.3 %	20.7 %
10,000 - 100,000	29.8 %	35.3 %	30.5 %
100,000 or more	29.8 %	29.2 %	40.0 %

Animal Related Activity Rates

Hunting	24.3 %
Fishing	65.0 %
Birdwatching	43.4 %
Club Membership	29.1 %
Pet Ownership	69.6 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.3. Characteristics of females (n=391)

Sex and Age		Race	
Male	0.0 %	White	88.0 %
Female	100.0 %	Black	8.2 %
Mean Age	44.0	Other	1.7 %

Highest Degree		Environmental Education	
B.S.	34.3 %	32.4 %	have attended a short workshop
M.S.	62.4 %	10.8 %	have attended a 1-3 day workshop
Ph.D.	2.1 %	6.1 %	have attended a 3+ day workshop

Grade Level		Science Teaching	
Kindergarten	8.7 %	17.7 %	teach biological science
1st - 3rd	29.6 %	19.3 %	teach earth science
4th - 6th	16.1 %	9.3 %	teach environmental ed.
7th - 9th	8.8 %		
9th -12th	18.6 %		
1st - 6th	61.3 %		
7th - 12th	33.4 %		

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	21.1 %	17.6 %	15.9 %
10,000 - 100,000	31.0 %	36.2 %	33.8 %
100,000 or more	34.3 %	31.7 %	32.6 %

Animal Related Activity Rates	
Hunting	6.1 %
Fishing	37.3 %
Birdwatching	47.2 %
Club Membership	26.8 %
Pet Ownership	67.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.4. Characteristics of black teachers (n=48)

Sex and Age		Race	
Male	32.7 %	White	0.0 %
Female	67.3 %	Black	100.0 %
Mean Age	43	Other	0.0 %

Highest Degree		Environmental Education
B.S.	14.9 %	36.5 % have attended a short workshop
M.S.	83.0 %	5.8 % have attended a 1-3 day workshop
Ph.D.	2.1 %	7.7 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	0.0 %	12.5 % teach biological science
1st - 3rd	10.4 %	10.4 % teach earth science
4th - 6th	4.1 %	8.3 % teach environmental ed.
7th - 9th	12.3 %	
9th -12th	37.4 %	
1st - 6th	29.1 %	
7th - 12th	60.5 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	10.0 %	5.8 %	1.9 %
10,000 - 100,000	20.8 %	19.3 %	9.6 %
100,000 or more	54.1 %	67.3 %	78.8 %

Animal Related Activity Rates	
Hunting	4.2 %
Fishing	25.0 %
Birdwatching	29.1 %
Club Membership	4.2 %
Pet Ownership	41.6 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.5. Characteristics of white respondents (n=596)

Sex and Age		Race	
Male	43.1 %	White	100.0 %
Female	56.6 %	Black	0.0 %
Mean Age	44.3	Other	0.0 %

Highest Degree		Environmental Education
B.S.	30.1 %	34.9 % have attended a short workshop
M.S.	65.1 %	10.8 % have attended a 1-3 day workshop
Ph.D.	3.6 %	7.0 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	5.1 %	18.1 % teach biological science
1st - 3rd	16.7 %	18.0 % teach earth science
4th - 6th	15.7 %	7.8 % teach environmental ed.
7th - 9th	10.6 %	
9th -12th	25.6 %	
1st - 6th	32.3 %	
7th - 12th	43.0 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	26.4 %	20.6 %	19.3 %
10,000 - 100,000	30.7 %	37.0 %	33.9 %
100,000 or more	30.2 %	27.4 %	32.1 %

Animal Related Activity Rates	
Hunting	14.5 %
Fishing	51.2 %
Birdwatching	47.0 %
Club Membership	29.3 %
Pet Ownership	71.6 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.6. Characteristics of teachers age 24-34 (n=105)

Sex and Age

Male	31.6 %
Female	68.4 %
Mean Age	31.2

Race

White	91.2 %
Black	7.0 %
Other	1.8 %

Highest Degree

B.S.	40.4 %
M.S.	57.0 %
Ph.D.	1.8 %

Environmental Education

32.4 % have attended a short workshop
5.2 % have attended a 1-3 day workshop
6.1 % have attended a 3+ day workshop

Grade Level

Kindergarten	6.6 %
1st - 3rd	14.3 %
4th - 6th	17.1 %
7th - 9th	6.6 %
9th -12th	22.8 %
1st - 6th	46.7 %
7th - 12th	34.3 %

Science Teaching

12.3 % teach biological science
14.9 % teach earth science
4.4 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	22.8 %	28.9 %	28.1 %
10,000 - 100,000	30.7 %	29.8 %	28.9 %
100,000 or more	31.6 %	25.4 %	22.8 %

Animal Related Activity Rates

Hunting	14.9 %
Fishing	48.2 %
Birdwatching	40.4 %
Club Membership	22.8 %
Pet Ownership	64.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.7. Characteristics of teachers age 35-45 (n=272)

Sex and Age

Male	43.6 %
Female	56.0 %
Mean Age	40.1

Race

White	90.0 %
Black	7.2 %
Other	1.7 %

Highest Degree

B.S.	30.9 %
M.S.	64.9 %
Ph.D.	3.1 %

Environmental Education

39.9 % have attended a short workshop
8.6 % have attended a 1-3 day workshop
5.1 % have attended a 3+ day workshop

Grade Level

Kindergarten	4.1 %
1st - 3rd	18.7 %
4th - 6th	16.9 %
7th - 9th	13.6 %
9th -12th	29.4 %
1st - 6th	40.1 %
7th - 12th	50.7 %

Science Teaching

19.2 % teach biological science
17.5 % teach earth science
8.2 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	20.9 %	18.9 %	17.2 %
10,000 - 100,000	33.0 %	40.9 %	37.4 %
100,000 or more	33.7 %	26.1 %	31.6 %

Animal Related Activity Rates

Hunting	11.7 %
Fishing	52.6 %
Birdwatching	43.3 %
Club Membership	29.2 %
Pet Ownership	71.5 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.8. Characteristics of teachers age 46-56 (n=203)

Sex and Age		Race	
Male	44.2 %	White	91.4 %
Female	55.8 %	Black	7.3 %
Mean Age	50.9	Other	0.8 %

Highest Degree		Environmental Education
B.S.	22.9 %	30.5 % have attended a short workshop
M.S.	73.0 %	12.5 % have attended a 1-3 day workshop
Ph.D.	4.3 %	9.4 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	6.9 %	20.2 % teach biological science
1st - 3rd	1.97 %	18.9 % teach earth science
4th - 6th	14.8 %	9.4 % teach environmental ed.
7th - 9th	11.8 %	
9th -12th	35.0 %	
1st - 6th	33.9 %	
7th - 12th	52.2 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	28.3 %	16.7 %	14.1 %
10,000 - 100,000	27.9 %	30.9 %	28.3 %
100,000 or more	30.5 %	38.6 %	44.6 %

Animal Related Activity Rates	
Hunting	16.7 %
Fishing	48.1 %
Birdwatching	48.1 %
Club Membership	30.5 %
Pet Ownership	73.4 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.9. Characteristics of teachers age 57-67 (n=58)

