AN EVALUATION OF THE EFFECTIVENESS OF AN URBAN ENVIRONMENTAL EDUCATION PROGRAM FOR INNER CITY CHILDREN

by

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(ABSTRACT)

This study measured gain in environmental knowledge, attitudes, and behavioral intentions during an environmental education program for inner city children. The ten-day day camp consisted of environmental education activities implemented at local community natural areas and more distant field trip locations. Three "pencil-and-paper" tests were administered in a pretest/posttest fashion; one measuring environmental knowledge, one measuring attitudes, and another measuring behavioral intentions.

Raw test scores revealed children gained in knowledge, but already possessed very positive environmentally sensitive attitudes and behavioral intentions before the program. Children exhibited little gain in knowledge, attitudes, and behavioral intentions in a statistical sense. Parents responded very favorably to the program, indicating their reasons for enrolling their children were well satisfied.

A small amount of support was found suggesting that the more parents indicated they were involved with their children about the program content, the less their children learned. Moderate support was found suggesting that children learned more when their parents enrolled them to learn about nature. A small amount of support was found suggesting test scores increased as the number of previous family nature visits increased.

Finally, little support was found for a positive relationship between the level of children's interest in nature and the amount they learned.

It is suggested that future environmental education programs for inner city children should be long-term, helping guide children through the entire environmental education process. Future program evaluation should include a pilot test of the program and evaluation instruments and also employ a variety of assessment instruments and procedures.

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CHAPTER ONE: INTRODUCTION

Portland: A Green City

Situated at the confluence of the Columbia and Willamette rivers and rimmed by scenic views of evergreen-clad mountains, Portland, Oregon is often highly praised as a very livable city. Its earliest beginnings occurred almost 150 years ago, when the city was named during a famous 1845 coin toss between two landowners. Winning the coin toss, Francis W. Pettygrove named the area which eventually became Portland after the city in his native state of Maine. Portland has a long, contradictory history of both conservatism and progressiveness and is today comprised of people with very diverse backgrounds. Many people, a large portion including immigrants, flocked to Portland at the turn of the century due to the Lewis and Clark Exposition (Friedman, 1993).

In 1993, the population of Portland had reached about 437,300, qualifying it as the thirtieth largest city in the United States. Of the fifty largest cities in the U.S., the city of Portland has the highest percentage of its population composed of Caucasian (84.6%), while 7.7% are Black, and the remaining 9.7% of the population consists of Native Americans, Asians, and Hispanics[1] (Friedman, 1993). The Portland-Vancouver metropolitan region, which encompasses parts of four counties in northwestern Oregon and southwestern Washington and had a population of 1,477, 895 in 1993, is projected to grow by about 500,000 in the next twenty years (Poracsky & Houck, 1994).

Portland is a true river city, having its east and west halves divided by the Willamette River. This river shapes the economy of the city and is a reference point for all Portlanders (Friedman, 1993). The Port of Portland is the largest grain port in the United States, exporting one-third of all U.S. wheat.

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[1] The sum of these numbers is equal to 102%. This error appears in Friedman (1993).

Undoubtedly, one of the factors contributing to Portland's livability is its expansive park system. The city is recognized as being defined, in part, by its system of parks (Friedman, 1993). Portland has a strong commitment to providing good parks and recreation, and maintains over 200 parks within its boundaries, including the nearly 5,000-acre Forest Park, the largest city park in the United States.

Portlanders have been described as people who really notice their natural surroundings (Friedman, 1993). The city has a long history of environmental activism by citizens and local organizations (Poracsky & Houck, 1994). Portland's livability has been attributed to the commitment of its citizens to the outdoors. This "outdoor city," characterized by "constant reminders of the weather and the vitality and enthusiasm with which the citizens enjoy the city's open spaces," is said to help its citizens be more relaxed and more aware of the relationship of how people and nature interact in the grander scope of the environment (Friedman, 1993:286).

The Need for Environmental Education

The reality of population growth in the area, now and in the future, has caused Portland citizens to be concerned that the region's unique identity is slipping away and that the livability of the metropolitan area is being compromised (Metro, 1991). Along with these concerns has come the growing recognition of the need to instill environmental respect and stewardship values in Portland's future generations, particularly the inner city youth. If Portland is to remain green and continue to preserve open spaces within the city, there is a need for the proper environmental values and attitudes to be encouraged in those who will be the leaders of tomorrow.

As the challenges presented by environmental problems continue to grow in every corner of the world, there is an increasing urgency for today's youth to grow up to be tomorrow's leaders in the environment. In order to face the dilemmas of mounting environmental crises, there is a need for our society to begin to prepare an informed citizenry - one that will be prepared to face the environmental challenges of the future. We begin to prepare our children to manage the environmental circumstances that threaten to take away from them the quality of life which we now enjoy.

In order to adequately prepare today's children to be tomorrow's environmental leaders, we must first become familiar with the formative influences which might cause one to aspire to make a difference in the environment. Examples of such formative influences might be found in the lives of active conservationists and naturalists in the present and the past. Previous research attempts in this domain, however, suggest that this is a very poorly investigated area in the field of environmental education (Tanner, 1980).

Two studies have investigated this issue and have uncovered several common influences in the lives of past and present conservationists and active environmentalists. Tanner (1980) and Peterson and Hungerford (1981) questioned active citizen conservationists and educators about the formative influences on their involvement and success in environmental issues. The results of these studies, as well as others, appear to suggest the significance of long-term experience with relatively pristine environments beginning at an early age (Marcinkowski, 1988; Sia et al., 1985). The natural environments were not necessarily wilderness, but often seemed to evoke a sense of awe and wonder. The experience of many childhood hours spent in nature appears to contribute to the development of environmental sensitivity and indirectly to the motivation of environmental activism.

A second formative influence on active conservationists and naturalists in these studies appears to be the influential role of a significant other, such as a parent or teacher during these outdoor experiences. Many well known naturalists attribute the longevity of their curiosity for the natural world to the presence of an encouraging adult in their childhood (Herman et al., 1991). Naturalist and writer, Rachel Carson, recognized the special role of an adult in a child's life. Her classic work, *The Sense of Wonder*, describes her relationship with her nephew, Roger, as they explored the beauty and intricacies of nature on their journeys into the outdoors together. Carson and other great naturalists and conservationists considered the positive influence of an adult role model sharing the sense of wonder with a child to be instrumental and essential in the development of environmental excitement, knowledge, and sensitivity.

Today, many of our children are growing up with few opportunities to positively experience nature with a sense of awe and wonder. The majority of today's children are growing up in urban and suburban environments, many quite removed form the world of nature. Natural environments for urban children to explore and experience adventure are quickly disappearing (Ladd, 1977). To experience adventure, some children, particularly in urban settings, must test the legal and moral boundaries of society. In addition, many of today's children are affected by problems caused by poverty, divorce, drug use, and teenage pregnancy. According to Clinchy (1993), the United States is experiencing devastating changes in its social structure. During the past thirty years, violent crime has increased 560 %, illegitimate births have increased 419 %, divorce rates have quadrupled, and teenage suicides have increased 200 % (Bennett, 1993). Child abuse and neglect have increased 259 % in the past 14 years (Hoyle, 1993).

Having earned a reputation for its livability, Portland is not without its own share of social ills. The city is known for its crime, and its citizens perceive crime to be one of

Portland's most critical problems (Friedman, 1993). Certain areas of the city, in particular, the two areas chosen for this study, are economically depressed neighborhood areas which have seen social problems on the rise. The Mt. Scott community and the Eliot community, located in southeast and northeast Portland, respectively, have both experienced an increase in violent crime over recent years (Borrie & Roggenbuck, 1993). These neighborhood areas have seen the ever-growing presence of gangs, drug abuse, and teenage pregnancies. Decreasing neighborhood pride has given rise to destructive graffiti. There is a growing perception by elders in these neighborhoods that "controlling the adrift young people" is a difficult task facing these communities (Borrie & Roggenbuck, 1993:13).

If Portland is to continue its reputation as a green and park-oriented city, its youth, particularly the inner city youth, need to be taught environmental sensitivity, responsibility, and leadership. This need brings about the question of what sort of program might be instrumental in encouraging these environmental values? A possible answer to this problem is environmental education implemented in a Benefits-Based Management context, conducted in local community and city parks and the surrounding natural environment.

The Benefits-Based Management Approach

The Portland Parks Bureau and its Director, Charles Jordan, have been leaders in the Benefits-Based Management approach. Benefits-Based Management is a new approach to leisure management which extends beyond the more traditional activity-based and experience-based management approaches to focus on promoting and maintaining the quality of life. The Benefits-Based Management approach perceives that recreation adds

more to people's lives than just fun times. Indeed, the benefits of recreation span widely from increases in social bonding among family or friends to gains in personal development such as improved self concept (Borrie & Roggenbuck, 1993). Concepts of the Benefits-Based Management approach have been embraced by the USDA Forest Service and the USDI Bureau of Land Management, and many municipal park and recreation agencies (Bruns et al., 1994).

The Benefits-Based Management approach recognizes that recreation opportunities can significantly influence the lives of visitors both on and off-site. In other words, the benefits-based approach recognizes that recreation opportunities continue to add value to people's lives even after their on-site experiences. According to Bruns et al. (1994:12), this consideration of off-site benefits has been a significant advance in recreation resource management:

> Benefits-Based Management moves the leisure profession forward a quantum leap by integrating within the benefits concept the value which is added to people's lives following on-site recreation engagements.

In addition to considering benefits accrued both on and off-site, the Benefits-Based Management approach recognizes that the benefits of recreation extend to both users and non-users of recreation and park areas (Bruns et al., 1994). That is, improved conditions resulting from the benefits of recreation can be experienced off-site by individuals and expanded further to groups of individuals, communities, local and regional economies, and society in general. This recognition of the flow of benefits to individuals and groups of individuals off-site is a distinguishing characteristic of the Benefits-Based Management approach (Bruns et al., 1994).

Recognizing the value of environmental education in instilling environmental sensitivity, responsibility, and leadership, the Portland Bureau of Parks and Recreation is increasingly emphasizing the role of environmental education in its Benefits-Based Management approach (Borrie & Roggenbuck, 1993). The Portland Park Bureau perceives the potential benefits of environmental education to communities and believes in the value of environmental education in helping to enrich the lives of citizens, to positively impact social ills, and to celebrate the beauty and heritage of Portland.

Problem Statement and Objectives

Many questions still remain about the benefits of environmental education programs, and how to increase the effectiveness of environmental education for inner city youth. To begin to investigate these questions, the overall goal of this study is to determine how inner city children relate to nature and respond to environmental education programs. More specifically, the objectives are:

1) To determine the role of the frequency of nature visits and the type of nature visits in shaping environmental sensitivity and environmental knowledge.

2) To determine the effectiveness of an urban environmental education day camp in increasing environmental knowledge, sensitivity, and appropriate behaviors.

3) To investigate the role of parental involvement in increasing the response of children to an environmental education day camp.

4) To determine whether children's interest in nature affects environmental learning.

CHAPTER TWO: LITERATURE REVIEW

Support has steadily increased among environmental educators for the importance of developing an informed and active citizenry (Stapp, 1969; Hendee, 1972; Childress & Wert, 1976). This support has grown to such an extent that the development of individuals who behave responsibly toward the environment has become the primary goal of environmental education (Hungerford & Peyton, 1976; Roth, 1970; Stapp, 1971).

Given that this is the ultimate goal of environmental education, environmental educators need to know the types of learning experiences which produce such persons (Tanner, 1980). Indeed, environmental educators and researchers have searched for the very precursors to and causes of environmental sensitivity and responsibility, in order to more effectively foster this effect among students (Roggenbuck et al., 1991).

According to Hines et al. (1986-87), curricular and instructional techniques which might effectively develop individuals who behave responsibly toward the environment have not been implemented in our school systems. Environmental educators have expressed doubt whether the emotional attachment to the environment necessary for environmental sensitivity can actually be taught in a classroom setting. In addressing the UNESCO conference on environmental education, Marcinkowski, Volk, and Hungerford (1989) noted that environmental sensitivity is a pre-goal or foundation goal for environmental education curricula -- a necessary antecedent to classroom environmental education (Roggenbuck et al., 1991). Chawla (1992) specifies that environmentally responsible behavior depends on a variety of factors which are usually gleaned from experiences outside of school, originating in the home and community, rather than in the classroom.

Responsible environmental action requires environmental sensitivity, knowledge, skills, and commitment. Certain experiences appear to be essential, such as introduction to the environment at an early age (often with the support of a significant other), field trips into the environment, and in-class environmental curricula at the K-12 level. This thesis and its literature review will focus most prominently on the effectiveness of field experiences, and indirectly upon the role of parental involvement and early childhood experiences.

Early Childhood Experiences and Parental Involvement

The Importance of Early Childhood Experiences

Linke (1981) determined that one of the major barriers to the accomplishment of environmental education's primary goal of developing active and informed citizens, stems from a lack of knowledge of those factors which have formative influences on the development of environmentally responsible behavior and sensitivity. Several studies suggest that people develop environmental sensitivity through positive childhood experiences with nature in wild or semi-wild places over extended periods of time (Chawla, 1992).

Many great naturalists and conservationists of the past and present attribute their endless curiosity about the natural world to childhood hours often spent in solitude wandering through pristine or semi-pristine areas which seemed to evoke a sense of wonder within them. Naturalist and writer Rachel Carson reflects: "I can remember no time when I wasn't interested in the outdoors and the whole world of nature...I was a

rather solitary child and spent a great deal of time in the woods and beside streams learning the birds and insects and flowers." (Herman et al., 1991:7).

As part of a study of significant influences on present day active conservationists and naturalists, Tanner (1980) analyzed biographical and autobiographical statements of past environmental activists such as David Brower, Rene Dubos, Aldo Leopold, Sigurd Olson, and seven others. Examining these lives, Tanner found "striking similarities" (p. 21) among these lives and others which point to the significance of many childhood hours spent in a more or less pristine environment in solitude or with a few friends. In concluding his study, Tanner noted that the field of environmental education is severely lacking in such retrospective searches into the lives of citizens who have asserted informed and responsible activism.

In a study by Chawla (1990), autobiographies of past environmental activists and conservationists were analyzed to uncover possible formative influences which might have led to their activism. This inquiry revealed a sense of connection to the natural world attributed to positive childhood experiences outdoors. Features of places where nature was experienced were remembered in great detail, and the whole environment was perceived to be responsively alive (p. 17).

Sia et al. (1985) sampled Elderhostel and Sierra Club members to determine possible dominant influences on their success and involvement in environmental issues. Those who scored high in responsible environmental behaviors were found to participate more often than the low environmental-behavior group in outdoor experiences such as family vacations, hiking, and individual or group camping. Similar experiences were evident for the high environmental-behavior group during childhood, as this group reported participating in more family vacations, outings, and group camping.

The above studies seem to indicate that childhood experiences in the outdoors exist as dominant influences in the lives of conservationists, naturalists, and environmental activists. While significant childhood experiences seem quite important, these alone are not sufficient to explain environmental sensitivity and activism in adulthood.

Parental Involvement and the Great Naturalists

In examining the formative influences on active conservationists and naturalists of the present and past, employing both questionnaires and autobiographical reminiscences, various studies have also determined that the influence of a parent or teacher was often instrumental in the development of environmental sensitivity (Tanner, 1980; Peterson & Hungerford, 1981; Sia et al., 1985; Borden, 1986; Chawla, 1989). To investigate the role of parental involvement in fostering environmental sensitivity, examples from the lives of well-known naturalists are again instructive.

Many well-known naturalists mention the influence of a parent on the development of their curiosity for the natural world (Herman et al., 1991). Explorer and naturalist Sigurd Olson spent his life marveling at the wild lands of northern Wisconsin, Minnesota, and Canada. However, he attributes his sense of awe about the natural world to an autumn hike with his mother:

> My first recollection came one Sunday afternoon when Mother led me through a grove of maples in the fall. That day the trees must have been in full color, for the ground was deep in drifting leaves. As we walked through them we were drenched with it. The whirling masses of red and yellow filled me with excitement, and when we ran through the grove we ran and ran until we could run no more and sank laughing to the ground - color and beauty became part of my life (Herman et al., 1991:6).

Naturalist Rachel Carson also recognized the role of parents in fostering environmental sensitivity. She attributes her love of nature to her mother, and mentioned sharing this interest with her (Brooks, 1972). Carson recognized the special role of an adult in sharing and encouraging a child's sense of curiosity for the natural world. In her book, *The Sense of Wonder*, she writes:

> If I had influence with the good fairy who is supposed to preside over the christening of all children, I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years... If a child is to keep alive his inborn sense of wonder, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement, and mystery of the world we live in (Brooks, 1972:201).

Parents need not have any particular skills to share a sense of wonder - simply sharing a child's excitement and letting curiosity guide experiences of the natural work is enough.

Rachel Carson recognized the importance of the childhood years for the development of respect and love for nature. She describes these formative early years in a child's life:

> The years of early childhood are the time to prepare the soil. Once the emotions have been aroused - a sense of the beautiful, the excitement of the new and the unknown, a felling of sympathy, pity, admiration or love - then we wish for knowledge about the object of our emotional response. Once found, it has lasting meaning (Brooks, 1972:202).

Carson felt that it was more important for an adult to encourage a child's sense of curiosity than to offer him lots of facts that he might not be able to absorb. She recognized the

importance of a child establishing a grounded sensitivity for the environment before detailed factual learning about the natural world was necessary. She believed that factual learning would develop and grow on its own as a result of a love and respect for nature.

Parental Involvement and Student Achievement

Because there is little, if any, environmental education research that deals with parental involvement and positive effects on environmental learning and attitude change, the following brief review of parental involvement and student achievement comes from the broad realm of educational research. The education literature is full of references to the importance of involving parents, particularly in early cognitive development. In a review of numerous studies on parental involvement and student achievement, Henderson (1987:1) states: "The evidence is beyond dispute that parent involvement improves student achievement." Children with parents who help them at home score higher academically than children of similar aptitude and family background whose parents are not involved. The value of parental involvement is documented to have long term benefits. Parental involvement promotes attitudes that are essential to achievement - attitudes capable of being formed independent of social class or other external circumstances.

A review of literature on parental involvement and its influence on student achievement and early cognitive development was conducted by Becher (1984). This review of research found that children who earn high achievement scores generally have parents who reinforce their child's school learning by viewing themselves a "teachers" of their own children, interacting with their children frequently, acting as models of learning and achievement, and expecting high achievements from their children. Becher also found

that programs designed to help parents get involved with their child's education (for example, spending time with them after school on their homework) positively influence their child's use of language skills, improve children's school behavior, and increase performance on tests. These differences were especially notable for low-income families.

A study by Irvine (1979) was designed to ascertain whether the amount of time parents were involved in an experimental pre-kindergarten program was related to cognitive achievement. The treatment group consisted of students whose parents were involved in school activities and engaged in school visits. Five categories of involvement were determined, according to the number of hours that parents were involved in the school over the course of a year. The control group consisted of children whose parents had no involvement in school activities and school visits. Results of the study showed that children's scores on test on reasoning, verbal concepts, and school-related skills varied directly with the number of hours that parents were involved in school. The study controlled for factors such as socioeconomic status, race, and level of education of parents.

A 1969 large-scale study by the U.S. Office of Education included as one of its objectives, an investigation of the role of parental involvement and student achievement (McDill et al., 1969). The study included a random sample of twenty public high schools in eight states. Questionnaires were administered to over 20,000 students, 1,000 faculty, and each of the twenty school principals. Among the other results of the study, the authors concluded that the degree of parental and community interest in quality education was the critical factor in explaining the effect of the high school environment on the achievement and aspirations of students (Henderson, 1987). The study determined that parental involvement had a significant effect on math achievement and college plans of

students, even among students of comparable academic ability and family education background.