Sex and Age		Race	
Male	43.5 %	White	92.8 %
Female	55.1 %	Black	2.9 %
Mean Age	59.8	Other	4.3 %

Highest Degree		Environmental Education
B.S.	20.3 %	36.3 % have attended a short workshop
M.S.	69.6 %	23.2 % have attended a 1-3 day workshop
Ph.D.	7.2 %	8.7 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	3.4 %	15.9 % teach biological science
1st - 3rd	24.1 %	17.4 % teach earth science
4th - 6th	15.5 %	11.6 % teach environmental ed.
7th - 9th	12.0 %	
9th -12th	24.1 %	
1st - 6th	46.5 %	
7th - 12th	46.5 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	31.8 %	17.4 %	18.8 %
10,000 - 100,000	24.6 %	40.6 %	33.3 %
100,000 or more	30.4 %	31.9 %	42.0 %

Animal Related Activity Rates	
Hunting	8.7 %
Fishing	39.1 %
Birdwatching	52.2 %
Club Membership	21.7 %
Pet Ownership	60.9 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.10. Characteristics of teachers with a B.S. degree (n=201)

Sex and Age		Race	
Male	31.5 %	White	93.4 %
Female	68.5 %	Black	3.3 %
Mean Age	42.0	Other	1.4 %

Highest Degree		Environmental Education
B.S.	100.0 %	35.2 % have attended a short workshop
M.S.	0.0 %	9.6 % have attended a 1-3 day workshop
Ph.D.	0.0 %	5.2 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	6.9 %	19.3 % teach biological science
1st - 3rd	21.9 %	23.0 % teach earth science
4th - 6th	12.5 %	8.0 % teach environmental ed.
7th - 9th	11.9 %	
9th -12th	21.2 %	
1st - 6th	45.2 %	
7th - 12th	41.3 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	30.1 %	31.4 %	28.2 %
10,000 - 100,000	29.0 %	32.4 %	29.6 %
100,000 or more	26.8 %	20.1 %	21.2 %

Animal Related Activity Rates	
Hunting	17.8 %
Fishing	52.6 %
Birdwatching	43.7 %
Club Membership	28.6 %
Pet Ownership	77.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.11. Characteristics of teachers with an M.S. degree (n=201)

Sex and Age		Race	
Male	44.2 %	White	88.1 %
Female	55.4 %	Black	8.8 %
Mean Age	45.0	Other	1.2 %

Highest Degree		Environmental Education
B.S.	0.0 %	35.2 % have attended a short workshop
M.S.	100.0 %	10.9 % have attended a 1-3 day workshop
Ph.D.	0.0 %	8.4 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	4.6 %	17.5 % teach biological science
1st - 3rd	18.4 %	15.3 % teach earth science
4th - 6th	16.5 %	8.3 % teach environmental ed.
7th - 9th	11.4 %	
9th -12th	32.4 %	
1st - 6th	40.8 %	
7th - 12th	51.7 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	22.7 %	15.5 %	14.5 %
10,000 - 100,000	31.5 %	36.9 %	33.6 %
100,000 or more	34.2 %	34.5 %	40.3 %

Animal Related Activity Rates	
Hunting	11.9 %
Fishing	47.9 %
Birdwatching	45.6 %
Club Membership	27.6 %
Pet Ownership	66.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.12. Characteristics of teachers with a Ph.D. degree (n=27)

Sex and Age		Race	
Male	63.2 %	White	88.9 %
Female	33.3 %	Black	3.7 %
Mean Age	48.0	Other	3.7 %

Highest Degree		Environmental Education
B.S.	0.0 %	25.1 % have attended a short workshop
M.S.	0.0 %	14.8 % have attended a 1-3 day workshop
Ph.D.	100.0 %	11.1 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	0.0 %	7.4 % teach biological science
1st - 3rd	0.0 %	7.4 % teach earth science
4th - 6th	0.0 %	3.7 % teach environmental ed.
7th - 9th	27.8 %	
9th -12th	28.8 %	
1st - 6th	11.1 %	
7th - 12th	77.9 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	22.7 %	7.4 %	33.4 %
10,000 - 100,000	25.9 %	44.4 %	33.6 %
100,000 or more	44.4 %	40.7 %	62.9 %

Animal Related Activity Rates	
Hunting	18.5 %
Fishing	40.7 %
Birdwatching	55.6 %
Club Membership	25.9 %
Pet Ownership	63.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.13. Characteristics of science teachers (n=197)

Sex and Age		Race	
Male	38.6 %	White	91.0 %
Female	61.4 %	Black	5.6 %
Mean Age	45	Other	2.0 %

Highest Degree		Environmental Education
B.S.	33.0 %	44.2 % have attended a short workshop
M.S.	64.5 %	15.8 % have attended a 1-3 day workshop
Ph.D.	2.0 %	14.3 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	6.1 %	65.9 % teach biological science
1st - 3rd	27.0	64.5 % teach earth science
4th - 6th	20.3 %	30.5 % teach environmental ed.
7th - 9th	11.1 %	
9th -12th	16.2 %	
1st - 6th	56.9 %	
7th - 12th	34.0 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	26.4 %	25.9 %	23.4 %
10,000 - 100,000	33.0 %	35.1 %	29.0 %
100,000 or more	26.5 %	28.5 %	32.5 %

Animal Related Activity Rates	
Hunting	19.0 %
Fishing	52.0 %
Birdwatching	54.0 %
Club Membership	36.0 %
Pet Ownership	76.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.14. Characteristics of nonscience teachers (n=197)

Sex and Age		Race	
Male	43.1 %	White	89.3 %
Female	56.4 %	Black	7.6 %
Mean Age	38.6	Other	1.1 %

Highest Degree		Environmental Education
B.S.	27.4 %	30.0 % have attended a short workshop
M.S.	66.9 %	8.5 % have attended a 1-3 day workshop
Ph.D.	4.3 %	5.0 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	4.7 %	0.0 % teach biological science
1st - 3rd	15.5 %	0.0 % teach earth science
4th - 6th	11.3 %	0.0 % teach environmental ed.
7th - 9th	12.2 %	
9th -12th	33.3 %	
1st - 6th	43.7 %	
7th - 12th	55.5 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	23.8 %	15.1 %	15.6 %
10,000 - 100,000	29.6 %	36.3 %	33.9 %
100,000 or more	34.4 %	31.3 %	36.6 %

Animal Related Activity Rates	
Hunting	10.8 %
Fishing	46.7 %
Birdwatching	41.8 %
Club Membership	23.7 %
Pet Ownership	66.5 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.15. Characteristics of 1st-6th grade science teachers (n=108)

Sex and Age		Race	
Male	22.2 %	White	92.6 %
Female	77.8 %	Black	5.6 %
Mean Age	39.8	Other	0.9 %

Highest Degree		Environmental Education
B.S.	36.1 %	42.5 % have attended a short workshop
M.S.	62.0 %	12.9 % have attended a 1-3 day workshop
Ph.D.	0.9 %	11.1 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	0.0 %	62.9 % teach biological science
1st - 3rd	44.4 %	73.1 % teach earth science
4th - 6th	34.3 %	33.0 % teach environmental ed.
7th - 9th	0.0 %	
9th -12th	0.0 %	
1st - 6th	100.0 %	
7th - 12th	0.0 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	24.1 %	23.1 %	22.2 %
10,000 - 100,000	38.0 %	35.1 %	33.3 %
100,000 or more	25.9 %	31.7 %	31.5 %