Schiamberg and Chum (1986) conducted a 1969 study of 1202 fifth- and sixth-grade rural students and their mothers from six southeastern states. Subsamples of the original study population were re-interviewed in 1975, 1978, and 1983, when these students were high school students, young adults, and adults. The authors looked at factors such as family background, characteristics of the students, achievement motivation, and attitudes of family members and significant others toward goal achievement. The results of the study determined that the effect of family influence on a student's ability to reach an occupational goal was greater than the effect of both the student's characteristics and educational attainment. Parents' expectations and level of educational achievement had a primary effect of their children's goals and whether or not they attained them. The authors concluded by stating that their research supports the need for educators to encourage family involvement in school learning activities, so that higher expectations might be met.

Finally, a study by Bloom (1985) searched for common features of growth and guidance that contributed to outstanding achievements in successful young people. This far-ranging study interviewed twenty-five highly successful young people involved in a variety of challenging and competitive fields, such as research mathematics and neurology, classical piano, swimming, and other arts and sciences. The study involved interviews with family members of the subjects as well. The subjects varied in ethnicity and socioeconomic status, but almost all mentioned lifelong support from their parents. Parental involvement for the majority of these high achievers consisted not only of involvement in schooling, lessons, and competitions, but also consistent support for any educational ambitions.

Given the possible increase in environmental sensitivity due to both parental involvement and early childhood experiences in the outdoors, and also the demonstrated positive relationship between parental involvement and student achievement, the following hypotheses arise:

H1: ***The higher a parent's indicated level of interaction with his/her child during the environmental education day camp, the more his/her child will learn from an environmental education day camp.***

H2: ***The higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for "learning to love nature" reasons, the more his/her child will learn from the environmental education daycamp. Likewise, the higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for "baby sitting" reasons, the less his/her child will learn from the environmental education day camp.***

H3: ***The more that families indicate they take trips to natural areas, the higher the scores exhibited by their children on environmental attitudes, behavioral intentions, and environmental knowledge measures.***

The Cognitive Benefits of Field Trips

One area which is reviewed here to examine the value of the frequency and type of nature visits is the more empirical body of studies which evaluates the merit of field trips versus traditional classroom teaching methods.

Considering the popularity of field trips to parks, forests, wetlands, museums, and zoos, surprisingly little is known about their value. Still, many educators are convinced of the benefits of the field trip experience (Falk, 1983; Falk et al., 1978). The values that teachers and researchers associate with field trips include increases in student knowledge, appreciation of science, changes in student attitudes, and motivational gains (Sorrentino &

Bell, 1970). Most research on field trips has focused on cognitive outcomes of the trip experience or attitude changes as a result of the experience (Falk & Balling, 1982). The literature suggests a positive link between field trips and knowledge and attitudinal gains (McKenzie et al., 1986).

Schellhammer (1935) investigated the knowledge gains of two groups of high school biology students. During this year-long study, the experimental group participated in field trip excursions, while the control group experienced only classroom lecture. Comparisons of posttest with pretest scores for both groups found knowledge gains were significant only with the experimental group. The groups were then reversed (control group becoming experimental and vice versa). The new experimental group showed more superior knowledge gains than the control group on a new unit of study.

In a study comparing field excursions to other teaching methods, Atyeo (1939) determined that the excursion technique was superior to classroom teaching involving material requiring comparisons and knowledge of concrete objects. Similarly, in a comparison of presentation modes, Wise and Okey's meta-analysis of instructional strategies (1983) found field instruction to be more effective than traditional strategies of learning.

A study by Wright (1980) investigated effectiveness of a field trip to a health museum on the application of knowledge and concepts about the human body. Six sixth-grade classes were each assigned randomly to the experimental and control groups. The experimental groups, which visited the health museum, showed superior achievement when tested on material about the human body when compared to the control groups, who had classroom instruction only.

Wendling and Wuensch (1985) measured the influence of outdoor education programs on knowledge and attitudes about the natural environment. The study employed

three separate methods for the teaching of ecology lessons: lectures only, hands-on activities, and a field trip. The results indicated that students who participated in either the field trip or the hands-on classroom activities achieved learning superior to students only exposed to lectures. Attitudes, however, became equally more environmentally sensitive in response to all three methods of instruction.

Another area of field trip research focused on the setting novelty of field trip situations and its effect on learning. In one study by Falk et al. (1978), the effect of setting novelty on the behavior and learning of children was measured. One group of children was chosen from a school surrounded by an urban area, while the other group of children lived in a public housing project near a wooded area. Both groups of children participated in a field trip to the Smithsonian Institution's Chesapeake Bay Center for Environmental Studies in a wooded area. It was hypothesized that the high level of setting novelty of the visited nature center would interfere with learning among the urban school children, but not for the school group more familiar with a forested environment. Comparisons of pretest scores of both groups confirmed the greater familiarity of the housing project children with the woods. The children participated in a plant succession activity where they measured and compared the foliage density in an old field and in a forest. The activity was designed to increase understanding of the process of succession. After the children conducted the learning activity in the natural setting in the field, it was found that both groups experienced gains in knowledge of general information about the wooded setting, but only the group of students from the wooded housing project exhibited any learning of the concepts taught in the lesson. Falk and associates suggested that the "urban" students directed their behavior toward exploration of the environment and away from structured learning activities. Their learning was constrained by a lack of familiarity with the natural area in the field trip setting.

A similar study by Falk and associates (1981) was conducted with two significant changes. First, the children sampled came from a higher socioeconomic status population. Secondly, the same children were tested in both a novel and familiar setting. The familiar setting consisted of the children's home schoolyard, while the other setting was a natural area outside their community. The children were distinguished by those who had previously been to this natural area versus those that had never been to this natural area. All students performed the same ecology activities in the familiar and unfamiliar settings. One activity focused on the soil changes that occur during plant succession. This activity required students to measure the soil texture and hardness. A second activity focused on plant community changes occurring during succession. In this activity, students measured the foliage height diversity in a specified area. The same teacher taught each activity in each location, and the activities were conducted identically in both the schoolyard and natural settings. The results revealed findings similar to the first study. All children in the familiar schoolyard environment were able to learn the concepts presented in the outdoor science activity. However, only children more familiar with wooded areas learned the concepts covered in the outdoor science activity in the natural setting.

A third study by Balling and Falk (1979) appeared to contradict the findings of the above two studies. In this study, middle class children from rural, suburban, and urban schools went on a field trip to one of three locations: a forest, a park in a quiet neighborhood, and a small park situated by a busy street in a large city. In one of these locations, each group of children participated in an activity focusing on the biology of trees. The study assumed that urban, suburban, and rural children would possess different levels of familiarity with natural environments and trees, due to their place of residence. The study found that urban and suburban children learned best in the forest, while rural children learned best in the suburban park. The test scores of students who performed the

activity in the forest setting were higher than the test scores of students who participated in the activity in the suburban or urban park. Balling and Falk concluded that a moderate amount of setting novelty appeared to enhance learning.

Suggesting evidence for the value of the frequency and type of nature visits in enhancing environmental knowledge, Falk (1983:141) concludes: "Our research suggests that repeated visits to a site often produce the best learning results at all ages, but particularly for very young children." Falk suggests that the first visit to a field trip site is useful in orienting and acquainting the child with the new setting, while successive visits to the site are more effective in producing learning of the concepts taught at the site. Falk also concludes that their research findings support the notion that field trip experiences for children often do result in significant cognitive learning.

Finally, a study by Harvey (1990) investigated the correlation between children's familiarity with vegetation and their environmental attitudes and knowledge. Harvey found that students from highly vegetated school grounds exhibited higher scores for knowledge than students from schools without vegetation. Students from schools with highly vegetated landscapes had higher scores for pastoralism and lower scores for human dominance attitudes than students from sparsely vegetated school yards. Scores for pastoralism were positively correlated with the variety, frequency, and pleasure associated with their contact with plants. Similar results were found by Bunting and Cousins (1985) in a study of Canadian children, perhaps suggesting the role of the frequency of nature experiences in the development of environmental knowledge and attitudes.

Given the above research on learning that results from field trip experiences, the following hypothesis arises:

H4: ***Children whose families indicate a moderate frequency of past visits to natural areas will learn more from an environmental education day camp than will children who had few or very frequent previous visits to natural areas.***

The Effectiveness of Environmental Education Programs in Increasing Environmental Knowledge, Sensitivity, and Appropriate Behaviors

To investigate the effect of environmental education on knowledge, attitudes, and behavior, the body of literature dealing with environmental education evaluation was examined. Environmental education evaluation efforts have been implemented in a variety of settings, including classroom settings and nonformal settings such as nature center visits and nature camp programs. Review of environmental education evaluation literature reveals that most evaluation efforts have centered on the affective domain (Lisowski & Disinger, 1991; Iozzi, 1984). The first body of studies reviewed here will focus on residential environmental education efforts.

A study by Keen (1991) investigated the effect of a residential environmental education program, Sunship Earth, on the ecological knowledge and environmental attitudes of fifth- and sixth-grade students. The treatment group was exposed to a five-day environmental education/ecology program, while the control group did not participate. The study employed pre- and posttests, as well as a delayed posttest presented six months after completion of the program. When compared to the control group, the treatment group was found to have exhibited significant gains in knowledge which were also retained after the six month period. No significant differences in environmental attitudes could be discerned between treatment and control groups. However, closer examination of attitudes indicated that visits to nature areas were directly related to positive attitudes toward learning about nature.

A study by Shepherd and Speelman (1986) sought to determine whether outdoor education programs within a five-day 4-H camp would have a measurable impact upon the environmental attitudes of the participants. Pretest-posttest comparisons suggested a positive attitude change. The study indicated that exposure to animals and plants with poor reputations, such as snakes and poison ivy, might increase positive attitudes toward these species. In addition, this study recommended a period for campers from urban areas to become more familiar with the natural settings to possibly enhance the opportunity for positive attitudinal development.

Burrus-Bammel (1977) investigated the immediate and long-term effects of a week-long environmental education camp for rural sixteen- to twenty-year-old males on environmental knowledge and attitudes. Another group of males, who were unable to be accommodated due to a lack of space in the program, served as a posttest-only control group. Results of the study indicate that the treatment group demonstrated a significant knowledge gain and environmental attitude change during the week of the camp, and these significant gains were maintained over six month and eighteen month periods, when compared to the control group.

Several studies have been conducted to evaluate the change in knowledge and attitudes resulting from the Youth Conservation Corps (YCC) program. A study by Marans et al. (1972) sought to measure changes in environmental concern and knowledge from the beginning to the end of the YCC program. Study results showed only slight increases of environmental knowledge among participants -- much lower than was anticipated. The youth showed little change in environmental concern over the course of the program, but it was noted that most of the participants entered the program with pre-existing high levels of environmental concern, indicating little room for attitude change.

Driver and Johnson (1984) compared the environmental attitudes of high school senior YCC enrollees to a nationwide longitudinal study of high school seniors (Bachman et al., 1980). A portion of the questionnaire administered to the YCC participants included the same questions as the national survey. This comparison was implemented in order to determine if YCC enrollees possessed different attitudes and behaviors than average American youth. Comparison of the two populations suggested that YCC participants engaged in different leisure activities than youth in the nationwide survey, such as more reading and involvement in community activities versus watching lots of television. Actual changes in knowledge, attitude, and behavior due to the YCC program were not measured in this study, rather the study subjectively measured whether the enrollees perceived any improvement in their attitudes, skills, and behaviors. When asked about benefits that they received from the program, the YCC enrollees indicated that they felt they had developed more environmental awareness about the conservation and the wise use of the nation's natural resources.

Environmental education evaluation has also researched the effects of single-day field trips and nature center visits on attitudinal, knowledge, and behavioral change. Roggenbuck and Passineau (1986) evaluated the effectiveness of an interpretive program at Indiana Dunes National Lakeshore. The study group included fourth through sixth-grade school children who made field trips to the park. The control group in the study consisted of groups who were turned down, canceled, or who visited the park without exposure to the program. Pretest-posttest comparisons showed that the short field trip experience at the park produced significant knowledge gains and attitude change, mostly on subject matter specifically related to the park, such as attitudes about protecting park resources and knowledge of general history of the park and appropriate park behavior.

Roggenbuck and Passineau's study also sought to measure the effectiveness of the field trip experience on litter behavior at the park. When appropriate litter pickup behavior was modeled by a park interpreter, 81% of previously planted litter was picked up by the children along the route of the tour. Without the demonstrated proper litter behavior by the park interpreter, only 66% of all planted litter was collected by the children when they were simply given a litter collection bag. This difference was found to be highly significant. In addition, after exposure to an anti-littering message, envelopes given to the children which contained a park button were never found discarded as litter along the tour route. Roggenbuck and Passineau (1986) attributed this appropriate behavior to the anti-littering message relayed to the children by the park interpreter.

A study by Kostka (1976) investigated the influence of a once-a-year visit to a nature center on the attitudes of sixth-graders. Randomly selected classes from schools requesting a nature center visit, which were exposed to standardized natural science programs, served as the treatment groups. The control groups, which were not exposed to the nature center programs, were also randomly selected from schools requesting a nature center visit. The study results revealed that groups participating in up to six to seven hours of nature-related environmental education programs did not score significantly better on an environmental attitudes scale than the control groups which did not engage in the programs.

Another kind of environmental education evaluation has focused on determining the effectiveness of environmental education in the classroom setting. This specific research area will only be covered briefly here. A study by Jaus (1982) was conducted to ascertain the effect of ten hours of classroom environmental education instruction on the environmental attitudes of fifth-graders. The experimental group in this study was exposed to fifteen lessons on environmental education topics for fifteen consecutive days.

The control group was not exposed to the environmental education lessons. Following the treatment, both groups were administered a questionnaire. The experimental group exhibited significantly more positive attitudes toward the environment than the control group. In addition, the control group was then exposed to the same treatment and afterwards completed the same questionnaire. Comparisons of the first questionnaire with the second questionnaire revealed that this new treatment group achieved statistically significant positive changes in environmental attitudes.

Another study by Jaus in 1984 investigated the effectiveness of two hours of classroom instruction in environmental education on the development and retention of positive environmental attitudes among elementary-age school children . Pretest-posttest comparisons revealed a significant positive change in environmental attitudes. Two years later, these same children were given the same posttest. Jaus found no significant differences between the posttests, and felt that the study perhaps suggested that young children can retain positive environmental attitudes as a result of a brief exposure to environmental education instruction.

One final area of environmental education evaluation research which is relevant to this thesis is the issue of what kinds of environmental education instruction are most effective at encouraging positive environmental behavior. There has been wide recognition among environmental educators that a large percentage of environmental education curricula focuses primarily on the development of environmental awareness and knowledge (Childress, 1978), not incorporating higher-order components such as problem-solving and action strategies.

A study by Ramsey et at. (1981) sought to compare the educational and behavioral outcomes of two distinct environmental education methodologies. The case study group received instruction which focused on awareness of environmental problems and

identification of potential solutions. A second group, the action group, was instructed in environmental action training and focused on investigating environmental problems, possible value positions, and problem-solving skills. A third group, the control group, received only textbook instruction. In addition to pretest and posttest measurements, a parental questionnaire was distributed two months following the completion of all forms of instruction, in order to assess parental observations of students' environmental behavior during and after the program. Study results indicated that the action group exhibited a significantly greater degree of knowledge of environmental action skills than the case study group. Parents of students in the action group reported significantly more occurrences of verbalized environmental awareness (such as the child discussing an environmental issue) and more overt environmental actions (such as the child acting in a pro-environmental manner, such as recycling), than parents of both the case study and control groups.

A study by Jordan and associates (1986) investigated the effect of instruction on environmental issue awareness versus environmental action awareness on the environmental knowledge of high school students and their willingness to participate in responsible environmental behavior. The participants were pre- and posttested, as well as administered a delayed posttest which measured environmental actions two months after the completion of the program. Participants receiving the action instruction demonstrated a significantly higher level of knowledge about environmental actions compared to the group who only received instruction in environmental issue awareness. In addition, the delayed posttest showed that the action group reported engaging in a statistically significant greater number of environmental actions following the instruction, compared to the number recorded before instruction and when compared to the issue-only group. The results of the above two studies suggest that environmentally responsible behavior can be

encouraged by those types of programs which are specifically designed to address this area. Research suggests that making people aware of environmental issues is not by itself sufficient to result in increased knowledge of environmental action strategies (Iozzi, 1989). Neither is simple awareness sufficient for a decision to engage in environmentally responsible actions.

To investigate the effectiveness of environmental education programs in increasing environmental knowledge, attitudes, and behavioral intentions, the following hypotheses arise:

H5: ***The environmental education day camp program evaluated in this study will increase environmental knowledge among participants.***

H6: ***The environmental education day camp program evaluated in this study will increase positive environmental attitudes among participants.***

H7: ***The environmental education day camp program evaluated in this study will increase appropriate environmental behavioral intentions among participants.***

The Role of Interest

Interest and the Environment

Culen et al. (1986) investigated the environmental perceptions and environmental behaviors of five discrete groups in order to better understand how different groups of people perceive environmental issues and react to them. The subjects of the study included members of the following groups: Elderhostel students, enrollees in an environmental problems course, Soil and Water Conservation District directors, Cooperative Wildlife Research Unit members, and environmental education trainees. As

part of the study, the participants were asked to identify both environmental issues of critical importance to humanity and environmental issues of greatest interest to them. The study evaluated the differences in perceptions held by these groups regarding issues of greatest personal interest, issues of critical importance to humanity, and a control issue, i.e., an issue which all individuals in all groups evaluated. The control issue in the study was noise pollution. For each issue, the subjects were asked to indicate their knowledge level, perceived critical importance to mankind, their perceived individual and group locus of control in affecting positive change, and self-reported environmental actions. Although interest and its role in shaping environmental knowledge and behavior was not the primary focus of this study, it will be emphasized here. Results of this study indicated that each group of subjects perceived that they possessed significantly more information on the issue of greatest interest to them compared to other identified issues and the control issue. Each group also perceived that they could influence the solution to issues they were interested in more than the control issue. In addition, members of each group reported taking significantly more citizenship action regarding those issues which held the greatest interest for them. The authors concluded the study by indicating that action should be taken to encourage interest in those issues which are most crucial to mankind. This study appears to suggest that interest in an environmental issue seems to increase a person's perceived level of knowledge on the issue, provide greater locus of control to take action on the issue, and increase the likelihood that a person will take actions in regard to this issue of interest. Given the lack of research on the relationship of individual interests and environmental learning and behavior, more studies on this topic would be helpful to investigate this relationship.

Interest and Academic Achievement

Although not specifically dealing with the natural environment, the field of educational psychology has conducted many studies which have researched the effect of interest on learning. According to Krapp et al. (1992), the areas of education and psychology have seen a large number of new empirical studies in recent years which investigate the influence of interest on learning. Research into the effect of interest on learning and student achievement has uniformly shown that interest plays a substantial role in learning (Krapp et al., 1992). It has also been determined that the relationship between interest and achievement becomes increasingly stable with age (Schiefele et al., 1992). Interest has been said to play a central role in intellectual functioning and as a result, is an important influence on how people differentiate and persevere in processing certain types of information in preference to others (Hidi & Anderson, 1992). In a review of related research, Hidi and Anderson (1992) concluded that interest greatly affects human functioning at both the psychological levels and the physiological levels. A meta-analysis review of interest and student achievement research by Schiefele et al. (1992) concluded that interest contributes significantly to the prediction of student achievement.

Deci (1992) notes that as a result of interest being a powerful motivator, children entertain themselves with activities that are interesting to them and by doing so, they learn about their world. Renninger and Wozniak (1985) sought to ascertain the effect of interest on young children's attention and memory. In this study, ongoing free play of sixteen children was videotaped. These tapes were used to code the play behavior of the children in order to determine which play objects were objects of interest for each child. Various characteristics such as the amount of time spent with an object, the type of play engaged in with the object, and the number of times the child returned to the object were used to distinguish objects of interest and noninterest. Once objects of interest were

identified for each child, these objects were employed as stimuli in three experimental tasks to evaluate attention shift, recognition, and recall memory. The results of the experiment showed that interest influenced the likelihood that young children would focus attention on, recognize, and recall play objects that were identified objects of interest more often than other, equally available play objects. The authors concluded that interest shapes the knowledge and values systems which children employ in organizing experience, memory, and problem solving.

Much of the interest and achievement research has been focused on the area of text-based learning. Many studies in this area clearly indicate that interesting texts encourage students to read, affect understanding, and tend to produce quantitatively and qualitatively superior learning (Krapp et al., 1992). Extra attention to highly interesting text has even, in fact, been shown to hinder understanding and recall of less interesting but more important textual information (Duffy et al., 1989).

Wade and Adams (1990) investigated the relationship of interest and importance of text and how they affect what is learned. Previous research has found both interest and importance of text to have powerful influence on learning (Wade, 1992). Text importance is based on main ideas and important factual information critical to the understanding of the passage of text. This study by Wade and Adams (1990) sought to determine which of four kinds of text (seductive details, main ideas, important factual details, or boring trivia) would be most likely and least likely remembered. The text was previously rated by college students on interest and importance. Both good and poor elementary-age readers were asked to read the material and then complete a recall test either immediately or one week later. Results of this study showed that interest was a better indicator than importance of what was remembered for both ability groups. Both types of text, i.e., the

seductive details and the main ideas, that had been rated interesting were remembered much better by both ability groups.

In another study of interest and text recall, Renninger and Stavis (in preparation) had 222 students identify their individual interests on a Likert-type questionnaire of over forty items such as soccer, swimming, and math. Activities of interest to these students were identified as those activities which students engaged in and indicated having more knowledge and value for relative to other listed activities. Pretesting of the students allowed the text to be tailored to the ability of each student. Students were asked to read textual information, answer two buffer questions, and then write down as much of the passage as they could remember. The textual information included two passages on a topic of interest indicated by the student and two passages of indicated noninterest by the student. Passages on topics of interest included information not commonly known by those familiar with the topic, so students were indeed being asked to recall information they had just read rather than information they already knew. Results from this study showed that on topics of interest, students were more likely to recall correct information, provide more detailed information about the topics, have no errors on their written recall, and recall more topic sentences than on those topics of noninterest. The authors concluded that information from the interesting passages of text was more easily accessed and grouped together than was information from the passages on noninterests.

Given the demonstrated positive influences of interest on learning, the following hypotheses arise:

H8: ***The higher a child's indicated interest in nature, the more environmental knowledge he/she will possess.***

H9: ***The higher a child's indicated interest in nature, the more he/she will learn from the environmental education day camp.***

CHAPTER THREE: METHODS

Study Area

Two low-income neighborhood areas, one located in southeast Portland and the other located in northeast Portland, were the study areas examined in this thesis. Each is described below.

The Mt. Scott Neighborhood and Community Center

Located in southeast Portland, the Mt. Scott neighborhood is a fairly stable, traditional, and established community. This compact and densely populated neighborhood is predominantly Caucasian - about 90%. Less than 1% of the neighborhood population is African American, while another 4% includes a recent inflow of non-English speaking Vietnamese and Korean citizens (Bureau of Planning; June, 1993). There appears to be a considerable pride in the neighborhood, as most of the houses and yards are well maintained (Borrie & Roggenbuck, 1993).

This mostly residential neighborhood is populated by many low-income families. Less than 15% of the neighborhood residents have college degrees (Portland averages 32%). The number of individuals with managerial or professional occupations averages about 30% for the city of Portland, but only 15% in the Mt. Scott area hold these types of positions (Johnson, 1993).

The 1989 sociodemographic data on the neighborhood indicate that just over half of the households have an income of less than $25,000, while 24% of households earn less than $10,000 (Johnson, 1993). Of the Mt. Scott neighborhood residents below the

poverty level, 58% are married couples and families. Eighteen percent of those households with incomes below the poverty level are single female-headed households, while a remaining 18% are those that live alone, many of them elderly (Bureau of Planning; June, 1993).

The Mt. Scott community has experienced an increase in crime, drugs, gang activity, and graffiti in recent years. The young people of the community are perceived to have little to do with their time, and lack respect and responsibility toward the neighborhood. Mt. Scott Park, adjacent to the community center, has recently been frequented after hours by boisterous adolescents with alcohol (Borrie & Roggenbuck, 1993).

Another significant community-wide problem for the Mt. Scott neighborhood is a substantial unmet child care need. Johnson (1993) indicated that only 17% of children under five years could be accommodated by licensed child care facilities in the Mt. Scott area. Borrie and Roggenbuck (1993) suggest that if the Mt. Scott Community Center were to begin to help meet this child care need, children could be "reached" and become part of the community and its community center at an earlier age. This might eventually help combat the problem of undesirable adolescent behavior that has been on the rise in the community in recent years.

The Mt. Scott Community Center has traditionally offered pre-school programs, summer day camps, sports, and arts and crafts programs. The constantly bustling center is equipped with a swimming pool, roller rink, weight room, gymnasium, craft room, and boxing arena. The adjacent Mt. Scott Park provides a wading area, playground, tennis courts, and numerous picnic tables. Towering Douglas Fir trees shade the spacious park, which contains few other vegetation types besides grass.

Accessible to most of the community members, the Mt. Scott Community Center and Mt. Scott Park are considered by many to be the nucleus of the Mt. Scott neighborhood community. The community center and park have been recognized as a source of community pride and as a significant part of the neighborhood area's identity (Bureau of Planning; June, 1993). The Mt. Scott Community Center is open on weekdays only, and parents consider it a safe place for their children, as they frequently drop their children off while they go to work or run errands.

The Matt Dishman Community Center and Eliot Neighborhood

The Matt Dishman Community Center is located within the Eliot neighborhood in northeast Portland. This neighborhood consists of a variety of racial, ethnic, and economic groups. The neighborhood is predominantly African American (55%), and 58% of the neighborhood is below the age of thirty-four (Johnson, 1993).

Forty percent of residents live below the poverty level. The annual median household income is only about $10,000. Those who hold jobs are typically operators, fabricators, and laborers. Thirty-five percent of the Eliot neighborhood residents are those that attended a few years of college, but never finished their degree. This neighborhood also consists of a high number (18%) of single female-headed households (Johnson, 1993).

Unlike the more stable and established Mt. Scott community, the Eliot neighborhood has been described as one in transition (Borrie & Roggenbuck, 1993). Most of the residents consider the neighborhood as a temporary place to stay until they can move to other housing. Some of the homes are poorly maintained, and in some cases deteriorating or abandoned. Nearby development has historically put pressures on the neighborhood, especially the construction and expansion of Emmanuel Hospital and the

Coliseum. The community is threatened to be divided by such development, and the African American community is gradually moving northward (Johnson, 1993).

The Eliot neighborhood has seen an increase in violent crime as well. Drug abuse, high school dropout rates, and teenage pregnancies have risen in recent years in the neighborhood. These undesirable behaviors among the adolescents in the neighborhood have caused great concern, and appear to be a significant problem facing the Eliot community (Borrie & Roggenbuck, 1993). The youth seem to lack positive role models, and it appears that the community does not have an alternative support structure available where adolescent youth would feel comfortable and welcome. It has been suggested that the Matt Dishman Community Center adopt a mentor program where adolescents might find someone to look up to and spend time with.

The Matt Dishman Community Center was re-opened in 1994 after renovations. The newly designed center is now very modern in appearance, and like the Mt. Scott Community Center is extremely busy. The Matt Dishman Community Center faces the unique task of catering to the various ethnic, racial, and age groups in the surrounding neighborhoods, as well as attempting to bring these groups together.

Since its re-opening, the Matt Dishman Community Center is catering to a wide variety of age groups. Swimming classes, sports, movies, and arts and crafts programs are offered by the center. The center includes a swimming pool, weight room, game room, gymnasium, and several extra rooms for activities and meetings. Local community groups often utilize the center as a formal and informal meeting location.

The Matt Dishman Community Center is not associated with a particular park. However, a few short blocks away is a small park called Dawson Park. Dawson Park consists of a playground, picnic tables, and a gazebo area. The park is less shaded than

Mt. Scott park, and includes different deciduous tree species than the monoculture at Mt. Scott Park.

Study Population

The populations examined in this study were the forty-eight children and their parents who participated in the Portland Bureau of Parks and Recreation's urban environmental education summer day camp called "Into the Woods." Twenty-four of the children were members of the Mt. Scott neighborhood, while the other twenty-four children were from the Matt Dishman area.

Although third and fourth-grade children were the target age group for this program, the study population included children ranging from ages six to eleven. In both day camp sessions, there was greater enrollment by boys. The Mt. Scott session consisted of nine girls and fifteen boys; the Matt Dishman session was attended by ten girls and fourteen boys.

The population of children attending the Mt. Scott session was entirely Caucasian, which is reflective of the high percentage of Caucasian residents in the neighborhood (90%) (Johnson, 1993). The Eliot neighborhood in the Matt Dishman area, on the other hand, is approximately 55% African American, 39% Caucasian, and 4% Asian (Johnson, 1993). The population of children attending the Matt Dishman session of the "Into the Woods" day camp did not, however, reflect the racial characteristics of the Eliot neighborhood. The largest racial group represented in the Matt Dishman day camp was Caucasians, who comprised 46% (11 children). Only about 30% (seven) of the children were African American. Of the remaining 24% of the Matt Dishman day camp children,

8% (two) were Indian, 8% (two) were an African American - Caucasian mix, and 8% (two) were an Asian - Caucasian mix.

Information on income and other family characteristics such as single-parent or two-parent households was gathered by way of a questionnaire distributed to parents at the ice-cream party concluding the program or mailed to those who did not attend the party. The response rate for both of the day camp sessions was about 60%, or 29 out of 48 surveys were returned.

Based on the sixteen total questionnaires that were returned by the Mt. Scott residents (67% response rate), the respondents indicated that 31% (five families) earned incomes of $10,000-$20,000; 38% (six families) indicated that their income was at the $20,000-$30,000 level; and the remaining 19% (three families) fell into the $30,000-$40,000 income category. Thirteen percent (two families) of the Mt. Scott residents who filled out the questionnaire did not respond to this income question on the survey. Johnson (1993) has reported that 24% of the Mt. Scott neighborhood residents make 0-$10,000; 36% of the residents earn $10,000-$25,000; and 25% of Mt. Scott residents earn $25,000-$50,000 each year. It appears that the Mt. Scott day camp families were fairly representative of the income distribution for the neighborhood, although the day camp was not attended by families at the lowest income level, 0-$10,000.

Neighborhood data indicate that 8% of the families in the Mt. Scott neighborhood area are single-parent households (Johnson, 1993). Of the sixteen questionnaires returned by the Mt. Scott parents, 13% (two families) indicated they were single-parent households. The remaining dual-parent households (14 families, or 87%) were divided evenly between households where either one or both parents work outside the home.

Based on the thirteen questionnaires returned by the Matt Dishman families participating in the day camp (54% response rate), 23% percent (three families) earned

$10,000-$20,000 per year; 31% (four families) indicated that they earned from $20,000 to $30,000 per year; another 23% (three families) said that they earned $30,000-$40,000 per year; and a surprising 15% (two families) indicated they earned over $40,000 per year. Eight percent (1 family) did not respond to the income question on the survey. Johnson (1993) found that for the neighborhood area surrounding the Matt Dishman Community Center, a striking 50% of the neighborhood residents fell into the 0-$10,000 income category. Thirty-six percent earn $10,000-$25,000 per year, and 10% earned $25,000-$50,000 per year. It appears that the families who participated in the Matt Dishman session of "Into the Woods" and responded to the questionnaire were those earning more than the average family in this neighborhood.

Neighborhood data reveal that 18% of the households in the Matt Dishman area are single-parent families (Johnson, 1993). Of the thirteen Matt Dishman area families who returned the post-camp questionnaire, 38% (five families) indicated they were single-parent households. Of the remaining two parent households (62%, or eight families), 75% (six families) of these indicated their family was a household with one parent working outside the home, while 2 families (25% of the two parent households) said that both parents work outside the home.

The Environmental Education Program

Program Characteristics

As part of its Benefits-Based Management focus, the Portland Bureau of Parks and Recreation conducted a pilot test of a community-based environmental education program in the summer of 1994. Planning and evaluation of the program was a partnership effort

involving the USDA Forest Service, Virginia Polytechnic Institute & State University, Oregon State University, and the Portland Bureau of Parks and Recreation. This thesis represents the evaluation of the program.

The urban environmental education day camp, called "Into the Woods," was designed for six to nine-year-old inner city children during the periods of July 11-22 and August 1-12, 1994. The first two-week day camp session was offered in the Mt. Scott neighborhood area at the Mt. Scott Community Center in southeast Portland, while the second session took place at the Matt Dishman Community Center and targeted the Eliot neighborhood in northeast Portland. The children attended the day camp from the hours of 10:00am to 3:00pm, Monday through Friday, with the exception of each Thursday, when the day camp ran from 9:00 to 5:00 to allow for longer field trips.

"Into the Woods" was open to twenty-five children per session, and was advertised by a program flyer (Appendix A) in the third and fourth-grade classes of several schools in each of the community areas as well as in the two community centers. Registration was conducted on a first-come-first-served basis, and the program was completely free, including free lunch each day through a federal lunch program. During each of the two-week sessions, the children participated in environmental education activities which focused on such concepts as water conservation, habitat preservation, and wildlife watching. The activities took place at the community centers and at local neighborhood parks, as well as off-site field trip locations. A bus was chartered for transportation to and from field trip locations.

Another aspect of the "Into the Woods" program was an ice-cream party for the campers and their families at the conclusion of the day camp. This event occurred on the evening of the last day of the day camp, in an attempt to involve the community and parents in the community-wide environmental education effort. The party was held at the

community center, and was open to friends and family of the daycamp children. During the party, the counselors were introduced, and the various activities of the camp were described. Each child was invited to tell the audience what he or she thought was special about the program. Many of the craft projects that the children had worked on during the camp were displayed for the parents, including two large murals. The party also allowed opportunities for the parents to provide some feedback to the Portland Bureau of Parks and Recreation and the counselors about the program.

Program Implementation

This thesis author (a graduate student from Virginia Polytechnic Institute & State University) was hired to plan, develop, and implement the "Into the Woods" program. Ten additional "counselors" were hired to chaperone and teach environmental education to the day camp children. The racial make-up of the group of eleven counselors included two African American counselors, one Asian counselor, and eight Caucasian counselors. Two of the eleven counselors were male.

Two counselors were interns from Oregon State University College of Forestry. These two college age counselors were responsible for the direction and supervision of eight high school teen counselors. All eight high school teen counselors were interviewed and hired from one high school in each of the community areas, four from each school. These eight counselors were hired as teachers of the day camp children, and were each responsible for presenting some of the environmental education programs.

Part of the overall research project was to assess the benefits of leadership positions upon the self concepts and environmental interests of the high school counselors (this objective was not addressed in this thesis). Because of the project's objectives, the teen counselors that were selected were not necessarily those who exhibited high achievement, high leadership skills, high interest in the environment, and who had demonstrated talent at working with children.

Due to lack of time, the counselors received only minimal training before becoming teachers of the children. Training primarily consisted of a two-day *Project Learning Tree* (American Forest Foundation, 1994) training workshop. Most of the programs and activities presented by the "Into the Woods" counselors were conducted on-site at the community center or at a nearby park. The majority of these activities were adapted from *Project Learning Tree* (American Forest Foundation, 1994) and *Naturescope - Trees are Terrific* (Braus, 1992) curricula. While at the community center, the day camp took place primarily outdoors in the park associated with the center. The Mt. Scott Community Center was unable to make a room available for the day camp, so the entire program, with the exception of one activity, occurred outdoors in Mt. Scott Park. The Matt Dishman Community Center was able to provide a room, so drop-off and pick-up of the children, as well as a few selected activities, took place indoors. Most activities at the Matt Dishman site occurred outdoors in the nearby Dawson Park, located a few blocks from the community center.

The Portland Bureau of Parks and Recreation encouraged the "Into the Woods" program to rely heavily upon local resource specialists who could come to the community centers or give programs at field trip locations. The Portland Bureau of Parks and Recreation also wanted to provide unique opportunities for city children to be exposed to the wealth of natural areas around Portland. Field trips beyond the inner city

neighborhoods were also seen as incentives for children to attend the entire ten-day period, which was vital to the study. Finally, the community center directors questioned the ability of the three college-age counselors (including this thesis author), all quite unfamiliar with the social ills and crime rate of the inner city, to conduct the ten-day camp entirely on their own. The outside resource specialists and the field trips thus contributed much to the overall quality of the educational program, but some control was lost over the program content. This problem created some challenges in attempting to research the effects of such a day camp on the knowledge, attitudes, and behaviors of the young children.

Before the first session began, resource specialists were contacted by phone and then sent a letter requesting that they fill out a standardized form (See Appendix B) which asked them to identify the themes and the knowledge, attitudinal, and behavioral objectives of their program. Only about half of the resource specialists returned the form. In general, resource specialists had difficulty in identifying the specific content and objectives for their programs.

Program Themes and Content

During field trips to neighborhood natural areas, local parks, and more distant journeys to sites such as Mt. St. Helens, three overlying themes were emphasized in the "Into the Woods" day camp program. One theme focused on the "Interconnectedness of Nature." This theme sought to connect the similarities between nature experienced on field trips to nature in backyards and gardens of the neighborhood community. "Into the Woods" sought to provide an opportunity for city children to see their backyard nature as belonging to and contributing to a greater ecosystem.

A second theme of the "Into the Woods" program was the "Relationship of Humankind to the Environment." This theme emphasized that humans are part of the environment, they depend on a clean environment for survival, and greatly affect the environment - often damaging it by their lifestyles. Within this theme, actions that individuals can take to help the environment were discussed.

The third theme focused on the concept of "Our Community." This theme sought to increase community pride among the day camp children by encouraging a greater awareness of their neighborhood community. In addition to focusing on the neighborhood itself, this theme sought to give the children an awareness of the place and significance of their community within the larger Portland metropolitan area.

Due to the heavy reliance on outside speakers and field trips, it was difficult to control which day would cover what topic or theme. However, in general, a majority of the program focused on the following topics: trees, water, and wildlife.

For each topic, a day was spent looking at these components from a human perspective, i.e., how humans impact, affect, and use these resources and what they can do to preserve them. A second day was spent looking at each individual topic from a natural perspective - how these resources are vital parts of natural ecosystems, existing and thriving without human intervention. The very last two days of each two-week session of the "Into the Woods" program were spent grouping together these individual topics to study ecosystems and how humans fit into and rely upon the earth's ecosystems for survival. Two additional days per day camp session were allocated, one for orientation (the first day) and one for activities focusing on the local community.

Below are listed the activities for each day of the camp. The same sequence was covered in both camps.

Week One

Day 1

- **Registration**
- **Pretesting**
- **Orientation**
- **Snake Program**
- **"Earth Manners" - *Project Learning Tree* activity #87**
- **Cascades Streamwatch preparation**
- **"Get in Touch With Trees" - *Project Learning Tree* activity #2**

Registration included confirming the drop-off and pick-up times and locations for the day camp with the parents or guardian of each child. Any necessary medical information about the children was also collected. Each child received a nametag and "Into the Woods" fanny pack. Orientation included welcoming the children and introducing each of the counselors. According to different nature symbols on each of the nametags, three or four children were assigned to each of the eight high school counselors. Rules regarding expected behavior were also provided.

Following orientation, a brief program about snakes was presented, and the children were offered an opportunity to handle a snake. This program was conducted because it was fun and interesting to the children, and because it would possibly help the children be less apprehensive about fears associated with nature.