Animal Related Activity Rates	
Hunting	10.2 %
Fishing	48.1 %
Birdwatching	47.2 %
Club Membership	25.0 %
Pet Ownership	75.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.16. Characteristics of 9th-12th grade science teachers (n=32)

Sex and Age		Race	
Male	78.1 %	White	90.6 %
Female	21.9 %	Black	9.4 %
Mean Age	42.1	Other	0.0 %

Highest Degree		Environmental Education
B.S.	15.6 %	28.1 % have attended a short workshop
M.S.	81.3 %	6.2 % have attended a 1-3 day workshop
Ph.D.	3.1 %	12.5 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	0.0 %	81.2 % teach biological science
1st - 3rd	0.0 %	34.3 % teach earth science
4th - 6th	0.0 %	25.0 % teach environmental ed.
7th - 9th	0.0 %	
9th -12th	100.0 %	
1st - 6th	0.0 %	
7th - 12th	0.0 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	25.0 %	21.8 %	9.4 %
10,000 - 100,000	31.2 %	31.2 %	31.2 %
100,000 or more	21.9 %	37.5 %	40.6 %

Animal Related Activity Rates	
Hunting	31.3 %
Fishing	75.0 %
Birdwatching	81.3 %
Club Membership	65.6 %
Pet Ownership	84.4 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.17. Characteristics of environmental education teachers (n=60)

Sex and Age		Race	
Male	30.0 %	White	89.7 %
Female	70.0 %	Black	6.9 %
Mean Age	46.4	Other	3.4 %

Highest Degree		Environmental Education
B.S.	28.3 %	48.3 % have attended a short workshop
M.S.	68.3 %	15.0 % have attended a 1-3 day workshop
Ph.D.	46.4 %	21.7 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	6.7 %	58.3 % teach biological science
1st - 3rd	30.0 %	56.6 % teach earth science
4th - 6th	30.0 %	100.0 % teach environmental ed.
7th - 9th	10.0 %	
9th -12th	15.0 %	
1st - 6th	60.0 %	
7th - 12th	25.0 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	33.3 %	28.3 %	23.3 %
10,000 - 100,000	28.3 %	33.3 %	35.0 %
100,000 or more	23.3 %	26.6 %	31.6 %

Animal Related Activity Rates	
Hunting	18.3 %
Fishing	50.0 %
Birdwatching	68.3 %
Club Membership	43.3 %
Pet Ownership	75.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.18. Characteristics of 1st-3rd grade teachers (n=126)

Sex and Age

Male	7.1 %
Female	92.1 %
Mean Age	45

Race

White	88.1 %
Black	7.1 %
Other	2.4 %

Highest Degree

B.S.	34.9 %
M.S.	64.3 %
Ph.D.	0.8 %

Environmental Education

38.9 % have attended a short workshop
8.9 % have attended a 1-3 day workshop
5.5 % have attended a 3+ day workshop

Grade Level

Kindergarten	0.0 %
1st - 3rd	100.0 %
4th - 6th	0.0 %
7th - 9th	0.0 %
9th -12th	0.0 %
1st - 6th	0.0 %
7th - 12th	0.0 %

Science Teaching

24.6 % teach biological science
13.5 % teach earth science
4.3 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	23.7 %	19.1 %	16.7 %
10,000 - 100,000	29.4 %	37.3 %	39.0 %
100,000 or more	31.7 %	37.3 %	31.0 %

Animal Related Activity Rates

Hunting	68.3 %
Fishing	36.5 %
Birdwatching	46.8 %
Club Membership	26.2 %
Pet Ownership	68.3 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.19. Characteristics of 4th-6th grade teachers (n=102)

Sex and Age

Male	40.7 %
Female	58.3 %
Mean Age	58.3

Race

White	96.3 %
Black	2.8 %
Other	0.0 %

Highest Degree

B.S.	31.5 %
M.S.	66.7 %
Ph.D.	0.9 %

Environmental Education

38.9 % have attended a short workshop
17.6 % have attended a 1-3 day workshop
14.8 % have attended a 3+ day workshop

Grade Level

Kindergarten	0.0 %
1st - 3rd	0.0 %
4th - 6th	100.0 %
7th - 9th	0.0 %
9th -12th	0.0 %
1st - 6th	0.0 %
7th - 12th	0.0 %

Science Teaching

34.3 % teach biological science
39.9 % teach earth science
16.7 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	25.0 %	23.2 %	24.1 %
10,000 - 100,000	41.7 %	37.9 %	29.1 %
100,000 or more	25.0 %	25.9 %	32.5 %

Animal Related Activity Rates

Hunting	13.9 %
Fishing	52.8 %
Birdwatching	47.2 %
Club Membership	28.7 %
Pet Ownership	78.7 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.20. Characteristics of 9th-12th grade teachers (n=197)

Sex and Age		Race	
Male	61.4 %	White	88.8 %
Female	38.1 %	Black	9.1 %
Mean Age	45	Other	0.0 %

Highest Degree		Environmental Education
B.S.	21.3 %	27.9 % have attended a short workshop
M.S.	72.1 %	8.7 % have attended a 1-3 day workshop
Ph.D.	4.6 %	8.2 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	0.0 %	22.2 % teach biological science
1st - 3rd	0.0 %	18.3 % teach earth science
4th - 6th	0.0 %	7.8 % teach environmental ed.
7th - 9th	0.0 %	
9th -12th	100.0 %	
1st - 6th	0.0 %	
7th - 12th	0.0 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	28.4 %	15.7 %	12.7 %
10,000 - 100,000	30.4 %	34.5 %	32.4 %
100,000 or more	30.0 %	35.0 %	42.6 %

Animal Related Activity Rates	
Hunting	16.2 %
Fishing	56.9 %
Birdwatching	49.2 %
Club Membership	24.9 %
Pet Ownership	65.5 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.21. Characteristics of teachers who grew up in a population of less than 5000 people (n=164)

Sex and Age		Race	
Male	48.7 %	White	96.9 %
Female	50.3 %	Black	2.6 %
Mean Age	45.3	Other	0.0 %

Highest Degree		Environmental Education
B.S.	35.2 %	30.0 % have attended a short workshop
M.S.	60.6 %	12.9 % have attended a 1-3 day workshop
Ph.D.	3.1 %	7.8 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	4.2 %	18.7 % teach biological science
1st - 3rd	20.1 %	21.2 % teach earth science
4th - 6th	17.1 %	10.9 % teach environmental ed.
7th - 9th	12.2 %	
9th -12th	34.7 %	
1st - 6th	36.8 %	
7th - 12th	48.2 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	100.0 %	40.9 %	36.3 %
10,000 - 100,000	0.0 %	24.8 %	27.5 %
100,000 or more	0.0 %	17.6 %	19.7 %

Animal Related Activity Rates	
Hunting	23.3 %
Fishing	54.4 %
Birdwatching	43.5 %
Club Membership	29.0 %
Pet Ownership	76.2 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.22. Characteristics of teachers who grew up in a population of 10,000-100,000 people (n=202)

Sex and Age		Race	
Male	40.9 %	White	90.2 %
Female	58.7 %	Black	5.8 %
Mean Age	43.4	Other	0.4 %

Highest Degree		Environmental Education
B.S.	27.6 %	38.2 % have attended a short workshop
M.S.	68.4 %	8.5 % have attended a 1-3 day workshop
Ph.D.	3.1 %	8.9 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	5.5 %	23.1 % teach biological science
1st - 3rd	18.3 %	18.2 % teach earth science
4th - 6th	22.7 %	7.5 % teach environmental ed.
7th - 9th	9.4 %	
9th -12th	27.4 %	
1st - 6th	46.0 %	
7th - 12th	45.0 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	0.0 %	15.5 %	13.3 %
10,000 - 100,000	100.0 %	53.3 %	52.4 %
100,000 or more	0.0 %	22.2 %	24.8 %

Animal Related Activity Rates	
Hunting	12.0 %
Fishing	52.9 %
Birdwatching	46.7 %
Club Membership	33.8 %
Pet Ownership	68.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.23. Characteristics of teachers who grew up in a population of more than 100,000 people (n=212)

Sex and Age		Race	
Male	38.7 %	White	84.0 %
Female	61.3 %	Black	11.3 %
Mean Age	44.1	Other	2.9 %

Highest Degree		Environmental Education
B.S.	23.9 %	34.9 % have attended a short workshop
M.S.	70.2 %	9.7 % have attended a 1-3 day workshop
Ph.D.	5.0 %	5.0 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	5.6 %	12.6 % teach biological science
1st - 3rd	18.9 %	14.3 % teach earth science
4th - 6th	12.7 %	4.6 % teach environmental ed.
7th - 9th	15.6 %	
9th -12th	27.8 %	
1st - 6th	37.3 %	
7th - 12th	51.4 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	0.0 %	7.1 %	7.5 %
10,000 - 100,000	0.0 %	30.7 %	20.6 %
100,000 or more	100.0 %	53.8 %	63.0 %

Animal Related Activity Rates	
Hunting	10.2 %
Fishing	38.2 %
Birdwatching	45.0 %
Club Membership	21.8 %
Pet Ownership	64.7 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.24. Characteristics of upper peninsula residents (n=24)

Sex and Age		Race	
Male	57.1 %	White	100.0 %
Female	42.9 %	Black	0.0 %
Mean Age	37	Other	0.0 %

Highest Degree		Environmental Education
B.S.	50.0 %	32.1 % have attended a short workshop
M.S.	41.6 %	7.1 % have attended a 1-3 day workshop
Ph.D.	4.2 %	0.0 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	4.2 %	7.1 % teach biological science
1st - 3rd	20.9 %	14.3 % teach earth science
4th - 6th	12.5 %	3.6 % teach environmental ed.
7th - 9th	4.2 %	
9th -12th	25.0 %	
1st - 6th	45.9 %	
7th - 12th	37.5 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	45.8 %	32.1 %	32.1 %
10,000 - 100,000	20.8 %	42.9 %	35.7 %
100,000 or more	20.8 %	3.6 %	3.6 %

Animal Related Activity Rates	
Hunting	25.0 %
Fishing	50.0 %
Birdwatching	40.6 %
Club Membership	37.5 %
Pet Ownership	87.5 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.25. Characteristics of northern lower peninsula residents (n=31)

Sex and Age		Race	
Male	54.8 %	White	100.0 %
Female	45.2 %	Black	0.0 %
Mean Age	36.8	Other	0.0 %

Highest Degree		Environmental Education
B.S.	71.0 %	32.1 % have attended a short workshop
M.S.	29.0 %	7.1 % have attended a 1-3 day workshop
Ph.D.	7.1 %	16.1 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	0.0 %	19.4 % teach biological science
1st - 3rd	9.6 %	38.7 % teach earth science
4th - 6th	25.8 %	9.7 % teach environmental ed.
7th - 9th	19.4 %	
9th -12th	22.6 %	
1st - 6th	41.9 %	
7th - 12th	48.4 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	38.7 %	51.6 %	41.9 %
10,000 - 100,000	29.0 %	19.4 %	22.6 %
100,000 or more	12.9 %	0.0 %	0.0 %

Animal Related Activity Rates	
Hunting	45.2 %
Fishing	74.2 %
Birdwatching	64.5 %
Club Membership	54.8 %
Pet Ownership	90.3 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.26. Characteristics of southern lower peninsula residents (n=636)

Sex and Age		Race	
Male	41.0 %	White	89.2 %
Female	58.6 %	Black	7.7 %
Mean Age	39.4	Other	1.6 %

Highest Degree		Environmental Education
B.S.	24.2 %	34.1 % have attended a short workshop
M.S.	62.6 %	10.7 % have attended a 1-3 day workshop
Ph.D.	2.3 %	7.4 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	4.7 %	18.4 % teach biological science
1st - 3rd	17.1 %	16.5 % teach earth science
4th - 6th	15.3 %	8.5 % teach environmental ed.
7th - 9th	10.4 %	
9th -12th	27.2 %	
1st - 6th	42.1 %	
7th - 12th	45.1 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	20.6 %	17.0 %	16.0 %
10,000 - 100,000	27.6 %	36.8 %	32.5 %
100,000 or more	30.2 %	33.0 %	39.2 %

Animal Related Activity Rates	
Hunting	10.1 %
Fishing	42.8 %
Birdwatching	40.6 %
Club Membership	22.6 %
Pet Ownership	61.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.27. Characteristics of Detroit teachers (Wayne county) (n=27)

Sex and Age

Male	43.8 %
Female	55.8 %
Mean Age	40.0

Race

White	82.8 %
Black	14.2 %
Other	1.1 %

Highest Degree

B.S.	17.9 %
M.S.	75.9 %
Ph.D.	4.7 %

Environmental Education

32.1 % have attended a short workshop
11.7 % have attended a 1-3 day workshop
8.4 % have attended a 3+ day workshop

Grade Level

Kindergarten	4.0 %
1st - 3rd	16.4 %
4th - 6th	16.1 %
7th - 9th	12.8 %
9th -12th	18.6 %
1st - 6th	32.5 %
7th - 12th	45.3 %

Science Teaching

16.8 % teach biological science
13.5 % teach earth science
13.1 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	18.6 %	4.4 %	0.5 %
10,000 - 100,000	29.2 %	35.4 %	24.8 %
100,000 or more	47.1 %	50.7 %	68.6 %

Animal Related Activity Rates

Hunting	9.9 %
Fishing	46.0 %
Birdwatching	47.4 %
Club Membership	23.7 %
Pet Ownership	63.1 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.28. Characteristics of teachers who have attended at least one environmental education workshop (n=317)

Sex and Age		Race	
Male	44.1 %	White	89.6 %
Female	55.4 %	Black	7.0 %
Mean Age	38.7	Other	2.3 %

Highest Degree		Environmental Education
B.S.	27.2 %	74.7 % have attended a short workshop
M.S.	68.7 %	22.4 % have attended a 1-3 day workshop
Ph.D.	3.5 %	16.0 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	7.1 %	23.5 % teach biological science
1st - 3rd	12.9 %	24.0 % teach earth science
4th - 6th	20.7 %	12.1 % teach environmental ed.
7th - 9th	9.9 %	
9th -12th	27.8 %	
1st - 6th	46.6 %	
7th - 12th	44.8 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	24.3 %	22.0 %	20.0 %
10,000 - 100,000	32.0 %	35.4 %	34.0 %
100,000 or more	32.0 %	30.4 %	34.2 %