The "Earth Manners" activity involved reading a story about the impacts of human recreation on nature. Small groups of children and their counselors then discussed appropriate ways to treat nature, such as staying on nature trails while hiking, not littering, and not picking flowers. Each group made a list of appropriate respectful nature behaviors and drew pictures that illustrated these actions. The groups presented their list and illustrations to the rest of the campers.

Cascades Streamwatch preparation involved a resource specialist coming to introduce the children to concepts that they would learn later in the week on their visit to Mt. Hood National Forest. The resource specialist introduced the concepts of the water cycle and how the proximity of Portland to the ocean and the mountains affects the rainfall.

The final activity for day 1 was the *Project Learning Tree* "Get in Touch With Trees" exercise (American Forest Foundation, 1994). This was an activity in which the children investigated the parts of a tree while blindfolded and discovered how trees differed in the texture of bark and leaves. Once the blindfolds were removed, the children were challenged to find the tree that they had investigated while blindfolded. The parts of a tree and their uses were discussed.

Day 2

- **All-day field trip to Magness Tree Farm, Wilsonville, Oregon**

The field trip to the tree farm was intended to educate the children about trees and how they are used by humans. The many benefits of trees to humans were discussed with the children. The children were taught about how trees are grown and harvested for human use. Campers were given a sense of how long it takes trees to grow large, and how tree growth occurs differently than human growth. The day ended with a hike to the fire tower overlooking the tree farm.

Day 3

- **Mt. Scott session (July 13) = all-day field trip to Hoyt Arboretum, Portland, Oregon**
- **Matt Dishman session (August 3) = all-day field trip to Portland Metro Washington Park Zoo**

While at the Hoyt Arboretum, the Mt. Scott session campers learned different types of trees and shrubs. The children participated in different types of games which were designed to help them see the differences in trees, such as opposite and alternate branch types and varying leaf types. Many of the day camp children had already visited the arboretum on a school field trip, and thus showed little enthusiasm for this field trip. It was therefore decided that the Matt Dishman session would instead visit the zoo, which was close to the arboretum and would cost about the same amount.

The Matt Dishman day camp visit to the zoo was intended to educate the children about wildlife, the value of zoos in helping to preserve and maintain endangered species, and the complex needs of individual animals. Due to the large group size of 24, it was unrealistic to keep the whole group together at the busy zoo. Instead, several small groups of children and counselors roamed the zoo at their own pace.

Day 4

- **"Hooks and Ladders" - *Project Aquatic Wild* activity at community center park**
- **Field trip to Cascades Streamwatch program, Wildwood Recreation Area, Zigzag Ranger District, Mt. Hood National Forest, Oregon**

Day 4 focused on water conservation issues. The first activity, an educational game, took place at the community center. As an introduction to the afternoon field trip to a pristine stream site, the children participated in the game, "Hooks and Ladders," a *Project Aquatic Wild* activity in which the children ran through an obstacle course

simulating the journey of the salmon to the ocean to spawn. Various obstacles in the game represented obstacles to the salmon, such as dams, turbines, predators, and anglers. Through this game and the story read with it, the children learned about the struggle of the salmon and how human use of electricity creates more barriers to the journey of the fish. The counselors discussed with the children that the few of them that successfully completed the obstacle course was analogous to the few salmon that successfully complete their journey.

The Cascades Streamwatch program was a unique opportunity for the children to explore a pristine river and stream environment by being scientists for the day. The program provided the scientific equipment for the campers to conduct tests such as pH, turbidity, temperature, and dissolved oxygen. Campers learned about the water cycle and about how and where the city of Portland gets its water. The children also observed life in the Sandy River and side stream by collecting aquatic insects. During these activities, the campers were given special sheets to record data they collected. At the end of the trip, the children reconvened and presented their findings to the entire group. This trip provided the opportunity for the children to see first-hand the need for clean water and how all life depends on it.

Day 5

- **Portland Bureau of Environmental Services watershed model activity**
- **Short field trip to local park - urban stream monitoring activity**
- **Paper making activity and creation of journals**

The watershed activity took place at the community center, and employed a model of an urban watershed, where the children could observe a water source and the human activity around it. Observing the model, the children were asked to identify possible

sources of pollution. After identifying these sources, the children were allowed to simulate rain and runoff by spraying water on the model. The model demonstrated the effect of pollution on a watershed. Through this activity, the children were able to observe how pollution can enter a water environment. The resource specialist discussed with the campers the possible effects of the pollution, and asked the campers for ideas on how the problems could be remedied and prevented.

The afternoon of day 5 was spent at a local urban park with stream access. During this trip, the children participated in a monitoring program of a local stream. Campers looked for healthy and unhealthy indicators of stream condition. Using a standardized sheet, the children calculated a rating of the stream's health. Campers were able to observe the impacts of nearby human recreation and other activity on the stream.

Day 5 was concluded with a paper making activity indoors at the community center (*Project Learning Tree,* activity #51, American Forest Foundation, 1994). Using a mixture of shredded and soaked recycled paper, the children sifted the paper mixture through a rectangular sieve. The sifted mixture was pressed flat and allowed to dry. Each child made two sheets - to serve as the front and back of a journal. The children decorated the journal covers, and constructed a journal with a variety of paper. The counselors discussed with the campers the benefits of keeping a journal and explained that the journal would be added to throughout the rest of the day camp program.

Week Two

Day 6

- **Community scavenger hunt**
- **Visit from long-time resident of the neighborhood community to speak on history of the neighborhood**
- **Storm drainage stenciling on neighborhood streets**

- **"School Yard Safari" - *Project Learning Tree* activity #46 (American Forest Foundation, 1994)**
- **Community mural**
- **Journal writing**

For the community scavenger hunt, the children split up into small groups with their counselors, and were given a list of various community elements, such as a library, gas station, grocery store, and medical clinic. During the activity, the campers were to find as many of these community components as possible. At the conclusion of the activity, the whole group discussed what makes up a community, and how everyone in the community depends on the various parts of a community.

As part of this day's focus on the community, one or more long-time community residents came to the park near the community center to briefly share their thoughts about the changes that the community has seen over time. Several of the speakers brought old photographs and items from the past to show the children. The speakers tried to recreate for the children what the area around the community park looked like many years before.

During the storm drainage stenciling activity, the campers and counselors walked the neighborhood streets in search of storm drains. Once drains were located, a stencil and spray paint were applied to the road near the drain. The message on the stencil displayed a fish, and stated: "Dump no waste - drains to stream." The stenciling of the neighborhood storm drains was intended to help prevent people from dumping harmful chemicals such as antifreeze down the storm drains. In this way, the day campers were passing on to the other residents of the neighborhood some of what they had learned.

During the "School Yard Safari" activity (American Forest Foundation, 1994) , the campers divided into small groups with their counselors, and each investigated a different part of the community park. The goal for each group was to find as many signs of animals in the park as possible. The campers were encouraged to look under rocks and on tree

trunks. Each group made a list of its discoveries, and then presented its findings to the rest of the campers. This activity was conducted in order to help the children be more aware of the types of nature and animal life that exist in their neighborhood.

The community mural was a project for the children to create a large picture of their community. The children were encouraged to include in the mural all the essential elements of a community that they could think of.

Day 7

- **All-day field trip to Oxbow County Park for wildlife watching program**
- **Swimming in Sandy River, Oxbow County Park**

While at Oxbow County Park, the day campers engaged in a unique wildlife watching opportunity while hiking on a floodplain area. The resource specialists talked about the needs of wildlife, and the techniques that can be used to watch them closely. The resource specialists taught the children various wildlife watching techniques such as standing very still, identifying animal tracks and calls, and being aware of all sights and sounds. The campers used these techniques to observe wildlife on the hike.

After the wildlife watching activity, the children were allowed to wade in the Sandy River that flows past Oxbow County Park.

Day 8

- **Owl pellet dissection**
- **"Microhike" with magnifying glasses**
- **Urban Audubon animal tracking program - Portland Audubon Society**
- **"The Peppermint Beetle" - *Project Learning Tree* activity #3**
- **Journal writing**

All activities on day 8 took place at the community center and community park. The owl pellet dissection activity was meant to complement the previous day's focus on wildlife, and also relate to the afternoon's activity of investigating signs of wildlife. This hands-on activity focused on the natural history of owls and their predator-prey relationships. The role of owls in controlling the rodent populations was discussed. The campers got to examine first-hand the bones of rodents in the owl's diet. To conclude the activity, the children created a diorama of the bones with pictures of owls and their prey.

The "microhike" activity gave the children a chance to observe the world of nature in their community park on a smaller scale. In small groups, the children and their counselors "hiked" with a magnifying glass inside the circle of a a twelve-foot stretch of rope. The children were encouraged to share their discoveries with each other and their counselors. This activity was intended to enable the children to see nature in their community park from another perspective, as well as encourage their sense of discovery of nature.

The Portland Audubon Society came to the community park to present a program on signs of wildlife. During this program, the children investigated different types of animal tracks, scat, and skins. Also available were different samples of "chewings, " where the teeth marks of certain animals were left on pieces of wood and other materials. The resource specialist spoke about different signs of animals in urban areas, and the children were asked to name signs that they had seen in their neighborhood and during the previous "School Yard Safari" activity on day 6.

The "Peppermint Beetle" activity was an activity which focused on how different animals use their sense of smell. The counselors asked the children how people rely on their sense of smell and what they use it for. The campers then discussed how animals use their sense of smell for such actions as defending territories, attracting a mate, avoiding

danger, and finding food. Before the activity, a counselor had marked some of the trees in an area of the community park with peppermint oil. In the activity, the children were challenged to locate each of the trees that had been marked by an imaginary "peppermint beetle." The children then were asked to discuss why they thought that the imaginary beetle had marked those particular trees.

Day 9

- **All-day field trip to Mt. St. Helens National Monument**

The Mt. St. Helens area was a unique environment where the campers could study the relationships within an ecosystem. The children visited an environment which had been completely decimated by the eruption, and observed the slow rate of recovery, where plants are beginning to once again establish themselves on the barren ground. In these mostly barren areas, the resource specialist discussed with the children the concepts of plant succession. The children did three plant counts - one in a barren area, one near a remaining forest, and one in the forest. Small groups of children counted the number of different plants inside a circle of rope that they placed in each of the three areas. After making a chart of the plant numbers in each area, the children presented their findings to the whole group. The resource specialists asked the children to explain the differences between the nearly barren area, the area close to the forest, and the forest. The children were also asked about the animal life in each of the areas.

While at Mt. St. Helens National Monument, the children also investigated Ape Cave - a cave created by lava flow. The resource specialist gave the children a tour of the cave and told them about cave ecology. The children then examined the walls and floors of the cave for signs of creatures. The fragile ecosystem in the cave and the decrease in

numbers of cave creatures due to human recreation in the cave were also discussed with the children.

Lastly at Mt. St. Helens, the children were taken on a hike through Lava Canyon, a canyon created by lava flow 2,000 years ago through which water now flows. The children hiked through the canyon, and were taught by the resource specialist how the landscape has changed over time, and then searched for signs of how the landscape looked in the past.

Day 10

- **Web of life activity #1**
- **Web of life activity #2**
- **Ecosystem mural**
- ***The Lorax*, (Geisel, 1971) film by Dr. Seuss**
- **Joining of the neighborhood community mural and ecosystem mural**
- **Posttesting**
- **Ice-cream party for campers and their families**

All activities on day 10 took place at the community center and community park. The first web of life activity involved the children role-playing different plants and animals in the environment. Once the children were assigned a plant or animal by the resource specialist, a picture of the plant or animal was pinned onto their shirt. The children were then asked which plants and animals were connected in a food chain. Those that needed each other for food were attached by a piece of string tied to their wrists. Eventually, all of the children were attached to at least one other "creature" which they depended on for survival. The resource specialist helped the campers notice that they were connected to each other by pieces of string just as all creatures in an ecosystem are interconnected. The resource specialist then discussed what happens to the ecosystem when one population of creatures is harmed, such as by DDT. The children then were able to see that because all

creatures are connected, impacts on one population of animals affects many other plants and animals that are connected to them.

The web of life activity #2 consisted of various stations set up at the community center park. Each station included samples from different elements of the environment. One station included soils, rocks, and organic matter. Other stations included elements from the forest floor, a portion of a rotting log, samples from a stream and pond, and a variety of animals such as snakes, frogs, insects, and newts. The children were instructed to spend ten minutes at each station in small groups and collect data such as drawing and recording details about the objects. The campers used this information to create a mural of what makes up an ecosystem.

The Dr. Suess film, *The Lorax* (Geisel, 1971), was a story about how human progress gone unchecked can result in pollution and an environment unfit for wildlife. The film concluded with a message that it is up to each of us to see that we do our best to take care of the environment. After the film, the counselors discussed the message of the story with the children, and helped the children join two previously created murals together - one mural representing the community, created on day 6, and the other ecosystem mural created earlier on day 10. After joining the murals, the counselors discussed with the children how the two murals are both parts of our world, and we need to be sure to take care of the natural environment in order to keep our neighborhood environment healthy, and livable.

Data Collection Procedures

This study utilized the pre- and posttests of the day camp children as well as two questionnaires from their parents to evaluate program outcomes and benefits. A total of

six tests (I-A, I-B, II-A, II-B, III-A, III-B; see Appendix C) were designed to assess the knowledge, attitudinal, and behavioral changes among the day camp children. These six tests were to serve as both the pre- and posttests, i.e., the same six tests would be given before and after the "Into the Woods" program. The pretests were begun as soon as each child was registered on the morning of the first day of camp, and successive pretests were administered throughout the day. The tests were administered by the high school counselors. Each counselor took a group of three or four children to a separate location and administered each child a test. Each counselor was available to answer questions and help the children with reading difficulties. The same procedure for testing the children was followed on the last day of camp for administering the posttests. The posttests were administered throughout the last day until they were completed.

Initially, it was hoped that all six tests developed for the children could be used as pre- and posttests. However, the time at which pretests could be administered was very limited, since day 2 and day 3 were field trip days. Day 1 was the only available pretesting day. The children tired of the somewhat lengthy tests and lost interest in them more quickly than expected. After six pretests had been given to the children on day 1, it was decided that only three of the six tests would serve as pre- and posttests. Therefore, only three posttests were administered on day 10, rather than all six posttests. This was easily arranged since the six tests actually were three tests (i.e., I, II, and III) divided into two parts (parts "A" and "B"). Therefore, only the tests I-A, II-A, and III-A were used as pre- and posttests for both sessions of the day camp. The remaining three tests, I-B, II-B, and III-B were only administered once, as pretests, on Day 1 of the first day camp (i.e., the day camp at Mt. Scott Community Center).

At the end of the first day of the "Into the Woods" day camp, each child was sent home with a "Parents' Information Form" (see Appendix D) to be completed by their

parents or guardian and returned the next day of camp. On the form, the parents were informed to return it with their child the next day.

A second parent questionnaire was distributed to parents at the ice-cream party concluding each day camp session. This questionnaire, or "Parents' Evaluation Form" (see Appendix D) was given to each family at the party along with a stamped and return addressed envelope to mail it back to the Portland Bureau of Parks and Recreation. Those who did not attend the ice-cream party were contacted by phone and mailed a questionnaire with a stamped addressed envelope. Two weeks after the questionnaires were distributed, the counselors made follow-up calls to those families who had not returned their questionnaire. Another set of follow-up calls was made a few weeks later. Out of the forty-eight total children who attended the "Into the Woods" day camp, 29 families, or about 60%, returned these questionnaires.

Data Collection Instruments

The pre- and posttests administered to the day camp children included a knowledge test (III-A), environmental attitudes test (I-A), and a behavioral intention test (II-A) (see Appendix C). The measure of behavioral intention was taken as an indicator of behavior.

The knowledge test (III-A) was designed to assess the children's knowledge of some general environmental education and conservation concepts. More specifically, the eight questions on the knowledge test covered the following concepts: drawing an insect, drawing or listing creatures found in a river, identifying the parts of a tree, identifying the source of Portland's drinking water, the food chain process, predator-prey relationships,

and identifying the meaning of the following concepts: adaptation, camouflage, and habitat. The knowledge test also included a question which asked the children if they felt they could help prevent pollution and another question which asked them whether they considered the earth to be a special home which needs protection. The questions on the knowledge test were worded as simply as possible, and for several questions, the children were given the option to draw or write. Other questions were designed to be answered in ways that were interesting to the children, such as connecting words with lines and filling in blanks.

The children's environmental attitude test (I-A) consisted of eighteen questions. This test measured attitudes toward the following concepts: littering, recycling, limiting consumption, protection of nature/wildlife, pollution, conserving water and electricity, pride in the community, and enjoying and learning about wildlife. Each question began with the statement, "How do you feel when..." A series of "smiley faces" was presented for each question, and the children were asked to mark the one that indicated how they felt in response to a situation such as "...someone throws stones at a squirrel." A very happy face indicated a very happy feeling. Likewise, a very unhappy face indicated an unhappy feeling. The "smiley faces" ranged from very happy, somewhat happy, neutral, somewhat unhappy, and very unhappy. This Likert-type scale of "smiley faces" was intended to both provide reliable and valid measures of attitudes as well as make the answering process more interesting to the children.

The children's behavioral intentions test (II-A) included seven questions. In each question, a situation or dilemma involving environmental protection or interest was described to the children, and they were asked to indicate how they would behave. Each question included four possible answers, and a blank was provided next to each answer for each child to mark his or her answer. The behavior test asked questions regarding the

following behaviors: protecting nature, recycling, littering, fear of nature, electricity conservation, water conservation, and love of parks and natural areas.

A second set of questionnaires was administered to the parents of the children who attended the "Into the Woods" day camp. Two questionnaires were completed by the parents, one after the first day of camp, and the second one following completion of the camp. The first parent questionnaire, "Parents' Information Form" (see Appendix D), asked the parents to indicate the how important fifteen possible reasons were in their decision to enroll their child in the day camp. These reasons ranged from an actual desire to have their child "learn to love and respect nature" to more practical reasons such as "it seems like a good child day care service." The "Parents' Information Form" also included some extra space for parents to elaborate on other important reasons for enrolling their child in the day camp.

The second parental questionnaire was the "Parents' Evaluation Form" (see Appendix D). This questionnaire began by asking the parents to indicate the extent to which the camp had satisfied their reasons for enrolling their child on a five-point Likert-type scale. The parents responded to the same fifteen reasons included on their pre-camp survey. A second part of the "Parents' Evaluation Form" asked the parents for information on how the camp affected their child's behavior at home during the two-week long program. Twelve possible child behaviors were listed, and the parents indicated how often (on a five-point scale from "not at all" to "all the time") their child displayed such behavior. The behaviors listed included actions such as "My child talked to me about the program" or "My child turned out lights that were not being used." Additional space on the questionnaire was provided for parents to elaborate on ways in which the day camp might have affected their child's behavior during the two-week program.

Another section of the "Parents' Evaluation Form" asked the parents to indicate how much involvement and interaction they had with their children during the two-week camp. Five possible types of parental involvement were listed, including, "I asked my child about the program's content" and "I took my child to parks or natural areas." Parents were asked to respond to these questions on a five point scale that ranged from "not at all" to "all the time."

An additional section of the "Parents' Evaluation Form" provided space for parents to comment on both what their child liked and disliked about the "Into the Woods" day camp. These items were followed by several questions which asked the parents to evaluate the overall program and whether such programs should be offered in the future.

Finally, the "Parents' Evaluation Form" concluded with a section asking the parents to offer information about their households. Such questions included income level, family size, race, and occupation. This section also asked parents to indicate how often their family participates in various recreation and nature recreation activities.

Data Analysis Procedures

Three types of data analysis were performed in this environmental education study. The Pearson correlation coefficient was used to assess the strength of the relationships described in the following hypotheses:

H1: The higher a parent's indicated level of interaction with his/her child during the environmental education day camp, the more his/her child will learn from an environmental education day camp.

H2: The higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for "learning to love nature" reasons, the more his/her child will learn from the environmental education day camp. Likewise, the

higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for "baby sitting" reasons, the less his/her child will learn from the environmental education day camp.

H3: The more that families indicate they take trips to natural areas, the higher the scores exhibited by their children on environmental attitudes, behavioral intentions, and environmental knowledge measures.

H8: The higher a child's indicated interest in nature, the more environmental knowledge he/she will possess.

H9: The higher a child's indicated interest in nature, the more he/she will learn from the environmental education day camp.

Paired t-tests were used to compare various pre- and posttest scores for hypotheses 5, 6, and 7:

H5: The environmental education day camp program evaluated in this study will increase environmental knowledge among participants.

H6: The environmental education day camp program evaluated in this study will increase positive environmental attitudes among participants.

H7: The environmental education day camp program evaluated in this study will increase appropriate environmental behavioral intentions among participants.

Finally, stepwise multiple linear regression was applied to hypothesis 4 to test the strength of the relationships described in this hypothesis:

H4: Children whose families indicate a moderate frequency of past visits to natural areas will learn more from an environmental education day camp than will children who had few or very frequent previous visits to natural areas.

CHAPTER FOUR: RESULTS AND DISCUSSION

Descriptive Overview of Study Findings

In this section, we are providing descriptive information on how the day camp children and parents answered study tests and questionnaires. Here, we are not attempting to generalize to a larger population of children and parents in the Mt. Scott and Matt Dishman Community areas. We are instead focusing only on the individuals who participated in the program (For the purposes of this section, the day camp children and their parents are considered the population of interest).

Descriptive Overview of Children's Response

Results for the children's knowledge measure, Quiz III-A displayed in Table 1, show that prior to the day camp, the children were not familiar with many of the concepts covered on the test. This is demonstrated by the low percentages of correct answers on the pretest. For about 45% of the questions (questions 1, 5, 6, 7b, and 8c), the children made apparent gains of greater than 10% in the positive direction between the pretest and posttest. The largest gain occurred for question 6 ("Where do people in Portland get their drinking water?"). Response to several questions (questions 7a, 8a, 9 and 10) appeared to trend in the negative direction, i.e., the children performed worse on these posttest questions than on the pretest questions. Three of these questions displaying a negative gain were the three questions exhibiting the highest score (87% correct or higher) among all the pretest questions.

Results for the children's environmental attitudes measure (Quiz I-A), displayed in Table 2, indicate that for all of the attitude questions, the children possessed very high

environmentally supportive attitudes prior to the day camp. This is demonstrated by the high scores on all the environmental attitude pretest questions. These highly positive attitudes provided little room for improvement between pretest and posttest scores. Indeed, the majority of the environmental attitude questions displayed only an apparent slight increase from pretest to posttest. Question 11 ("How do you feel about seeing water sprinklers running all day on your neighbor's lawn") showed the biggest positive change in environmental attitude gain, but only gained less than one point (on a one to five scale) in the direction of more environmentally supportive. Several attitude questions, namely questions 2, 3, 8, and 16 displayed a slight change in the negative direction, i.e., the posttest score was slightly lower than the pretest score. Three of these questions had pretest scores which were the highest of any of the eighteen pretest questions. These three questions (questions 2, 3, and 16) all displayed pretest scores above 4.85.

For the children's behavioral intentions measure (Quiz II-A), Table 3 indicates that for all but one question (question 5), the children possessed very environmentally sensitive behavioral intentions prior to the day camp. This is demonstrated by the fact that 90% or more of the answers indicated by the day camp children on the pretest were the most "environmentally sensitive" answers. Like the children's environmental attitudes measure, high pretest scores provided little room for positive change in environmental behavioral intentions. The largest positive gain in environmental behavioral intentions occurred for question 5 ("You have a day off from school. What would you do that day if your parent said you could do anything you wanted?"), which exhibited a low pretest score of only 59% correct. Three of the behavioral intentions questions exhibited a change in the negative direction, i.e., the posttest score was lower than the pretest score. These questions displaying a negative change (questions 3, 4, and 7) had the highest pretest scores (97% "correct" or higher).

Table 1. Comparison of sample size and percent of questions answered correctly among pretests and posttests: Quiz III-A, children's knowledge measure.[1]

QUIZ III-A: KNOWLEDGE OF NATURE AND PARKS	Pretest N	Pretest % Correct	Posttest N	Posttest % Correct
Question 1: In the space provided below, draw a picture of an insect.	31	29	31	42
Question 5: Label the parts of a tree and its environment (draw a line from the word to the part of the tree described)	31	52	31	68
Question 6: Where do people in Portland get their drinking water?	31	13	31	55
Question 7a: Complete the following food chain by putting the plants and animals in the boxes in the correct order. Use this list: frogs, plants, fish. *Sun_____Insects*	31	94	31	90
Question 7b: Complete the following food chain by putting the plants and animals in the boxes in the correct order. Use this list: frogs, plants, fish. *Insects_____Bald eagle*	31	45	31	68
Question 8a: Fill in the blanks in the following story with the words provided: predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special_____to protect themselves from predators*	31	45	31	32
Question 8b: Fill in the blanks in the following story with the words provided: predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special camouflage to protect themselves from_____.*	31	77	31	84
Question 8c: Fill in the blanks in the following story with the words provided: predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *The color of their hair helps them blend into their woodland_____.*	31	61	31	74
Question 8d: Fill in the blanks in the following story with the words provided: predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *This is called_____.*	31	32	31	39
Question 9: I can help prevent pollution __Agree __Don't' know __Disagree	31	87	31	77
Question 10: We need to protect the earth; it is a special home. __Agree __Don't know __Disagree	31	97	31	94

[1]Questions 7 and 8 on the children's environmental knowledge measure are split here into several parts (i.e., 7a and 7b; 8a, 8b, 8c, and 8d) for data analysis purposes, since these questions actually consist of several questions. The sample size of 31 children is due to the fact that several of the 48 day camp children did not attend either the first or last day of the program when the pre- and posttests were administered.

Table 2. Comparison of sample size, mean, and standard deviation among pretest and posttest questions: Quiz I-A, children's environmental attitudes measure.[2]

Range of answers:

5 = Strongly agree with environmentally supportive attitude
4 = Agree with environmentally supportive attitude
3 = Neutral opinion about environmentally supportive attitude
2 = Disagree with environmentally supportive attitude
1 = Strongly disagree with environmentally supportive attitude

QUIZ I-A: FEELINGS ABOUT NATURE AND PARKS	Pretest			Posttest		
"How do you feel when...."	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Question 1: You see an empty can on the ground at your park?	34	4.29	1.19	35	4.8	0.47
Question 2: Someone throws stones at a squirrel?	34	4.85	0.44	35	4.8	0.41
Question 3: Saving and recycling your family's newspaper?	34	4.97	0.17	34	4.77	1.0
Question 4: Leaving the lights on in your room when you leave?	33	4.24	0.94	34	4.44	0.86
Question 5: Going to a forest or wildlife area?	34	4.74	0.96	35	4.77	0.81
Question 6: Writing a story about wildlife in the park?	34	4.53	1.1	34	4.68	0.84
Question 7: Living with fewer things - such as clothes, TVs and games - if it would protect nature?	33	3.64	1.6	35	4.17	1.18
Question 8: Your friend steps on a caterpillar (fuzzy worm) on the sidewalk?	32	4.59	0.62	34	4.44	0.96
Question 9: Children who kill frogs and snakes?	33	4.79	0.42	34	4.82	0.72
Question 10: Seeing smoke from a factory?	31	4.29	1.24	33	4.79	0.49
Question 11: Seeing water sprinklers running all day on your neighbor's lawn?	34	3.71	1.61	34	4.68	0.84
Question 12: Visiting the parks in your neighborhood?	34	4.82	0.52	34	4.85	0.83
Question 13: Living in your neighborhood?	34	4.32	1.43	35	4.43	1.24
Question 14: Living in Portland?	34	4.29	1.3	35	4.4	1.22
Question 15: Helping to pick up paper litter to keep the school yard clean?	34	4.85	0.44	33	4.88	0.49
Question 16: Seeing someone use the recycling cans at school?	34	4.94	0.24	32	4.84	0.45
Question 17: Throwing away things that could be used by others?	34	4.03	1.38	33	4.09	1.36
Question 18: Watching a TV program about scientists who work to keep the rivers clean?	34	4.68	0.88	33	4.73	0.76

[2] The varying N sizes displayed in this table are reflective of: 1) the fact that several day camp children did not attend the first and/or last day of the program when the pre- and posttest environmental attitudes measures were administered; and 2) some of the children failed to answer all the questions on their tests.

Table 3. Comparison of sample size and percent of questions answered correctly among pretests and posttests: Quiz II-A, children's behavioral intentions measure.[3]

QUIZ II-A: THINGS YOU LIKE TO DO	Pretest		Posttest	
	N	% Correct	N	% Correct
Question 1: While walking along a path in the park you find an aluminum can dropped on the ground. What would you do? __Leave it there __Pick it up and put it in the trash can __Pick it up and put it in the recycling box so the can be used over __Cover it with leaves	38	90	34	91
Question 2: You and your friend are visiting a park. He brings his new pocket knife and wants to try it out in the park. He asks you what he should try it out on. What would you tell him to try the knife on? __A live oak tree __A trail sign __A dead branch on the ground, __A live Christmas tree	39	92	34	97
Question 3: You are walking in the park and eating a candy bar. When you finish eating the candy, what would you do with the candy wrapper? __Throw it on the ground __Give it to your friend __Give it to your dog __Put it in the trash	39	100	34	97
Question 4: Your teacher brings a live snake to the classroom to teach you about animals. She holds it and describes how it eats. Then she asks if any of the children in the class want to hold it. What would you do? __Hide behind the student in front of you and hope your teacher doesn't call on you __Tell your teacher the snake is too ugly __Turn your face away from the snake __Tell your teacher you would like to hold the snake	39	97	33	85
Question 5: You have a day off from school. What would you do that day if your parent said you could do anything you wanted? __Go to a movie __Go to a park in your neighborhood __Go to a shopping mall __Go to a forest park outside the city	39	59	33	71
Question 6: Your mom or dad leave a room in your house and leave the lights on. You see that no one is using the room. What would you do? __I would do nothing, __I would go and turn out the light __I would turn on additional lights in the room __I wouldn't notice anything wrong	39	92	34	97
Question 7: You and your friend are playing outside. You are thirsty. You and your friend go inside the house to get a drink of water. Which of the following would you do? __Let the water from the faucet run a long time so the water is cold __Fill up the glass of water, drink what I want, and dump the rest __Fill up a big glass of water to impress your friend __Take only as much water as I will drink	39	97	34	94

[3] The varying N sizes displayed in this table are reflective of: 1) the fact that several day camp children did not attend the first and/or last day of the program when the pre- and posttest environmental attitudes measures were administered; and 2) some children failed to answer all the questions on their tests.

Descriptive Overview of Parents' Response

The parents' post-camp questionnaire ("Parents' Evaluation Form") included questions which requested sociodemographic information about the households of the "Into the Woods" day camp families. The response rate for this questionnaire was about 60%, i.e., 29 out of the 48 families returned the questionnaire. Responses to these sociodemographic questions are displayed in Tables 4 - 13. Table 4 indicates that 27 adults (or 93%) who filled out the "Parents' Evaluation Form" were actual parents of the day camp children, while a remaining 7% (two adults) consisted of one grandparent and one foster mother. In all but one case, the adult who completed the "Parents' Evaluation Form" was female, as indicated in Table 5. The overall mean age of the adult completing the parents' questionnaire was about 35. Table 6 indicates that the mean parental age for the Matt Dishman day camp was slightly higher (about age 37) than for the Mt. Scott day camp session (about age 34).

Table 7 displays the racial background of the 29 parents who completed the "Parents' Evaluation Form." One parent (about 3%) did not indicate his/her racial background. Parents of children in both sessions of the day camp were generally European American (22 out of 29, or 76%). The second highest parental racial group represented was African American (4 out of 29, or about 14%). All of the African Americans were parents of children attending the Matt Dishman day camp.

Across both day camps, only a remaining seven percent (two parents) of the parents indicated that they were a race other than European American or African American. Of these, one person indicated Asian racial background and another indicated "mixed" racial background. It should be noted that the racial background of the parents of children in both day camp sessions shown in Table 7 does not represent the racial

background of the day camp children themselves, as some day camp children were born into families of mixed races.

Occupations of the parents of day camp children are represented in Table 8. Seventeen different occupations were indicated. The most common occupation of parents in both sessions of day camp children was housewives, followed by students, housecleaning, and education. In several cases, although the mother of a child filled out the "Parents' Evaluation Form," she indicated her husband's occupation instead of her own. This fact makes it difficult to draw conclusions about occupations of day camp parents.

Table 9 includes the mean number of years that the parent who filled out the "Parents' Evaluation Form" lived in Portland. The overall mean for both day camp sessions was about 21 years. The parents of children in the Mt. Scott day camp indicated they had lived in Portland a shorter time on average than parents of children attending the Matt Dishman day camp session (a mean of about 19 years vs. a mean of about 23 years, respectively).

Across both day camp sessions, the most highly represented income level was $20,000 - $30,000 (34%, or 10 out of 29 families). The next most common income level represented was $10,000 - $20,000 (28%, or eight out of 29 families), followed by the $30,000 - $40,000 income level (21%, or six out of 29 families). The income level above $40,000 was the least represented by day camp families, occurring only in the Matt Dishman day camp session. Families of the Matt Dishman day camp session reported higher incomes in general. For example, 38% of the Matt Dishman day camp families (or five of 13 families who returned the questionnaire) indicated that they earned over $30,000 in 1993, whereas only 19% of the Mt. Scott day camp families (three of 16 families) indicated that they earned this much (Table 10).

Type of household is represented in Table 11. Based on the 29 returned questionnaires, 24% of children from the two day camp sessions came from families with single parents. Single-parent families occurred more predominantly in the Matt Dishman day camp session; 38% (five of the 13 returned Matt Dishman area questionnaires) of these families were single-parent households. However, only about 13% of the Mt. Scott group (i.e., two of the 16 families who returned the post-camp questionnaire) were from single-parent households.

The Mt. Scott and Matt Dishman day camp session families also differed substantially in the number of parents working outside the home within two-parent households. Table 11 shows that out of the 15 people that responded to this question in the Mt. Scott session, the number of parents working outside the home was almost evenly distributed between one or two parents (47%, or seven families, vs. 53%, or eight families). However, the Matt Dishman day camp session consisted of a higher percentage of its families where only one of two parents worked outside the home (75%, or six of the eight families that indicated they were two-parent households).

Table 12 displays the size of the households for the day camp children. The overall mean number of people living in a household for both day camp sessions was about 5 people. On average, about 2 of these people were adults (18 or over) and about 3 of these people were children or adolescents (under 18).

Of the Portland Bureau of Parks and Recreation programs listed on the "Parents' Evaluation Form," participants of both day camp sessions indicated that they most often attend swimming programs, as indicated by Table 13. Response to the question about participation in the Portland Bureau of Parks and Recreation nature recreation programs included 29% of the day camp families indicating that they do not participate (eight out of the 28 people that responded to this question), 57% indicating that they sometimes

participate (16 out of the 28 families), and 14% indicating that they frequently participate (four of the 28 families who responded to this question).

Table 13 also shows that out of the three listed natural areas: Mt. Hood, Mt. St. Helens, and the Oregon Coast, the coast was the most popular area for families of both day camp sessions. Trips to Mt. Hood were taken by 15% of the day camp families (i.e., four of the 27 families who answered this question), sometimes taken by 63% of the families (i.e., 17 of 27 families), and frequently taken by 22% of the day camp families (i.e., six of the 27 families). Sixty-three percent of the day camp families indicated that they did not take trips to Mt. St. Helens (i.e., 17 of the 27 families who responded to this question), while the remaining 37% (i.e., 10 of 27 families) indicated that they sometimes took trips to Mt. St. Helens. Finally, trips to the Oregon Coast were not at all taken by 4% of the day camp families (i.e., one of the 28 families who responded to this question), sometimes taken by 68% of the families (i.e., 19 of 28 families), and frequently taken by 28% of the day camp families (i.e., eight of the 28 families responding to this question).

Tables 14 and 15 deal with reasons that parents enrolled their children in the day camp. Table 14 includes the parents' ratings of reasons for enrollment that were listed on the parents' pre-camp questionnaire ("Parents' Information Form"). Parents of children from both day camp groups rated most of the listed reasons on average at a high level of importance. Reasons involving care for the earth or the environment (Questions 1b, 1j, and 1o) were rated on average as "very important" or higher by both day camp groups. Conversely, parents of both groups rated reasons such as "It seems like a good child day care service" (Question 1h) on average at a low level of importance.

Table 15 displays the parents' evaluation of how well their reasons for enrolling their child were met by the day camp program. On average, most of the parents indicated that their expectations were met. For example, for question 4e, "taught my child to

respect the earth," the mean performance score was 4.52, falling between the ratings "agree" (4.0) and "strongly agree" (5.0). The mean performance score for question 4f, "taught my child to learn about nature" was 4.72, again falling between the ratings "agree" (4.0) and "strongly agree" (5.0). For question 4j "taught my child actions to protect the environment," the mean performance score was 4.52.

However, the mean performance score was somewhat lower for four of the fifteen reasons listed on the questionnaire. These lower rated questions included question 4c, "helped my child lose his/her fear of nature," question 4d "provided good lunches," question 4g "was a good day care service for my child," and question 4k "taught my child to behave properly." Each of these questions had mean performance scores, between the ratings "neutral" (3.0) and "agree" (4.0), about one point lower (on a scale from one to five) than all the other performance scores.

Tables 16-19 categorize parents' responses to several open-ended questions on the pre- and post-camp questionnaires. The pre-camp "Parents' Information Form" asked parents to list additional reasons for enrolling their child in the day camp. Ten reasons total were mentioned by parents from both day camp groups. The two most frequently listed reasons for enrolling children were "I hope you offer this program again -- children like it," and "this is a good experience for children" (Table 16).

Table 17 lists additional comments that parents made on any aspect of the "Into the Woods" program. The most frequent comment mentioned by parents in both day camp groups included "the program was great." The second most common response was "the counselors were great," followed by the comments "my child had fun," and "this program should be offered again and to more children."

The "Parents' Evaluation Form" also asked the day camp parents to list what their child liked most about the day camp program (Table 18). The most frequently mentioned

aspect of the day camp was "field trips." Other program aspects listed by the parents that the children enjoyed included "hands-on environmental activities," "learning about nature and the environment," and "the camp counselors," respectively.

Table 19 lists the aspects of the day camp mentioned by parents which their children disliked. The most commonly disliked aspect was the lunches. The second and third most frequently mentioned dislikes were "disruptive children" and "bee stings," respectively.

Table 20 lists the parents' perceptions of the day camp's effect on their child's behavior during the two-week program. Responses for both the Mt. Scott session and the Matt Dishman session were very similar for all questions, except question 5e ("The child asked to be taken to places visited during the program"). For this question, the Mt. Scott average response was higher (3.44, between "sometimes" and "often") than the Matt Dishman response (2.77, between "rarely" and "sometimes"). Two of the children's behaviors that the parents of both day camp groups indicated occurred most frequently included the behavior "talked to you about the program," with a mean of 4.26 (falling between "often" and "all the time"), and the behavior "showed you things he/she did during the program," with a mean of 4.41 (also occurring between the ratings "often" and "all the time").