Animal Related Activity Rates	
Hunting	15.9 %
Fishing	54.5 %
Birdwatching	53.3 %
Club Membership	34.2 %
Pet Ownership	73.3 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.29. Characteristics of teachers who have not attended an environmental education workshop (n=349)

Sex and Age		Race	
Male	39.5 %	White	89.1 %
Female	60.5 %	Black	7.4 %
Mean Age	38.3	Other	0.6 %

Highest Degree		Environmental Education
B.S.	31.8 %	0.0 % have attended a short workshop
M.S.	62.8 %	0.0 % have attended a 1-3 day workshop
Ph.D.	3.7 %	0.0 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	3.4 %	18.4 % teach biological science
1st - 3rd	18.6 %	16.5 % teach earth science
4th - 6th	12.3 %	8.5 % teach environmental ed.
7th - 9th	13.8 %	
9th -12th	35.2 %	
1st - 6th	36.4 %	
7th - 12th	55.5 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	24.6 %	17.7 %	15.5 %
10,000 - 100,000	28.4 %	35.8 %	30.4 %
100,000 or more	32.9 %	30.4 %	36.9 %

Animal Related Activity Rates	
Hunting	10.6 %
Fishing	43.3 %
Birdwatching	37.8 %
Club Membership	20.9 %
Pet Ownership	65.6 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.30. Characteristics of anti-hunters (n=135)

Sex and Age		Race	
Male	25.0 %	White	82.0 %
Female	74.0 %	Black	12.0 %
Mean Age	44	Other	2.1 %

Highest Degree		Environmental Education
B.S.	19.6 %	32.4 % have attended a short workshop
M.S.	74.3 %	10.1 % have attended a 1-3 day workshop
Ph.D.	6.7 %	6.7 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	6.0 %	15.7 % teach biological science
1st - 3rd	22.2 %	15.0 % teach earth science
4th - 6th	13.3 %	7.5 % teach environmental ed.
7th - 9th	9.9 %	
9th -12th	29.2 %	
1st - 6th	34.1 %	
7th - 12th	48.1 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	13.5 %	8.9 %	6.8 %
10,000 - 100,000	31.8 %	37.8 %	35.8 %
100,000 or more	43.2 %	39.2 %	43.9 %

Animal Related Activity Rates	
Hunting	0.0 %
Fishing	27.0 %
Birdwatching	42.9 %
Club Membership	23.7 %
Pet Ownership	62.9 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.31. Characteristics of nonhunters (n=336)

Sex and Age		Race	
Male	43.2 %	White	85.9 %
Female	56.8 %	Black	5.4 %
Mean Age	44	Other	1.7 %

Highest Degree		Environmental Education
B.S.	21.1 %	33.8 % have attended a short workshop
M.S.	75.2 %	10.8 % have attended a 1-3 day workshop
Ph.D.	3.8 %	6.5 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	3.2 %	16.6 % teach biological science
1st - 3rd	20.5 %	17.0 % teach earth science
4th - 6th	16.9 %	6.8 % teach environmental ed.
7th - 9th	12.2 %	
9th -12th	29.2 %	
1th - 6th	43.5 %	
7th - 12th	49.7 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	27.0 %	20.5 %	20.6 %
10,000 - 100,000	32.5 %	38.1 %	34.4 %
100,000 or more	26.7 %	27.6 %	31.4 %

Animal Related Activity Rates	
Hunting	0 %
Fishing	50.5 %
Birdwatching	42.4 %
Club Membership	21.1 %
Pet Ownership	69.2 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.32. Characteristics of hunters (n=88)

Sex and Age		Race	
Male	73.5 %	White	94.1 %
Female	25.5 %	Black	2.9 %
Mean Age	44	Other	0.6 %

Highest Degree		Environmental Education
B.S.	37.3 %	41.2 % have attended a short workshop
M.S.	56.9 %	12.8 % have attended a 1-3 day workshop
Ph.D.	4.9 %	14.7 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	1.0 %	26.5 % teach biological science
1st - 3rd	10.2 %	21.6 % teach earth science
4th - 6th	17.0 %	10.8 % teach environmental ed.
7th - 9th	10.3 %	
9th -12th	36.3 %	
1th - 6th	34.1 %	
7th - 12th	69.5 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	41.2 %	40.2 %	31.4 %
10,000 - 100,000	26.4 %	23.6 %	23.6 %
100,000 or more	18.6 %	22.5 %	32.3 %

Animal Related Activity Rates	
Hunting	100.0 %
Fishing	94.1 %
Birdwatching	53.9 %
Club Membership	53.9 %
Pet Ownership	76.1 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.33. Characteristics of anglers (n=322)

Sex and Age

Male	55.7 %
Female	44.5 %
Mean Age	43.5

Race

White	93.9 %
Black	3.9 %
Other	0.6 %

Highest Degree

B.S.	31.0 %
M.S.	64.8 %
Ph.D.	3.0 %

Environmental Education

38.2 % have attended a short workshop
12.8 % have attended a 1-3 day workshop
10.2 % have attended a 3+ day workshop

Grade Level

Kindergarten	4.4 %
1st - 3rd	14.4 %
4th - 6th	17.7 %
7th - 9th	9.4 %
9th -12th	34.8 %
1st - 6th	31.9 %
7th - 12th	54.6 %

Science Teaching

22.2 % teach biological science
18.3 % teach earth science
7.8 % teach environmental ed.

Population Where Teacher:

	Grew Up	Lives	Teaches
Less than 5000	26.9 %	24.7 %	20.7 %
10,000 - 100,000	33.0 %	34.7 %	31.9 %
100,000 or more	27.2 %	26.0 %	34.0 %

Animal Related Activity Rates

Hunting	26.6 %
Fishing	100.0 %
Birdwatching	51.5 %
Club Membership	34.9 %
Pet Ownership	75.3 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.34. Characteristics of birdwatchers (n=303)

Sex and Age

Male	39.8 %
Female	59.6 %
Mean Age	45.0

Race

White	92.3 %
Black	4.2 %
Other	1.2 %

Highest Degree

B.S.	27.6 %
M.S.	65.9 %
Ph.D.	4.5 %

Environmental Education

39.7 % have attended a short workshop
13.0 % have attended a 1-3 day workshop
11.8 % have attended a 3+ day workshop

Grade Level

Kindergarten	4.7 %
1st - 3rd	19.5 %
4th - 6th	16.9 %
7th - 9th	12.2 %
9th -12th	35.0 %
1st - 6th	40.6 %
7th - 12 th	51.2 %

Science Teaching

22.0 % teach biological science
18.7 % teach earth science
12.2 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	22.8 %	23.2 %	19.9 %
10,000 - 100,000	40.2 %	35.6 %	31.5 %
100,000 or more	31.8 %	27.6 %	34.2 %