The parents' indicated level of involvement with their child during the day camp is shown in Table 21. The type of parental involvement, "I asked my child whether he/she liked the program" received the highest involvement rating of 4.69, falling between "frequently" (4.0) and "all the time" (5.0). The second highest rated type of parental involvement occurred for the issue, "I asked my child about the program's content," with a mean response of 4.55 (falling between "frequently" and "all the time"). For four of the five listed types of parental involvement, the Mt. Scott and Matt Dishman day camp

groups did not differ substantially. For question 6a, ("I asked my child about the program's content") however, the mean response for the Matt Dishman camp session (4.96, between "frequently" and "all the time") was higher than the mean response for the Mt. Scott session (3.13, between "sometimes" and "frequently").

The parents' overall evaluation of the quality of the "Into the Woods" day camp program is displayed in Table 22. The overall mean was a high score of 4.48, falling between "very good" and "excellent." Both the Mt. Scott and the Matt Dishman day camp parents rated the quality of the day camp between "very good" and "excellent."

When asked whether they would send their child or another son or daughter to a future "Into the Woods" program, both session of day camp indicated a high overall mean of 4.83 (between "probably yes" and "definitely yes"). The parents of both day camp sessions also gave a very positive response to the question: "Should Portland Parks and Recreation provide more nature education programs?" The mean response to this question was 4.83, again falling between "probably yes" (4.0) and "definitely yes" (5.0). These results are displayed in Table 23.

The overall success of the "Into the Woods" day camp might be summarized in the camp's performance at satisfying the parents' reasons for enrolling their children. Comparison of Tables 14 (parents' perceptions of importance of various reasons for enrolling their child in the day camp) and 15 (parents' evaluation of the day camp's performance) shows that overall, the "Into the Woods" day camp apparently did a very good job of satisfying the parents' expectations. Reasons for enrolling their child displayed in Table 14 which were rated as most important by the parents received consistently high scores when the parents were asked if their expectations had been met for these same reasons. For example, the reason for enrollment, "I want my child to learn about nature," was rated the highest of all by the parents prior to the camp. At the

conclusion of the day camp, parents indicated that their expectations for this reason had been met with a very high score of 4.79, between "agree" (4.0) and "strongly agree" (5.0). All other reasons for enrollment for which the parents indicated the importance was "very" (4.0) or higher, had performance scores of "agree" (4.0) or higher.

Table 4. Comparison of Mt. Scott and Matt Dishman day camp sessions: parental relationship to child.

Question 3: "Please indicate your relationship to child"	N Mt. Scott	N Dishman	Total
Parent	16	11	27
Grandparent	-	1	1
Other (please specify)	-	1 (foster mother)	1

Table 5. Comparison of Mt. Scott and Matt Dishman day camp sessions: gender of parent responding to questionnaire.

Range of answers: **1 = Male**
2 = Female

Question 10b: "Please indicate your gender"	N Mt. Scott	% Male Mt. Scott	% Female Mt. Scott	N Dishman	% Male Dishman	% Female Dishman	Overall % Male	Overall % Female
	16	6	94	13	0	100	3	97

Table 6. Comparison of Mt. Scott and Matt Dishman day camp sessions: age of parent responding to questionnaire.

Question 10a "Indicate your age"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Standard Deviation Overall
	16	33.63	6.51	12	37.25	7.81	35.18	7.19

Table 7. Comparison of Mt. Scott and Matt Dishman day camp sessions: racial background of parent responding to questionnaire.

Question 10c: "Please indicate your race"	N Mt. Scott	N Dishman	Overall
African American	-	4	4
European American	14	8	22
Asian	-	1	1
Mixed	1	-	1

Table 8. Comparison of Mt. Scott and Matt Dishman day camp sessions: occupation of parent.

Question 10g: "What is your occupation?"	N Mt. Scott	N Dishman	N Overall
"Housewife"	4	2	6
"Student"	1	2	3
"Housecleaning"	2	-	2
"Education"	-	2	2
"Machinist"	1	-	1
"Bookkeeper"	1	-	1
	N Mt. Scott	N Dishman	N Overall
"Volunteer"	1	-	1
"Telecommunications operator"	1	-	1
"Data entry operator"	1	-	1
"Truck driver"	1	-	1
"School cafeteria worker"	1	-	1
"Retired"	-	1	1
"Attorney"	-	1	1
"Cosmetics distributor"	-	1	1
"Teacher's assistant"	-	1	1
"Corrections"	-	1	1
"Self-employed"	-	1	1

Table 9. Comparison of Mt. Scott and Matt Dishman day camp sessions: years parent lived in Portland.

Question 10i: "How long have you lived in Portland?" (years)	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
	14	19.29	12.8	13	22.92	13.49	21.04	13.01

Table 10. Comparison of Mt. Scott and Matt Dishman day camp sessions: family income.[4]

Question 10h: "Indicate your family's total combined income in 1993?"	N Mt. Scott	% Mt. Scott	N Dishman	% Dishman	Overall N	Overall %
$0 - $10,000	0	0	0	0	0	0
$10,000 - $20,000	5	31	3	23	8	28
$20,000 - $30,000	6	38	4	31	10	34
$30,000 - $40,000	3	19	3	23	6	21
Over $40,000	0	0	2	15	2	7

Table 11. Comparison of Mt. Scott and Matt Dishman day camp sessions: type of household.

Question 10d: "Which of the following describes your household?"	N Mt. Scott	% single parent Mt. Scott	% double parent Mt. Scott	N Dishman	% single parent Dishman	% double parent Dishman	Overall % single parent household	Overall % double parent household
	16	12.5	87.5	13	38	62	24	76
Question 10e: "If two parent household, how many parents work outside the home?"	**N Mt. Scott**	**% one parent Mt. Scott**	**% both parents Mt. Scott**	**N Dishman**	**% one parent Dishman**	**% both parents Dishman**	**Overall % one parent works**	**Overall % both parents work**
	15	47	53	8	75	25	57	43

[4] Three of the 29 families (about 10%) who returned the post-camp questionnaire, did not respond to this question about their income level.

Table 12. Comparison of Mt. Scott and Matt Dishman day camp sessions: size of household.

Question 10f: "How many people live in your household?"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
	15	4.73	1.16	13	4.23	1.36	4.5	1.26
Question 10f1a: "Of these, how many are adults (18 or over)?"	**N Mt. Scott**	**Mean Mt. Scott**	**Standard Deviation Mt. Scott**	**N Dishman**	**Mean Dishman**	**Standard Deviation Dishman**	**Overall Mean**	**Overall Standard Deviation**
	15	2	0.38	13	1.69	0.75	1.86	0.59
Question 10f1b: "How many are children or adolescents (under 18)?"	**N Mt. Scott**	**Mean Mt. Scott**	**Standard Deviation Mt. Scott**	**N Dishman**	**Mean Dishman**	**Standard Deviation Dishman**	**Overall Mean**	**Overall Standard Deviation**
	15	2.73	1.28	13	2.46	1.13	2.61	1.2

Table 13. Comparison of Mt. Scott and Matt Dishman day camp sessions: family participation in recreational activities.

Range of answers: **1 = Not at all**
2 = Sometimes
3 = A lot

Question 10l: "How often does your family participate in the following Portland Parks & Recreation programs?"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
Sports	14	1.86	0.66	13	1.85	0.8	1.85	0.72
Swimming	15	2.4	0.63	13	2.54	0.52	2.46	0.58
Crafts	15	1.47	0.52	13	1.69	0.75	1.57	0.63
Nature recreation (like trips to forests)	15	1.93	0.59	13	1.77	0.73	1.86	0.65
Art (like dance and painting)	15	1.33	0.49	13	1.69	0.63	1.5	0.58
Washington Park Zoo	14	1.93	0.48	12	1.83	0.84	1.89	0.65
Question 10k: "How often does your family go to:"	**N Mt. Scott**	**Mean Mt. Scott**	**Standard Deviation Mt. Scott**	**N Dishman**	**Mean Dishman**	**Standard Deviation Dishman**	**Overall Mean**	**Overall Standard Deviation**
Mt. Hood	15	2.13	0.74	12	2	0.43	2.07	0.62
Mt. St. Helens	15	1.2	0.41	12	1.58	0.52	1.37	0.49
Oregon Coast	15	2.27	0.46	13	2.23	0.6	2.25	0.52

Table 14. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' perceptions of importance of various reasons for enrolling their child.

Range of answers:

1 = Not at all
2 = Somewhat
3 = Moderately
4 = Very
5 = Extremely

"How important are the following reasons in your decision to enroll your child in the 'Into the Woods' nature camp program?"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Mean Total	Overall Standard Deviation
Question 1a: "It seems like a safe place for my child"	13	4.23	0.73	11	4.27	0.79	4.25	0.74
Question 1b: "I want my child to learn about nature"	13	4.54	0.52	11	4.36	0.51	4.46	0.51
Question 1c: "It is free"	13	3.15	0.99	11	2.91	1.45	3.04	1.2
Question 1d: "It seems like a good child day care service"	13	2.15	1.41	10	1.9	0.99	2.04	1.22
Question 1e: "I want my child to learn about the beauty of Portland"	14	4.36	0.63	11	4.27	0.91	4.32	0.75
Question 1f: "I want my child to lose his/her fear of nature"	12	2.17	1.33	10	2.7	1.64	2.41	1.47
Question 1g: "I want my child to have good role models"	13	3.77	0.93	11	4.46	0.69	4.08	0.88
Question 1h: "It offers free lunch"	13	2.08	1.04	11	1.82	1.25	1.96	1.12
Question 1i: "I want my child to get away from the television"	13	3.85	0.99	11	4	1.34	3.92	1.14
Question 1j: "I want my child to learn to respect the earth"	14	4.36	0.84	11	4.64	0.51	4.48	0.71
Question 1k: "I want my child to learn to get along in a group"	13	4.08	0.86	11	4	0.89	4.04	0.86
Question 1L: "I want my child to be proud of his/her neighborhood"	13	3.85	0.9	11	4.18	0.87	4	0.89
Question 1m: "I want my child to go on trips to forests and parks outside the city"	14	4.21	0.98	11	4.09	0.83	4.16	0.9
Question 1n: "I want my child to learn to behave properly"	11	3.18	1.33	11	3.73	1.49	3.46	1.41
Question 1o: "I want my child to learn to take actions to protect the environment"	13	4.31	0.86	11	4.46	0.69	4.38	0.77
Question 1p: "I want my child to have good teachers"	13	4.31	0.63	11	4.64	0.51	4.46	0.59

Table 15. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' evaluation of the day camp program.

Range of answers:

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

"Indicate how well the camp satisfied your reasons for enrolling your child"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
Question 4a: "Provided a safe environment for my child"	16	4.56	0.51	13	4.15	0.56	4.38	0.56
Question 4b: "Had good role models for my child"	16	4.44	0.51	13	4.31	0.75	4.38	0.62
Question 4c: "Helped my child lose his/her fear of nature"	14	3.29	0.47	12	3.75	0.75	3.5	0.65
Question 4d: "Provided good lunches"	16	3.63	0.72	13	3.69	0.86	3.66	0.77
Question 4e: "Taught my child to respect the earth"	16	4.56	0.51	13	4.46	0.52	4.52	0.51
Question 4f: "Helped my child to learn about nature"	16	4.94	0.25	13	4.62	0.51	4.79	0.41
Question 4g: "Was a good day care service for my child"	16	3.63	0.62	13	3.62	1.19	3.62	0.9
Question 4h: "Took my child to see forests and parks outside the city"	16	4.81	0.4	13	4.62	0.51	4.72	0.46
Question 4i: "Helped my child get along well in a group"	16	4.19	0.75	13	4.15	0.56	4.17	0.66
Question 4j: "Taught my child to take actions to protect the environment"	16	4.63	0.62	13	4.39	0.51	4.52	0.57
Question 4k: "Taught my child to behave properly"	15	3.53	0.83	13	3.69	0.86	3.61	0.83
Question 4L: "Helped my child be proud of his/her neighborhood"	16	4.13	0.81	13	4.23	0.6	4.17	0.71
Question 4m: "Showed my child the beauty of Portland"	16	4.25	0.58	13	4.54	0.52	4.38	0.56
Question 4n: "Had good teachers for my child"	16	4.63	0.62	13	4.54	0.66	4.59	0.63
Question 4o: "Helped my child get away from the television"	16	4.31	0.7	13	4.46	0.78	4.38	0.73

Table 16. Comparison of Mt. Scott and Matt Dishman day camp sessions: additional reasons that parents gave for enrolling their child.

Question 2: "Please list other reasons for enrolling your child in the day camp"	N Mt. Scott	N Dishman
"I want my child to learn about what is out in nature"	1	-
"Creative education such as this is easier for children to learn"	1	-
"Gives my child something to do and to look forward to"	1	-
"Gives children a chance to learn about everyday things that they see"	1	-
"My child needs structured activities such as this"	1	-
"The theme of the program is enjoyable to kids"	1	-
"I want my child to learn about the environment as something to be respected, not taken for granted"	1	-
"I hope you offer this program again -- kids like it!"	-	2
"This is a good experience for kids"	-	2
"Gives my child a chance to make new friends"	-	1

Table 17. Comparison of Mt. Scott and Matt Dishman day camp sessions: additional comments parents made.

Question 9d: Is there anything else about the program that you would like to comment on?	N Mt. Scott	N Dishman	Overall
"The program was great"	3	2	5
"The counselors were great"	3	1	4
"Child had fun"	1	2	3
"Program should be offered again and to more children"	1	2	3
"Child is more environmentally aware"	2	-	2
"Program should be longer than two weeks"	1	-	1
"The organization of the program was great"	1	-	1
"Child learned to work in a group"	1	-	1
"Teen counselors need more experience"	1	-	1
"Parents not sure where to pick up child"	1	-	1
"Meeting new children was positive"	1	-	1
"Child learned responsibility in relating to the earth"	1	-	1
"Child returned home good-natured despite the intense learning"	1	-	1
"Should provide a time for children to share things about conservation from home with class"	-	1	1
"Good student/teacher ratio"	-	1	1
"Great use of actual equipment to do experiments and activities"	-	1	1
"Child shared experiences daily with parents"	-	1	1
"Child's self-esteem boosted by time with the counselors"	-	1	1
"Meeting location was convenient"	-	1	1

Table 18. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' perceptions of what their child liked most about day camp.

Question 7: **"Describe in your own words what your child liked most about the day camp program?"**	**N Mt. Scott**	**N Dishman**	**Total**
"Field trips"	9	9	18
"Hands-on environmental activities"	7	3	10
"Learning about nature and environment"	5	3	8
"The camp counselors"	7	1	8
"Mt. St. Helens field trip"	5	2	7
"Mt. Hood field trip"	2	2	4
"Learning about trees"	3	-	3
"Other children"	1	2	3
"Being independent without Mom"	2	-	2
"Learning about animals and insects"	2	-	2
"The water quality tests"	1	1	2
"Storm drainage stenciling"	-	2	2
"Crafts and being creative"	-	2	2
"Activities about salmon"	1	-	1
"Hoyt Arboretum field trip"	1	-	1
"The fire tower at the tree farm"	1	-	1
"Oxbow Park field trip"	-	1	1
"Paper making activity"	-	1	1
"Holding the snake"	-	1	1
"Bus rides and bus driver"	-	1	1
"Neighborhood pride"	-	1	1
"Owl pellets activity"	-	1	1

Table 19. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' perceptions of what their child disliked about the day camp program.

Question 8: **"Describe in your own words what you child disliked about the day camp program?"**	**N Mt. Scott**	**N Dishman**	**Total**
"Lunches"	4	2	6
"Disruptive children"	2	2	4
"Bee stings"	-	3	3
"The hot weather"	2	-	2
"Bus rides"	1	-	1
"Days at the Community Center (non-field trip days)"	1		1
"The schedule change (not going to Washington Park)"	1	-	1
"Hoyt Arboretum field trip"	1	-	1
"Not enough time to complete projects"	-	1	1
"Counselors not keeping up with kids' stuff left behind"	-	1	1
"Teen counselors did not have good public relation skills during contact with parents, especially during drop-off and pick-up"	-	1	1
"Day camp not long enough"	1	-	1

Table 20. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' perceptions of the day camp's effect on child's behavior.

Range of answers:
1 = Not at all
2 = Rarely
3 = Sometimes
4 = Often
5 = All the time

"Tell us how the camp affected your child's behavior at home during the two-week long program"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
Question 5a: "Talked to you about the program"	16	4.31	0.48	13	4.23	0.83	4.28	0.65
Question 5b: "Told his/her siblings about the program"	15	3.73	1.03	12	3.08	1.0	3.44	1.05
Question 5c: "Showed you things he/she did during the program"	16	4.38	0.62	13	4.46	0.97	4.41	0.78
Question 5d: "Urged you to conserve water in the home"	16	3.19	1.17	13	3.39	0.96	3.28	1.07
Question 5e: "Asked to be taken to places visited during the program"	16	3.44	1.15	13	2.77	1.01	3.14	1.13
Question 5f: "Picked up litter in the yard or neighborhood"	16	2.75	0.93	13	2.92	1.12	2.83	1.0
Question 5g: "Wanted to watch nature programs on TV"	16	3.56	1.09	13	2.54	0.97	3.1	1.15
Question 5h: "Urged you to recycle household goods"	15	3.4	1.3	13	3.46	0.88	3.43	1.1
Question 5i: "Read books about nature"	16	3.31	1.35	13	3.08	0.86	3.21	1.15
Question 5j: "Visited neighborhood or community parks on weekends"	16	3.88	0.81	13	3.46	0.97	3.69	0.89
Question 5k: "Asked you about ways to protect nature"	16	3	1.21	13	3	0.58	3	0.96
Question 5L: "Turned out lights that weren't being used"	16	3.13	1.03	13	3.31	1.38	3.21	1.18

Table 21. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' involvement with child concerning the day camp content.

Range of answers:
1 = Not at all
2 = Rarely
3 = Sometimes
4 = Frequently
5 = All the time

"How often did you ask your child about the day camp program content or encourage his/her involvement?"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
Question 6a: "I asked my child about the program's content"	16	3.13	0.51	13	4.69	0.48	4.55	0.51
Question 6b: "I took my child to parks or nature areas"	16	3.63	0.62	13	3.31	1.12	3.48	0.87
Question 6c: "I helped my child protect or clean up the environment"	16	3.31	1.25	13	3.46	0.88	3.38	1.08
Question 6d: "I helped my child get more information about nature"	16	3.31	1.14	13	3.15	0.8	3.24	0.99
Question 6e: "I asked my child whether he/she liked the program"	16	4.63	0.5	13	4.77	0.44	4.69	0.47

Table 22. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' evaluation of quality of day camp program.

Range of answers:
1 = Poor
2 = Fair
3 = Good
4 = Very good
5 = Excellent

Question 9a: "How do you rate the quality of the day camp?"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
	16	4.69	0.6	13	4.23	0.83	4.48	0.74

Table 23. Comparison of Mt. Scott and Matt Dishman day camp sessions: parents' support for additional nature education programs.

Range of answers:
1 = Definitely not
2 = Probably not
3 = Undecided
4 = Probably yes
5 = Definitely yes

Question 9b: "Would you send your child (or another son or daughter) to this day camp next year?"	N Mt. Scott	Mean Mt. Scott	Standard Deviation Mt. Scott	N Dishman	Mean Dishman	Standard Deviation Dishman	Overall Mean	Overall Standard Deviation
	16	4.88	0.34	13	4.77	0.6	4.83	0.47
Question 9c: "Should Portland Parks & Recreation provide more nature education programs?"	**N Mt. Scott**	**Mean Mt. Scott**	**Standard Deviation Mt. Scott**	**N Dishman**	**Mean Dishman**	**Standard Deviation Dishman**	**Overall Mean**	**Overall Standard Deviation**
	16	4.88	0.5	13	4.77	0.6	4.83	0.54

Hypotheses Test Results

For the purposes of hypotheses testing, we are considering the children and parents in the day camp program to be a sample of the larger population of children and

parents in the Mt. Scott and Matt Dishman Communities. We acknowledge, however, that participation in the day camp program was voluntary, and as previously discussed, the day camp children and parents do not precisely represent the actual sociodemographic characteristics of these two communities.