Animal Related Activity Rates

Hunting	16.3 %
Fishing	55.2 %
Birdwatching	100.0 %
Club Membership	41.2 %
Pet Ownership	76.0 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.35. Characteristics of conservation club members (n=182)

Sex and Age		Race	
Male	43.9 %	White	94.6 %
Female	55.6 %	Black	1.5 %
Mean Age	44	Other	1.5 %

Highest Degree		Environmental Education
B.S.	29.8 %	41.9 % have attended a short workshop
M.S.	65.9 %	13.1 % have attended a 1-3 day workshop
Ph.D.	3.4 %	15.1 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	5.5 %	24.9 % teach biological science
1st - 3rd	18.2 %	21.5 % teach earth science
4th - 6th	11.5 %	13.7 % teach environmental ed.
7th - 9th	15.4 %	
9th -12th	26.9 %	
1st - 6th	41.2 %	
7th - 12th	48.9 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	24.8 %	24.3 %	19.0 %
10,000 - 100,000	37.0 %	35.0 %	33.2 %
100,000 or more	25.3 %	25.8 %	31.2 %

Animal Related Activity Rates	
Hunting	26.8 %
Fishing	61.5 %
Birdwatching	67.8 %
Club Membership	100.0 %
Pet Ownership	82.9 %

Appendix 7. Characteristics of Teacher Subgroups

Table 7.36. Characteristics of pet owners (n=463)

Sex and Age		Race	
Male	42.1 %	White	92.7 %
Female	57.5 %	Black	4.3 %
Mean Age	38.7	Other	1.6 %

Highest Degree		Environmental Education
B.S.	33.0 %	38.3 % have attended a short workshop
M.S.	63.0 %	11.0 % have attended a 1-3 day workshop
Ph.D.	2.4 %	7.8 % have attended a 3+ day workshop

Grade Level		Science Teaching
Kindergarten	5.6 %	22.4 % teach biological science
1st - 3rd	27.6 %	20.7 % teach earth science
4th - 6th	18.3 %	9.5 % teach environmental ed.
7th - 9th	12.7 %	
9th -12th	35.5 %	
1st - 6th	30.2 %	
7th - 12th	48.6 %	

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	27.2 %	21.4 %	20.7 %
10,000 - 100,000	29.8 %	35.2 %	30.9 %
100,000 or more	29.8 %	27.2 %	32.2 %

Animal Related Activity Rates	
Hunting	14.5 %
Fishing	53.6 %
Birdwatching	49.7 %
Club Membership	32.4 %
Pet Ownership	100.0 %

Appendix 8

CHARACTERISTICS OF TEACHER PROFILE TYPES

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.1. Respondents with low naturalistic, ecologistic, humanistic, and moralistic scores (- - - -) (n=113)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.11	.14	.20	.15	.03	.16	.11	.06

Sex and Age

Male	41.6 %
Female	58.4 %
Mean Age	39.1

Race

White	86.7 %
Black	10.9 %
Other	0.0 %

Highest Degree

B.S.	31.0 %
M.S.	64.6 %
Ph.D.	39.1%

Environmental Education

32.7 % have attended a short workshop
9.7 % have attended a 1-3 day workshop
4.4 % have attended a 3+ day workshop

Grade Level

Kindergarten	5.3 %
1st - 3rd	20.4 %
4th - 6th	13.3 %
7th - 9th	9.7 %
9th -12th	35.4 %
1st - 6th	45.1 %
7th - 12th	48.7 %

Science Teaching

9.7 % teach biological science
13.3 % teach earth science
3.5 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	23.0 %	21.2 %	19.5 %
10,000 - 100,000	20.4 %	34.5 %	33.6 %
100,000 or more	38.9 %	36.3 %	36.3 %

Animal Related Activity Rates

Hunting	8.0 %	Non 62.8 %	Anti 7.1 %
Fishing	31.9 %		
Birdwatching	24.4 %		
Club Membership	4.4 %		
Pet Ownership	46.9 %		

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.2. Respondents with high naturalistic, ecologistic, humanistic, and moralistic scores (+ + + +) (n=58)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.46	.44	.61	.65	.10	.04	.03	.08

Sex and Age

Male	36.2 %
Female	63.8 %
Mean Age	38.6

Race

White	93.1 %
Black	5.2 %
Other	1.7 %

Highest Degree

B.S.	32.8 %
M.S.	65.5 %
Ph.D.	1.7 %

Environmental Education

34.5 % have attended a short workshop
6.9 % have attended a 1-3 day workshop
6.9 % have attended a 3+ day workshop

Grade Level

Kindergarten	3.4 %
1st - 3rd	8.6 %
4th - 6th	31.0 %
7th - 9th	17.2 %
9th -12th	29.3 %
1st - 6th	39.7 %
7th - 12th	50.0 %

Science Teaching

37.9 % teach biological science
18.9 % teach earth science
12.1 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	15.5 %	25.9 %	24.1 %
10,000 - 100,000	37.9 %	27.5 %	22.4 %
100,000 or more	24.1 %	29.3 %	29.3 %

Animal Related Activity Rates

Hunting	10.3 %
Fishing	60.3 %
Birdwatching	79.3 %
Club Membership	50.0 %
Pet Ownership	94.8 %

Non 44.8 %

Anti 25.9 %

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.3. Respondents with high naturalistic, ecologistic, and low humanistic and moralistic scores (+ + - -) (n=49)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.50	.06	.20	.14	.11	.10	.18	.12

Sex and Age

Male	85.7 %
Female	12.2 %
Mean Age	37.8

Race

White	91.8 %
Black	4.1 %
Other	3.0 %

Highest Degree

B.S.	36.7 %
M.S.	57.1 %
Ph.D.	2.0 %

Environmental Education

32.6 % have attended a short workshop
24.5 % have attended a 1-3 day workshop
14.3 % have attended a 3+ day workshop

Grade Level

Kindergarten	0.0 %
1st - 3rd	3.4 %
4th - 6th	10.2 %
7th - 9th	14.3 %
9th -12th	49.0 %
1st - 6th	22.0 %
7th - 12th	49.0 %

Science Teaching

32.6 % teach biological science
24.5 % teach earth science
14.3 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	26.5 %	34.7 %	26.5 %
10,000 - 100,000	28.6 %	34.7 %	38.8 %
100,000 or more	22.4 %	18.4 %	20.4 %

Animal Related Activity Rates

Hunting	46.9 %	Non 40.8 %	Anti 0.0 %
Fishing	75.5 %		
Birdwatching	67.3 %		
Club Membership	61.2 %		
Pet Ownership	69.4 %		

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.4. Respondents with low naturalistic and ecologistic, and high humanistic and moralistic scores (- - + +) (n=43)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.14	.14	.65	.59	.03	.07	.03	.21

Sex and Age

Male	18.6 %
Female	81.4 %
Mean Age	38.1

Race

White	97.7 %
Black	2.3 %
Other	0.0 %

Highest Degree

B.S.	23.3 %
M.S.	67.4 %
Ph.D.	4.7 %

Environmental Education

25.6 % have attended a short workshop
9.3 % have attended a 1-3 day workshop
2.3 % have attended a 3+ day workshop

Grade Level

Kindergarten	4.7 %
1st - 3rd	23.3 %
4th - 6th	9.3 %
7th - 9th	14.0 %
9th -12th	32.6 %
1st - 6th	44.2 %
7th - 12th	46.5 %