For the data analyses of this thesis, a p-value (significance level) of 0.1 was used to determine statistical significance (i.e., to test for evidence to reject the null hypothesis). A p-value of 0.1 was chosen over the more commonly used 0.05 level because we were willing to accept a slightly increased chance of making a Type I error (i.e., rejecting the null hypothesis when it in fact was true) in order to reduce the likelihood of a Type II error (i.e., accepting the null hypothesis when it in fact was false) (Gregoire & Driver, 1987). Several of the analyses required the computation of gain scores for each of the children's tests (Quiz III-A, children's knowledge measure; Quiz II-A, children's behavioral intentions measure; and Quiz I-A, children's environmental attitudes measure). Gain scores were computed for each test question by subtracting the scores on the pretest question from the corresponding posttest question. Only children who were present for both the pretest and the posttest were included in tests of gain scores.

It should be noted that statistical problems with the reliability of gain scores, or "change scores" have been identified. Specifically, Cohen and Cohen (1975) state: "A change score has a necessary dependence on the level of prescore. Subtracting the prescore from the postscore leaves some variance in the change score, wholly a result of the prescore, distorting the relationship of the change score to the other variables" (p. 378). To investigate this issue, the reliability of the gain scores for the environmental knowledge, attitudes, and behavioral intentions measures were computed. Reliabilities for these gain scores were found to be very low, i.e., 0.027 for the knowledge measure, 0.099

for the attitudes measure, and 0.017 for the behavioral intentions measure (reliability coefficients vary between values of 0 and 1.00, with 1.00 indicating perfect reliability). Because of the questionable reliability of gain scores, caution should be used in drawing conclusions regarding hypotheses 1, 2, 3, 4, and 9.

Hypothesis 1: The higher a parent's indicated level of interaction with his/her child during the environmental education day camp, the more his/her child will learn from an environmental education day camp.

Five questions on the "Parents' Evaluation Form" were combined to create an index variable for parental involvement. This was done by adding across five items and finding a mean score. The five items included question 6a ("I asked my child about the program's content"), question 6b ("I took my child to parks or nature areas"), question 6c ("I helped my child to protect or clean up the environment") question 6d ("I helped my child get more information about nature"), and 6e ("I asked my child whether he/she liked the program"). The parental involvement index variable was tested for reliability, and revealed a Cronbach's alpha of 0.61. This value is considered in the "barely acceptable" range ($\geq$ 0.6 to 0.7) for Cronbach's alpha, where a value of 0.7 or higher is desirable (Knoke & Bohrnstedt, 1994). Pearson's correlation was used to test for significant relationships between the parental involvement index variable and the gain scores for all questions on Quiz III-A (children's knowledge measure), Quiz II-A (children's behavioral intentions measure), and Quiz I-A (children's environmental attitudes measure).

For the children's knowledge measure (Quiz III-A), the parental involvement index variable was correlated with the thirteen individual item gain scores and an overall gain score computed across all thirteen items of the children's knowledge test. Only three of the correlations were found significant (Table 24). These included the relationships of parental involvement with the gain scores of questions 7b, 8c, and the overall gain score. Of these significant correlations, all three were in the negative direction, contrary to Hypothesis 1.

When the parental involvement index variable was correlated with the eighteen individual item gain scores and the overall gain score across all items on the children's environmental attitudes measure (Quiz I-A), four correlations were found to be significant at the 0.1 level (Table 25). These significant correlations included the relationships of parental involvement with the gain scores of questions 3, 10, 15, and 16. Of those correlations found significant, three were in the negative direction (contrary to Hypothesis 1) and one was in the positive direction (question 10).

Only one of the correlations of parental involvement with the seven individual item gain scores and the overall gain score on the children's behavioral intentions test (Quiz II-A) was found significant at the 0.1 level. This was the relationship between parental involvement and the question 7 gain score (Table 26). This correlation was in the positive direction (supportive of Hypothesis 1). However, about one significant relationship would be expected due to chance.

In sum, very little support for Hypothesis 1 was found. Few significant relationships were found, and those that seem to exist were predominantly negative relationships. This finding is puzzling since a positive relationship between parental involvement and student achievement is strongly supported by educational research (Henderson, 1987). Perhaps if the day camp children had taken home their work sheets or

other "homework", and the parents were thus given the opportunity to become involved with the day camp test content, the relationship between parental involvement and achievement on the tests would have been more positive.

On the other hand, it is possible that the way in which parental involvement was measured for this study, (i.e., five questions on the post-camp "Parents' Evaluation Form"), may not have been a good indication of parents' actual involvement with their children. Uninvolved parents could have indicated they were involved because this is a socially desirable characteristic.

Lastly, perhaps we should have asked the day camp children about their perceived level of their parents' involvement. It is the child's perception of his/her parents' level of involvement that most likely shapes positive response to educational interventions.

Table 24. Significant Pearson's correlations between parental involvement and Quiz III-A gain scores (children's knowledge measure).

Significant Correlations:	Parental Involvement		
Quiz III-A, Children's Knowledge Measure	Correlation	Number of Cases	Significance Level
Question 7b gain score: Complete the following food chain by putting the plants and animals in the boxes in the correct order (to show what gets food from what) Use this list: Frogs, Plants, Fish *Insects_____Bald Eagle*	-0.27	23	0.1
Question 8c gain score: Fill in the blanks in the following story with the words provided: Predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special camouflage to protect themselves from predators. The color of their hair helps them blend into their woodland_____.*	-0.46	23	0.01
Overall gain score	-0.35	23	0.05

Table 25. Significant Pearson's correlations between parental involvement and Quiz I-A gain scores (children's environmental attitudes measure).

Significant Correlations:	Parental Involvement		
Quiz I-A, Children's Environmental Attitudes Measure	Correlation	Number of Cases	Significance Level
Question 3 gain score: How do you feel about saving and recycling your family's newspaper?	-0.33	19	0.09
Question 10 gain score: How do you feel about seeing smoke from a factory?	0.37	18	0.07
Question 15 gain score: How do you feel about helping to pick up paper litter to keep the school yard clean?	-0.34	19	0.08
Question 16 gain score: How do you feel about seeing someone use the recycling cans at school?	-0.47	19	0.02

Table 26. Significant Pearson's correlations between parental involvement and Quiz II-A gain scores (children's behavioral intentions measure).

Significant Correlations:	Parental Involvement		
Quiz II-A, Children's Behavioral Intentions Measure	Correlation	Number of Cases	Significance Level
Question 7 gain score: You and your friend are playing outside. You are thirsty. You and your friend go inside the house to get a drink of water. Which of the following would you do? __Let the water from the faucet run a long time so the water is cold __Fill up the glass of water, drink what I want, and dump the rest __Fill up a big glass of water to impress your friend __Take only as much water as I will drink	0.49	20	0.01

Hypothesis 2: The higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for "learning to love nature" reasons, the more his/her child will learn from the environmental education day camp. Likewise, the higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for "baby-sitting" reasons, the less his/her child will learn from the environmental education day camp.

Question 1b ("I want my child to learn about nature"), question 1j ("I want my child to learn to respect the earth"), and question 1o ("I want my child to take actions to protect the environment") on the pre-camp "Parents' Information Form," were combined to create an index measure of strength of parents' reasons for enrolling their child for "learning to love nature" purposes (i.e., this was done by adding across the three questions and finding a mean score). This three question index variable was tested for reliability, and had a Cronbach's alpha of 0.7. A Cronbach's alpha of 0.7 or greater is desirable (Knoke & Bohrnstedt, 1994).

Question 1d on the pre-camp "Parents' Information Form" ("It seemed like a good child day care service") was used to measure the parents' strength of enrolling their child for "baby-sitting" purposes. Both the "learning to love nature" index variable and the "baby-sitting" variable were correlated with the individual item gain scores and overall gain score on Quiz III-A (knowledge), Quiz II-A (behavioral intentions), and Quiz I-A (environmental attitudes).

When the "learning to love nature" index variable was correlated with the thirteen individual item gain scores and the overall gain score on the children's knowledge measure, five correlations were found significant at the 0.1 level (Table 27). The correlation of "learning to love nature" with the question 2b gain score was significant in the negative direction. Significant correlations in the positive direction (supportive of Hypothesis 2) included gain scores for questions 6, 7a, 8d, and the overall gain score. All of these significant positive correlations were found to be have a relationship stronger than the value 0.5, e.g., the correlation between "learning to love nature" index and gain scores for question 6 ("Where do people in Portland get their drinking water?") was 0.52. For the question 7a gain score ("Complete the following food chain by putting the plants and animals in the boxes in the correct order. Sun_____Insects"), it was 0.6. For the gain score of question 8d ("Fill in the blanks in the following story with the words provided. Deer have special camouflage to protect themselves from predators. The color of their hair helps them blend into their woodland habitat. This is called_____.") the correlation was found to be 0.59. The correlation between enrolling in the day camp to learn to love nature and the overall gain score was 0.58. This suggests that parents' motives for enrolling their child does have a moderately strong effect on the child's learning.

None of the correlations of the thirteen knowledge question gain scores or the overall gain score with the "baby-sitting" variable was found significant.

The correlation of the eighteen individual environmental attitude gain scores and overall gain score with the "learning to love nature" index variable revealed nine significant relationships (Table 28). Significant positive correlations (supportive of Hypothesis 2), included only the relationship between the "learning to love nature" variable with question 7. Significant negative correlations (contrary to Hypothesis 2), included the correlations of the "learning to love nature" variable with questions 2, 3, 4, 8, 9, 11, 18, and the overall gain score. Of these significant negative correlations, two were found to have a relationship stronger than the value 0.5. These included the correlation for the gain scores of question 3 (How do you feel about saving and recycling your family's newspaper?) and question 9 ("How do you feel about children who kill frogs and snakes?"). The correlations were found to be -0.51 and -0.56, respectively.

When the "baby-sitting" variable was correlated with the eighteen individual item gain scores and the overall gain score on the children's environmental attitudes test, five correlations were found to be significant (Table 29). Three were found to have positive correlations, contrary to Hypothesis 2 (gain scores for questions 1, 7, and 13), and two relationships were found to be negative, supportive of Hypothesis 2 (gain scores for questions 4 and 9). Of the significant negative correlations, one was found to have a relationship stronger than the value 0.5. This was the correlation for question 9 ("How do you feel about children who kill frogs and snakes?"), which was found to be -0.63. This significant relationship suggested that the more parents enrolled their children for "baby-sitting" motives, the less the children felt negatively toward other children who kill frogs.

Correlations of the "learning to love nature" variable with the seven individual item gain scores and overall gain score on the behavioral intentions test (Quiz II-A)

revealed only one significant positive relationship, i.e., the relationship involving question 6 (Table 30). However, about one significant relationship would be expected due to chance.

When the "baby-sitting" variable was correlated with the seven behavioral intentions gain scores and the overall gain score, no relationships were found to be significant.

In sum, moderate support in favor of Hypothesis 2 was found for the positive relationship between parents' motives for enrolling their child to learn about nature and the children's performance on the knowledge test. Children who were enrolled in the day camp because it was important to their parents for them to learn about nature were likely primed to engage actively and attentively in the day camp's learning experiences.

Almost no support for Hypothesis 2 was found for the relationship between gains in children's environmental attitudes and the importance of parents enrolling their children for "learning to love nature" reasons. Indeed, a high number of negative correlations were found, suggesting that the more children were enrolled for "learning to love nature" purposes, the less their environmental attitudes improved over the course of the day camp. This finding suggests that perhaps children of parents who considered it important for them to learn about nature already possessed very positive environmental attitudes before participating in the day camp. Therefore, there was little room for improvement in environmental attitudes.

Almost no support was found for the hypothesized negative relationship between parents' motives for enrolling their child in the day camp for "baby-sitting" reasons and the children's gain in knowledge, environmental attitudes, or environmental behavioral intentions. This was likely due to the low variance in parents' response on the "baby-

sitting" item; almost all parents rated this reason for enrollment as "not at all" or only "somewhat" important.

Table 27. Significant Pearson's correlations between strength of parents enrolling their child in the day camp for "learning to love nature" reasons and Quiz III-A gain scores (children's knowledge measure).

Significant Correlations:	**Parents' enrollment of child for "learning to love nature" reasons**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 2b gain score: Percent correct on question 2a: "Tell us what lives in a river?"	-0.38	17	0.07
Question 6 gain score: Where do people in Portland get their drinking water? __ The ocean __ The rain and snow falling on the mountains __ The Willamette River __ Wells	0.52	17	0.02
Question 7a gain score: Complete the following food chain by putting the plants and animals in the boxes in the correct order (to show what gets food from what). Use this list: Frogs, Plants, Fish. *Sun_____Insects*	0.6	17	0.01
Question 8d gain score: Fill in the blanks in the following story with the words provided: Predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special camouflage to protect themselves from predators. The color of their hair helps them blend into their woodland habitat. This is called_____.*	0.59	17	0.01
Overall gain score	0.58	17	0.01

Table 28. Significant Pearson's correlations between the strength of parents enrolling their child in the day camp for "learning to love nature" reasons and Quiz I-A gain scores (children's environmental attitudes measure).

Significant Correlations:	**Parent's enrollment of child for "learning to love nature" reasons**		
Quiz I-A, Children's Attitudes Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 2 gain score: How do you feel when someone throws stones at a squirrel?	-0.4	14	0.08
Question 3 gain score: How do you feel about saving and recycling your family's newspaper?	-0.51	13	0.04
Question 4 gain score: How do you feel about leaving the lights on in your room when you leave?	-0.43	13	0.07
Question 7 gain score: How do you feel about living with fewer things -- such as clothes, TVs, and games if it would protect nature?	0.41	13	0.08
Question 8 gain score: How do you feel when your friend steps on a caterpillar (fuzzy worm) on the sidewalk?	-0.39	13	0.09
Question 9 gain score: How do you feel about children who kill frogs and snakes?	-0.56	14	0.02
Question 11 gain score: How do you feel about seeing water sprinklers running all day on your neighbor's lawn?	-0.41	13	0.09
Question 18 gain score: How do you feel about watching a TV program about scientists who work to keep rivers clean?	-0.35	14	0.11
Overall gain score	-0.45	14	0.05

Table 29. Significant Pearson's correlations between strength of parents enrolling their child in the day camp for "baby-sitting" reasons and Quiz I-A gain scores (children's environmental attitudes measure).

Significant Correlations:	**Parents' enrollment of child for baby-sitting reasons**		
Quiz II-A, Children's Attitudes Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 1 gain score: How do you feel when you see an empty can on the ground at your park?	0.43	14	0.06
Question 4 gain score: How do you feel about leaving lights on in your room when you leave?	-0.37	13	0.1
Question 7 gain score: How do you feel about living with fewer things -- such as clothes, TVs and games - if it would protect nature?	0.06	13	0.01
Question 9 gain score: How do you feel about children who kill frogs and snakes?	-0.63	14	0.01
Question 13 gain score: How do you feel about living in your neighborhood?	0.42	14	0.07

Table 30. Significant Pearson's correlations between strength of parents enrolling their child in the day camp for "learning to love nature" reasons and Quiz II-A gain scores (children's behavioral intentions measure).

Significant Correlations:	Parents' enrollment of child for "learning to love nature" reasons		
Quiz II-A, Children's Behavioral Intentions Measure	Correlation	Number of Cases	Significance Level
Question 6 gain score: Your mom or dad leaves a room in your house and leaves the lights on. You see that no one is using the room. What would you do? __I would do nothing __I would go and turn out the light __I would turn on additional lights in the room __I wouldn't notice anything wrong	0.35	16	0.09

Hypothesis 3: The more that families indicate they take trips to natural areas, the higher the scores exhibited by their children on environmental attitudes, behavioral intentions, and environmental knowledge measures.

To create a variable for frequency of trips to natural areas, questions from the post-camp "Parents' Evaluation Form" were combined. These included questions 10j4 ("How often does your family participate in the following recreation programs offered by the Portland Bureau of Parks and Recreation -- nature recreation such as trips to forests?"), and questions 10k1 - 10k3 ("How often does our family go to: Mt. Hood, Mt. St. Helens, and the Oregon Coast?"). The index variable "nature visits" was created by adding across these four questions and finding a mean score.

To test Hypothesis 3, this "nature visits" index variable was correlated with individual-item pretest scores, the overall pretest score, the gain scores, and the overall

gain score for all questions on the children's knowledge (Quiz III-A), environmental attitudes (Quiz I-A), and behavioral intentions test (Quiz II-A).

When the "nature visits" index variable was correlated with the thirteen knowledge pretest scores and the overall pretest score, two significant relationships were found (Table 31); one a negative correlation (for "nature visits" and the question 2a pretest score), and the other a positive correlation (for "nature visits" and the question 6 pretest score, supportive of Hypothesis 3).

When the "nature visits" index variable was correlated with the thirteen gain scores on individual items and the overall gain on the knowledge test, two significant relationships were found (Table 32). These items were the gain score for question 8d and the overall gain score, and both correlations were found in the negative direction, contrary to Hypothesis 3.

The correlation of the "nature visits" index variable with the eighteen individual children's environmental attitudes pretest scores and the overall pretest score revealed five significant relationships (Table 33). Three were negative correlations, including the relationships of the "nature visits" variable with the pretest scores for questions 7, 15, and 18, while two were positive correlations (questions 5 and 13, supportive of Hypothesis 3).

Correlation of the "nature visits" index variable with the eighteen individual item gain scores and the overall gain score on the children's environmental attitudes measure revealed six significant relationships (Table 34). Of these, four were in the positive direction (supportive of Hypothesis 3), including the correlation of "nature visits" with the gain scores for questions 4, 5, 6, and 8. Two of the significant correlations were in the negative direction, including the correlation of "nature visits" with the gain scores for questions 13 and 17.

When the "nature visits" index variable was correlated with the seven individual item pretest questions and the overall score on the children's behavioral intentions measure, only one correlation was found significant at the 0.1 level (Table 35). This was the relationship of "nature visits" with the question 7 pretest score, and it was in the negative direction, (contrary to Hypothesis 3). However, about one significant relationship would be expected to occur due to chance.

Of the correlations of the "nature visits" index variable with the seven individual item gain scores and the overall gain score on the children's behavioral intentions measure, two significant and positive correlations (supportive of Hypothesis 3) were found. These included the relationship of "nature visits" with the gain score for question 7 and the overall behavioral intentions gain score (Table 36).

In sum, very little evidence of a relationship between the children's pretest and gain scores on the three tests and the number of past family visits to natural areas was found. Of the few significant correlations involving knowledge that were found, nearly equal numbers of the relationships were found positive and negative. Perhaps the small sample size used for tests of Hypothesis 3 influenced the overall lack of findings. The day camp only served forty-eight children, and many of these children were eliminated from the data analyses because they did not complete both a pretest and posttest. In addition, only those children whose parents completed the post-camp "Parents' Evaluation Form" (65% response rate for this parents' questionnaire) could be used to test Hypothesis 3. With a small sample size, the correlations found between the children's previous number of family visits to natural areas and their performance on the three tests would have had to be relatively strong to be significant.

Another postulated reason for the overall lack of results found from tests of Hypothesis 3 is that perhaps the day camp program content had little to do with the types

of things the day camp children might have learned on previous family nature trips. Or, perhaps such previous visits to natural areas failed to inspire an interest in the type of content covered during the day camp, i.e., basic ecological concepts.

A small amount of support for Hypothesis 3 was found in the positive relationship between gain on four of the children's environmental attitudes and the number of previous family visits to natural areas. Perhaps past visits to natural areas reflect a general positive attitude toward the environment, and these visits reinforce sensitive environmental attitudes. Many visits may not however, contribute to more specific knowledge and behavioral intentions.