Science Teaching

4.7 % teach biological science
2.3 % teach earth science
4.7 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	11.6 %	11.6 %	7.0 %
10,000 - 100,000	37.2 %	48.8 %	48.8 %
100,000 or more	34.9 %	23.2 %	28.0 %

Animal Related Activity Rates

Hunting	0.0 %
Fishing	27.9 %
Birdwatching	39.5 %
Club Membership	20.9 %
Pet Ownership	79.1 %

Non 34.9 %

Anti 53.5 %

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.5. Respondents with high naturalistic and low ecologistic, humanistic and moralistic scores (+ - - -) (n=52)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.40	.17	.23	.17	.05	.11	.14	.20

Sex and Age

Male	57.7 %
Female	42.3 %
Mean Age	42.0

Race

White	88.5 %
Black	9.6 %
Other	0.0 %

Highest Degree

B.S.	34.6 %
M.S.	59.6 %
Ph.D.	3.8 %

Environmental Education

40.4 % have attended a short workshop
5.8 % have attended a 1-3 day workshop
7.7 % have attended a 3+ day workshop

Grade Level

Kindergarten	1.9 %
1st - 3rd	17.3 %
4th - 6th	17.3 %
7th - 9th	5.8 %
9th -12th	32.7 %
1st - 6th	42.3 %
7th - 12th	53.8 %

Science Teaching

9.6 % teach biological science
13.5 % teach earth science
5.8 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	28.8 %	21.1 %	26.7 %
10,000 - 100,000	32.7 %	55.8 %	50.0 %
100,000 or more	25.0 %	28.8 %	40.4 %

Animal Related Activity Rates

Hunting	25.0 %	Non	63.5 %	Anti	1.9 %
Fishing	73.1 %				
Birdwatching	48.1 %				
Club Membership	26.9 %				
Pet Ownership	59.6 %				

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.6. Respondents with high ecologistic and low naturalistic, humanistic and moralistic scores (- + - -) (n=35)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.18	.38	.19	.16	.65	.14	.12	.17

Sex and Age

Male	60.0 %
Female	40.0 %
Mean Age	37.5

Race

White	91.4 %
Black	2.9 %
Other	2.9 %

Highest Degree

B.S.	22.9 %
M.S.	77.1 %
Ph.D.	0.0 %

Environmental Education

31.4 % have attended a short workshop
14.3 % have attended a 1-3 day workshop
5.8 % have attended a 3+ day workshop

Grade Level

Kindergarten	2.9 %
1st - 3rd	20.0 %
4th - 6th	14.3 %
7th - 9th	8.6 %
9th -12th	28.6 %
1st - 6th	42.9 %
7th - 12th	54.3 %

Science Teaching

34.2 % teach biological science
25.7 % teach earth science
5.7 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	37.1 %	25.7 %	28.6 %
10,000 - 100,000	28.6 %	40.0 %	31.4 %
100,000 or more	22.9 %	17.1 %	20.0 %

Animal Related Activity Rates

Hunting	20.0 %	Non	60.0 %	Anti	8.6 %
Fishing	57.1 %				
Birdwatching	20.0 %				
Club Membership	28.6 %				
Pet Ownership	65.7 %				

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.7. Respondents with high humanistic and low naturalistic, ecologistic and moralistic scores (- - + -) (n=64)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.12	.13	.63	.20	.02	.11	.10	.22

Sex and Age

Male	25.0 %
Female	75.0 %
Mean Age	38.6

Race

White	89.1 %
Black	6.3 %
Other	1.6 %

Highest Degree

B.S.	31.3 %
M.S.	65.6 %
Ph.D.	1.6 %

Environmental Education

1.6 % have attended a short workshop
1.6 % have attended a 1-3 day workshop
0.0 % have attended a 3+ day workshop

Grade Level

Kindergarten	9.4 %
1st - 3rd	23.4 %
4th - 6th	10.9 %
7th - 9th	14.1 %
9th -12th	25.0 %
1st - 6th	39.1 %
7th - 12th	48.4 %

Science Teaching

9.4 % teach biological science
15.6 % teach earth science
3.1 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	28.1 %	18.8 %	18.8 %
10,000 - 100,000	42.2 %	34.4 %	42.2 %
100,000 or more	26.6 %	32.8 %	29.7 %

Animal Related Activity Rates

Hunting	4.7 %	Non 75.0 %	Anti 7.8 %
Fishing	46.9 %		
Birdwatching	25.0 %		
Club Membership	10.9 %		
Pet Ownership	89.1 %		

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.8. Respondents with high moralistic and low naturalistic, ecologistic and humanistic scores (- - - +) (n=42)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.15	.14	.21	.59	.05	.12	.05	.32

Sex and Age

Male	23.8 %
Female	73.8 %
Mean Age	39.0

Race

White	73.8 %
Black	19.0 %
Other	2.4 %

Highest Degree

B.S.	28.6 %
M.S.	66.7 %
Ph.D.	4.8 %

Environmental Education

40.5 % have attended a short workshop
9.5 % have attended a 1-3 day workshop
9.5 % have attended a 3+ day workshop

Grade Level

Kindergarten	14.3 %
1st - 3rd	21.4 %
4th - 6th	7.1 %
7th - 9th	9.5 %
9th -12th	23.8 %
1st - 6th	33.3 %
7th - 12th	40.4 %

Science Teaching

9.4 % teach biological science
9.5 % teach earth science
7.1 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	16.6 %	9.5 %	7.1 %
10,000 - 100,000	23.8 %	30.9 %	42.9 %
100,000 or more	45.2 %	47.6 %	54.8 %

Animal Related Activity Rates

Hunting	0.0 %	Non	19.0 %	Anti	61.9 %
Fishing	14.3 %				
Birdwatching	28.6 %				
Club Membership	14.3 %				
Pet Ownership	42.9 %				

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.9. Respondents with low naturalistic and high ecologistic, humanistic and moralistic scores (- + + +) (n=15)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.18	.37	.77	.68	.04	.08	.05	.18

Sex and Age

Male	20.0 %
Female	80.0 %
Mean Age	36.0

Race

White	93.3 %
Black	0.0 %
Other	6.7 %

Highest Degree

B.S.	73.3 %
M.S.	26.7 %
Ph.D.	0.0 %

Environmental Education

46.7 % have attended a short workshop
20.0 % have attended a 1-3 day workshop
0.0 % have attended a 3+ day workshop

Grade Level

Kindergarten	6.7 %
1st - 3rd	20.0 %
4th - 6th	20.0 %
7th - 9th	6.7 %
9th -12th	20.0 %
1st - 6th	40.0 %
7th - 12th	46.0 %

Science Teaching

13.3 % teach biological science
26.6 % teach earth science
0.0 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	13.3 %	0.0 %	13.4 %
10,000 - 100,000	33.3 %	20.0 %	6.7 %
100,000 or more	53.3 %	66.6 %	60.0 %

Animal Related Activity Rates

Hunting	0.0 %	Non 40.0 %	Anti 40.0 %
Fishing	26.7 %		
Birdwatching	60.0 %		
Club Membership	60.0 %		
Pet Ownership	100.0 %		

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.10. Respondents with low ecologistic and high naturalistic, humanistic and moralistic scores (+ - + +) (n=32)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.44	.13	.62	.63	.07	.06	.04	.18

Sex and Age

Male	21.9 %
Female	78.1 %
Mean Age	37.1

Race

White	90.6 %
Black	3.1 %
Other	3.7 %

Highest Degree

B.S.	28.1 %
M.S.	68.8 %
Ph.D.	0.0 %

Environmental Education

25.0 % have attended a short workshop
3.1 % have attended a 1-3 day workshop
3.1 % have attended a 3+ day workshop

Grade Level

Kindergarten	6.3 %
1st - 3rd	34.4 %
4th - 6th	9.4 %
7th - 9th	9.4 %
9th -12th	15.6 %
1st - 6th	59.3 %
7th - 12th	31.2 %

Science Teaching

31.2 % teach biological science
15.6 % teach earth science
18.8 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	21.9 %	9.4 %	9.4 %
10,000 - 100,000	25.0 %	34.4 %	21.9 %
100,000 or more	40.6 %	34.4 %	43.7 %

Animal Related Activity Rates

Hunting	6.3 %	Non 40.6 %	Anti 40.6 %
Fishing	43.8 %		
Birdwatching	56.3 %		
Club Membership	9.4 %		
Pet Ownership	84.4 %		

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.11. Respondents with low humanistic and high naturalistic, ecologistic and moralistic scores (+ + - +) (n=29)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.50	.45	.23	.58	.09	.06	.05	.12

Sex and Age

Male	48.1 %
Female	51.9 %
Mean Age	39.2

Race

White	90.4 %
Black	9.6 %
Other	0.0 %

Highest Degree

B.S.	26.9 %
M.S.	23.1 %
Ph.D.	1.9 %

Environmental Education

26.9 % have attended a short workshop
25.0 % have attended a 1-3 day workshop
15.4 % have attended a 3+ day workshop

Grade Level

Kindergarten	9.6 %
1st - 3rd	23.1 %
4th - 6th	19.2 %
7th - 9th	9.6 %
9th -12th	23.0 %
1st - 6th	46.1 %
7th - 12th	42.3 %

Science Teaching

26.9 % teach biological science
25.0 % teach earth science
15.4 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	26.9 %	28.8 %	13.4 %
10,000 - 100,000	30.8 %	32.7 %	26.9 %
100,000 or more	28.8 %	32.7 %	44.2 %

Animal Related Activity Rates

Hunting	19.2 %
Fishing	59.6 %
Birdwatching	65.4 %
Club Membership	48.1 %
Pet Ownership	67.3 %

Non 36.5 %

Anti 26.9 %

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.12. Respondents with low moralistic and high naturalistic, ecologistic and humanistic scores (+ + + -) (n=29)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.49	.40	.63	.23	.13	.08	.07	.08

Sex and Age

Male	44.8 %
Female	55.2 %
Mean Age	40.5

Race

White	96.6 %
Black	3.4 %
Other	0.0 %

Highest Degree

B.S.	31.0 %
M.S.	62.1 %
Ph.D.	6.9 %

Environmental Education

48.3 % have attended a short workshop
13.8 % have attended a 1-3 day workshop
10.3 % have attended a 3+ day workshop

Grade Level

Kindergarten	0.0 %
1st - 3rd	17.2 %
4th - 6th	24.1 %
7th - 9th	10.3 %
9th -12th	20.7 %
1st - 6th	51.7 %
7th - 12th	44.8 %

Science Teaching

31.0 % teach biological science
44.8 % teach earth science
24.1 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	37.9 %	24.1 %	24.1 %
10,000 - 100,000	27.6 %	24.1 %	20.7 %
100,000 or more	20.7 %	20.7 %	37.9 %

Animal Related Activity Rates

Hunting	34.5 %	Non	51.7 %	Anti	3.4 %
Fishing	58.6 %				
Birdwatching	65.5 %				
Club Membership	48.3 %				
Pet Ownership	100.0 %				

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 8. Characteristics of Teacher Profile Types *

Table 8.13. Respondents with low naturalistic and humanistic and high ecologistic and moralistic scores (- + - +) (n=12)

Nat	Eco	Hum	Mor	Sci	Uti	Dom	Neg
.18	.36	.21	.55	.07	.10	.04	.15

Sex and Age

Male	50.0 %
Female	50.0 %
Mean Age	34.0

Race

White	100.0 %
Black	0.0 %
Other	0.0 %

Highest Degree

B.S.	8.3 %
M.S.	83.3 %
Ph.D.	8.3 %

Environmental Education

25.0 % have attended a short workshop
0.0 % have attended a 1-3 day workshop
8.3 % have attended a 3+ day workshop

Grade Level

Kindergarten	0.0 %
1st - 3rd	16.7 %
4th - 6th	25.0 %
7th - 9th	16.7 %
9th -12th	25.0 %
1st - 6th	50.0 %
7th - 12th	50.0 %

Science Teaching

16.7 % teach biological science
25.0 % teach earth science
8.3 % teach environmental ed.

Population Where Teacher:	Grew Up	Lives	Teaches
Less than 5000	0.0 %	16.7 %	8.3 %
10,000 - 100,000	41.6 %	33.3 %	50.0 %
100,000 or more	41.6 %	25.0 %	33.3 %

Animal Related Activity Rates

Hunting	0.0 %	Non	41.7 %	Anti	33.3 %
Fishing	33.3 %				
Birdwatching	16.7 %				
Club Membership	8.3 %				
Pet Ownership	41.7 %				

* (scale scores at or below the mean are symbolized by a minus sign(-). Scale scores above the mean for all respondents are symbolized by a plus sign(+))

Appendix 9

CHARACTERISTICS OF NONRESPONDENTS

Appendix 9. Characteristics of Nonrespondents

Table 9.1. Characteristics of nonrespondents(n=84)

Sex and Age		Race	
Male	42.3 %	White	92.3 %
Female	57.7 %	Black	6.4 %
Mean Age	42.0	Other	1.3 %

Grade Level		Science Teaching
Kindergarten	6.3 %	24.2 % teach biological science
1st - 3rd	12.5 %	20.2 % teach earth science
4th - 6th	24.0 %	11.2 % teach environmental ed.
7th - 9th	11.5 %	
9th -12th	29.1 %	
1st - 6th	42.7 %	
7th - 12th	41.7 %	

Population Where Teacher Grew Up	
less than 5000	33.8 %
10,000 - 100,000	31.2 %
100,000 or more	23.8 %

Animal Related Activity Rates	
Hunting	14.6 %
Fishing	43.8 %
Birdwatching	29.2 %
Club Membership	20.1 %

Type of Animal liked best:	1st choice	2nd choice
A. Not interested in most animals	7.4 %	1.1 %
B. Beautiful animals	6.4 %	18.4 %
C. Useful animals	4.3 %	14.9 %
D. Scientifically fascinating animals	5.3 %	10.3 %
E. Attractive and likeable animals	41.5 %	12.6 %
F. Competitive, sporting, trophy animals	2.1 %	6.9 %
G. Animals in the wild	28.1 %	24.1 %
H. Animals important to particular ecosystems	1.1 %	9.2 %
I. No opinion	3.2 %	1.1 %