Table 31. Significant Pearson's correlations between number of family visits to natural areas and Quiz III-A pretest scores (children's knowledge measure).

Significant Correlations:	**Number of family visits to natural areas**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 2a pretest: Number of answers given for "Tell us what lives in a river?"	-0.33	21	0.07
Question 6 pretest: Where do people in Portland get their drinking water? __The ocean __The rain and snow falling on the mountains __The Willamette River __Wells	0.39	21	0.04

Table 32. Significant Pearson's correlations between number of family visits to natural areas and Quiz III-A gain scores (children's knowledge measure).

Significant Correlations:	**Number of family visits to natural areas**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 8d gain score: Fill in the blanks in the following story with the words provided: Predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special camouflage to protect themselves from predators. The color of their hair helps them blend into their woodland habitat. This is called_____.*	-0.33	21	0.07
Overall gain score	-0.31	21	0.09

Table 33. Significant Pearson's correlations between number of family visits to natural areas and Quiz I-A pretest scores (children's environmental attitudes measure).

Significant Correlations:	**Number of family visits to natural areas**		
Quiz I-A, Children's Attitudes Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 5 pretest: How do you feel about going to a forest or wildlife area?	0.47	22	0.01
Question 7 pretest: How do you feel about living with fewer things -- such as clothes, TVs and games - if it would protect nature?	-0.4	21	0.04
Question 13 pretest: How do you feel about living in your neighborhood?	0.34	22	0.06
Question 15 pretest: How do you feel about helping to pick up paper litter to keep the school yard clean?	-0.38	22	0.04
Question 18 pretest: How do you feel about watching a TV program about scientists who work to keep rivers clean?	-0.37	22	0.05

Table 34. Significant Pearson's correlations between number of family visits to natural areas and Quiz I-A gain scores (children's environmental attitudes measure).

Significant Correlations:	**Number of family visits to natural areas**		
Quiz I-A, Children's Attitudes Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 4 gain score: How do you feel about leaving the lights on in your room when you leave?	0.41	27	0.02
Question 5 gain score: How do you feel about going to a forest or wildlife area?	0.28	27	0.08
Question 6 gain score: How do you feel about writing a story about wildlife in the park?	0.25	27	0.1
Question 8 gain score: How do you feel when your friend steps on a caterpillar (fuzzy worm) on the sidewalk?	0.44	27	0.01
Question 13 gain score: How do you feel about living in your neighborhood?	-0.28	27	0.08
Question 17 gain score: How do you feel about throwing away things that could be used by others?	-0.29	27	0.07

Table 35. Significant Pearson's correlations between family visits to natural areas and Quiz II-A pretest scores (children's behavioral intentions measure).

Significant Correlations:	**Number of family visits to natural areas**		
Quiz III-A, Children's Behavioral Intentions Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 7 pretest: You and your friend are playing outside. You are thirsty. You and your friend go inside the house to get a drink of water. Which of the following would you do? __Let the water from the faucet run a long time so the water is cold __Fill up the glass of water, drink what I want, and dump the rest __Fill up a big glass of water to impress my friend __Take only as much water as I will drink	-0.4	18	0.05

Table 36. Significant Pearson's correlations between family visits to natural areas and Quiz II-A gain scores (children's behavioral intentions measure).

Significant Correlations:	Number of family visits to natural areas		
Quiz III-A, Children's Behavioral Intentions Measure	Correlation	Number of Cases	Significance Level
Question 7 gain score: You and your friend are playing outside. You are thirsty. You and your friend go inside the house to get a drink of water. Which of the following would you do? __Let the water from the faucet run a long time so the water is cold __Fill up the glass of water, drink what I want, and dump the rest __Fill up a big glass of water to impress my friend __Take only as much water as I will drink	0.49	18	0.02
Overall gain score	0.4	18	0.05

Hypothesis 4: Children whose families indicate a moderate frequency of past visits to natural areas will learn more from an environmental education day camp than will children who had few or very frequent previous visits to natural areas.

The "nature visits" index variable used to assess frequency of past visits to natural areas in Hypothesis 3 was also used as our independent measure in Hypothesis 4. Stepwise multiple linear regression was used to test Hypothesis 4. Stepwise regression is a combination of forward and backward regression. The first variable is selected if it is the one with the largest positive or negative correlation with the dependent variable, and it meets the established criterion for forward entry in the regression equation. Criterion for forward entry into the regression equation included F-to-enter = 0.1, while the criterion for removal from the regression equation was F-to-remove = 0.15.

This hypothesis suggests an "inverted U" curvilinear relationship between the variables "number of nature visits" and the individual item gain scores and the overall gain scores for each of the children's three tests (Quiz III-A, Quiz II-A, and Quiz I-A). The independent variable, "nature visits," was squared, to enable the hypothesized quadratic,

nonlinear model to be fit with linear regression models. Squaring this variable would permit us to find a curvilinear relationship between "nature visits" and the individual gain scores and the overall gain scores if in fact such a relationship existed. In our stepwise regression, number of "nature visits" and number of "nature visits" squared were considered predictor variables of the gain scores.

For the thirteen gain scores and the overall gain scores on the children's knowledge measure (Quiz III-A), stepwise multiple linear regression revealed no significant results at the 0.1 level.

For the children's environmental attitudes measure (Quiz I-A), the relationship of nature visits with two of the eighteen gain scores tested was found significant at the 0.1 level. However, almost two significant relationships could occur by chance alone. One relationship was that between the "nature visits" variable and the gain score of question 4 on the environmental attitudes test (Table 37). The relationship suggested by the regression equation for these two variables was apparently a strongly positive relationship (gain scores increased rapidly as the "nature visits" variable increased), rather than the hypothesized "inverted U" curvilinear relationship. The other relationship found significant for the children's environmental attitudes test was the relationship between "nature visits squared" and the gain score for question 8 (Table 38). The regression equation again suggests a strongly positive curvilinear relationship between these two variables, rather than the hypothesized "inverted U" curvilinear relationship.

For the children's behavioral intentions measure (Quiz II-A), the relationship of nature visits and two of the seven gain scores tested was found significant at the 0.1 level. One was the relationship between "nature visits squared" and the question 7 gain score (Table 39). The apparent relationship between these two variables indicated by the regression equation suggests a strongly positive curvilinear relationship, rather than the

hypothesized "inverted U" curvilinear relationship. The second relationship found significant at the 0.1 level for the behavioral intentions measure was the relationship between "nature visits squared" and the overall gain scores (Table 40). The apparent relationship between these two variables indicated by the regression equation again suggests a positive curvilinear relationship, rather than the hypothesized "inverted U" curvilinear relationship.

In sum, almost no support was found for Hypothesis 4. What few significant relationships were found, i.e., between the number of past family visits to natural places and the children's "improvement" on the attitudes and behavioral intentions tests suggested a strongly positive curvilinear relationship, rather than the hypothesized "inverted U" curvilinear relationship. This very positive curvilinear relationship suggested that children's learning increased rapidly as their number of past nature area visits increased. No support was found for the notion that many past nature visits would induce boredom with the day camp content and thus inhibit improvement of environmental attitudes, knowledge, and environmental behavioral intentions. Perhaps even those children in the study who had the highest number of previous visits to natural areas did not reach a level where the material covered would be so familiar as to be boring. Nature is considered to have very high intrinsic interest (Knopf, 1987). Perhaps the natural areas visited and content covered in the day camp program were so different from past natural areas visited that the content in the day camp program was not "old hat."

Table 37. Relationship of frequency of family visits to natural areas and Quiz I-A question 4 gain score ("How do you feel about leaving the lights on in your room when you leave?). Children's environmental attitudes measure. Stepwise multiple linear regression.

Analysis of Variance					
	Degrees of Freedom	**Mean Square**	**F**	**R Squared**	**p**
Regression	1	4.69	6.66	0.31	≤ 0.01
Residual	15	0.7			
Variables in the Equation	**B**	**Standard Error of B**	**Standardized Beta**	**t-value**	**T**
Visits	1.52	0.59	0.55	2.58	0.02
(Constant)	-2.85	1.13		-2.52	0.02

Table 38. Relationship of frequency of family visits to natural areas and Quiz I-A question 8 gain score (How do you feel when your friend steps on a caterpillar on the sidewalk?) Children's environmental attitudes measure. Stepwise multiple linear regression.

Analysis of Variance					
	Degrees of Freedom	**Mean Square**	**F**	**R Squared**	**p**
Regression	1	5.33	7.4	0.35	≤ 0.01
Residual	14	0.72			
Variables in the Equation	**B**	**Standard Error of B**	**Standardized Beta**	**t-value**	**T**
Visits Squared	0.46	0.17	0.59	2.72	0.02
(Constant)	-1.85	0.65		-2.85	0.01

Table 39. Relationship of frequency of family visits to natural areas and Quiz II-A question 7 gain score (You and your friend are playing outside. You are thirsty. You and your friend go inside the house to get a drink of water. Which of the following do you do?). Children's behavioral intentions measure. Stepwise multiple linear regression.

Analysis of Variance					
	Degrees of Freedom	**Mean Square**	**F**	**R Squared**	**p**
Regression	1	0.35	6.27	0.28	≤ 0.01
Residual	16	0.06			
Variables in the Equation	**B**	**Standard Error of B**	**Standardized Beta**	**t-value**	**T**
Visits Squared	0.11	0.04	0.53	2.51	0.02
(Constant)	-0.41	0.17		-2.42	0.03

Table 40. Relationship of frequency of family visits to natural areas and Quiz II-A the overall gain score (children's behavioral intentions measure). Stepwise multiple linear regression.

Analysis of Variance					
	Degrees of Freedom	**Mean Square**	**F**	**R Squared**	**p**
Regression	1	1.16	3.32	0.17	≤ 0.01
Residual	16	0.35			
Variables in the Equation	**B**	**Standard Error of B**	**Standardized Beta**	**t-value**	**T**
Visits Squared	0.2	0.11	0.41	1.82	0.09
(Constant)	-0.53	0.43		-1.25	0.23

Hypothesis 5: The environmental education day camp program evaluated in this study will increase environmental knowledge among participants.

To test this hypothesis, paired t-tests were performed on the thirteen pre- and posttest questions and the overall pretest and posttest scores on the children's knowledge measure (Quiz III-A). Knowledge scores were coded as 0 for incorrect and 1.0 for correct. Thus, gain scores could range from -1.0 to 1.0.

Of the tests run, three were found significant at the 0.1 level. Two paired t-tests found change in the correct direction, i.e., showing significant improvement from pretest to posttest (supportive of Hypothesis 5). The children demonstrated gain on questions 6 ("Where do people in Portland get their drinking water?"), and 7b ("Complete the following food chain using this list: frogs, plants, fish. *Insect*_____*Bald Eagle*."). The content of question 6 was covered thoroughly during the day camp program, hence the gain exhibited by the children on this question. Although the content of question 7b was not specifically emphasized during the day camp program, the children had several lessons about wildlife, including a visit to a zoo, which could have aided them with the concept covered in the question. In addition, the children scored very poorly on these two questions on the pretest, allowing room for positive gain on these questions.

The children demonstrated a loss in knowledge for question 9 ("I can help prevent pollution. __Agree __Don't know __Disagree"). The day camp program emphasized different aspects about pollution, especially water pollution. This finding suggests that as the children learned more about pollution, the less control they felt to help prevent it. Perhaps this was because the children learned more about the complexity of pollution, i.e., complexities such as the high number of variables contributing to pollution and how reducing pollution might also reduce the number of people's jobs.

In sum, very little support was found for Hypothesis 5. The overall lack of knowledge gain demonstrated by tests of Hypothesis 5 is suspected to be related to several factors. First of all, the small sample size reduced the likelihood of statistically significant knowledge gains. The day camp only served forty-eight children, and this sample was made even smaller when those children who did not complete both a pretest and a posttest were eliminated from data analyses.

Secondly, due to time limitations in planning of the day camp, the three children's tests were developed before the day camp's content was finalized. The knowledge test did not reflect the actual day camp content as closely as desirable, and instead pertained to more general ecological and environmental education concepts. Therefore, the knowledge test may not have been "sensitive" enough to detect gains. This aspect of the knowledge test will be addressed in greater detail in Chapter Five: Implications and Conclusions.

Table 41. Paired t-test of pretest question 6 versus posttest question 6 ("Where do people in Portland get their drinking water? __The ocean __The rain and snow falling on the mountains __The Willamette River __Wells?"). Children's knowledge measure, Quiz III-A.

	Number of Cases	Mean	Standard Deviation	t-value	Degrees of Freedom	2-tailed Probability
Question 6 Pre	31	0.13	0.34			
				-4.65	30	0.00
Question 6 Post	31	0.55	0.51			

Table 42. Paired t-test of pretest question 7b versus posttest question 7b ("Complete the following food chain by putting the plants and animals in the boxes in the correct order. Use this list: Frogs, Plants, Fish. *Insects*_____*Bald Eagle"*). Children's knowledge measure, Quiz III-A.

	Number of Cases	Mean	Standard Deviation	t-value	Degrees of Freedom	2-tailed Probability
Question 7b Pre	31	0.45	0.51			
				-1.88	30	0.07
Question 7b Post	31	0.68	0.48			

Table 43. Paired t-test of pretest question 9 versus posttest question 9 ("I can help prevent pollution. __Agree __Don't know __Disagree"). Children's knowledge measure, Quiz III-A.

	Number of Cases	Mean	Standard Deviation	t-value	Degrees of Freedom	2-tailed Probability
Question 9 Pre	31	0.87	0.34			
				1.79	30	0.08
Question 9 Post	31	0.77	0.43			

Hypothesis 6: The environmental education day camp program evaluated in this study will increase positive environmental attitudes among participants.

Data analyses for Hypothesis 6 entailed pretest-posttest comparisons of the questions on the children's environmental attitudes measure (Quiz I-A). To test this hypothesis, paired t-tests were applied to the eighteen individual pretest and posttest questions as well as to the overall attitude score on the pretest and posttest. Only one of

the paired t-tests involving the environmental attitudes questions was found significant at the 0.1 level (Table 44). This was the positive change for question 1. However, at least one significant finding could result from chance alone.

The lack of significant attitude gain found in tests of Hypothesis 6 is suspected to be due in part to the small sample size used to test this hypothesis. In addition, the three children's tests were developed prior to the implementation and establishment of the day camp content, due to constraints in planning time. The environmental attitudes test content did not reflect the program content of the day camp as closely as desirable, therefore making it more difficult to detect gain in environmental attitudes. This aspect will be discussed further in Chapter Five: Implications and Conclusions. Finally, the descriptive overview of the children's environmental attitudes (Table 2) show that the children possessed very positive environmental attitudes in general before they participated in the day camp program. Because the children's initial environmental attitudes were high, there was little room for improvement over the course of the day camp.

Table 44. Paired t-test of pretest question 1 versus posttest question 1 ("How do you feel when you see an empty can on the ground at your park?"). Children's environmental attitudes measure, Quiz I-A.

	Number of Cases	Mean	Standard Deviation	t-value	Degrees of Freedom	2-tailed Probability
Question 1 Pre	24	4.29	1.16			
				-2.5	23	0.02
Question 1 Post	24	4.83	0.38			

Hypothesis 7: The environmental education day camp program evaluated in this study will increase appropriate environmental behavioral intentions among participants.

To test this hypothesis, eight paired t-tests were performed on the individual pretest and posttest questions of the children's behavioral intentions measure (Quiz II-A) as well as on the overall pretest and posttest scores. Only one of the paired t-tests was found significant at the 0.1 level; scores on the overall behavioral intentions posttest did increase over those on the pretest (Table 45).

In sum, little support was found for Hypothesis 7. About one significant relationship would be possible just by chance alone. As was suggested for Hypothesis 6, the small data set used to test Hypothesis 7 is suspected to have lowered the likelihood of a statistically significant gain in environmental behavioral intentions. In addition, the environmental behavioral intentions test for children did not reflect the day camp content as closely as desirable. The three children's tests were developed prior to the beginning of the day camp. Instead of including specific questions on the day camp content, the behavioral intentions measure consisted of questions pertaining to more general concepts and themes encompassed by the day camp. This issue will be more directly addressed in Chapter Five: Implications and Conclusions. Finally, the descriptive overview of the children's environmental behavioral intentions measure (Table 3) shows that the children possessed environmentally sensitive behavioral intentions before they participated in the day camp program. Thus, there was little room for improvement in environmental behavioral intentions over the course of the day camp.

Table 45. Paired t-test for difference between the overall pretest and overall posttest behavioral intentions scores (questions 1-7), Quiz II-A.

	Number of Cases	Mean	Standard Deviation	t-value	Degrees of Freedom	2-tailed Probability
Overall pretest score	28	6.32	0.82			
				-1.8	27	0.08
Overall posttest score	28	6.54	0.58			

Hypothesis 8: The higher a child's indicated interest in nature, the more environmental knowledge he/she will possess.

For this hypothesis, several pretest questions on the children's environmental attitudes measure (Quiz I-A) were combined to create a measure of interest. Three index measures of interest in nature were created, based on three different types of environmental attitudes. These three index measures of interest were created by adding across two questions (per index variable) and finding a mean score.

One index was labeled "support of recycling," and it combined two pretest items: questions 3 ("How do you feel about saving and recycling your family's newspaper?") and 16 ("How do you feel about seeing someone use the recycling cans at school?"). These questions were positively correlated with a value of 0.7, and had an acceptable Cronbach's reliability alpha of 0.79.

Another measure of "interest in nature" was formed by creating an index based on "caring for nature/wildlife." Two items were included in this index: question 8 ("How do you feel when your friend steps on a caterpillar on the sidewalk?") and Question 9 ("How do you feel about children who kill frogs and snakes?") These questions were positively

correlated with a value of 0.52. When tested for reliability, these questions revealed a barely acceptable Cronbach's alpha value of 0.65.

A third measure of "interest in nature" for tests of Hypothesis 8 was an index variable believed to assess interest in a "clean environment." Again, two items, question 15 ("How do you feel about helping to pick up paper litter to keep the school yard clean?") and question 18 ("How do you feel about watching a TV program about scientists who work to keep the rivers clean?") were created to combine an index. These were positively correlated with a value of 0.74. When tested for reliability, these questions revealed a Cronbach's alpha value of 0.74.

Tests of Hypothesis 8 were correlations of each of these measures of interest in nature ("support of recycling," "caring for nature/wildlife," and "clean environment") with the individual item pretest scores and the overall pretest scores on the children's knowledge test (Quiz III-A) and the children's behavioral intentions test (Quiz II-A).

When the "support of recycling" measure of interest in nature was correlated with the various pretest measures on the children's knowledge test, only three significant correlations were found, and all were negative (contrary to Hypothesis 8). These included the relationships of the "support of recycling" variable with question 6 and 8d pretest scores as well as with the overall pretest score (Table 46).

Correlations of the "support of recycling" measure of interest in nature with the individual pretest and the overall pretest scores for the children's behavioral intentions test (Quiz II-A) revealed no correlations that were significant at the 0.1 level.

The correlation of the "caring for nature/wildlife" measure of interest in the environment with the thirteen individual knowledge pretest scores and the overall measure of children's knowledge revealed one significant positive relationship (supportive of Hypothesis 8) and one in the negative direction (Table 47). Significant in the positive

direction was the correlation of "caring for nature/wildlife" with pretest question 5, while the correlation of "caring for nature/wildlife" and pretest question 10 was significant in the negative direction.

The correlation of the "caring for nature/wildlife" measure of interest in nature with the eighteen individual items and the overall measure of children's behavioral intentions found no significant relationships.

When the "clean environment" index of "interest in nature" was correlated with the thirteen individual knowledge test items and the overall measure of the children's knowledge at the time of the pretest, three significant relationships were found (Table 48). Two of the significant correlations were in the negative direction (the correlation of "clean environment" with pretest question 5 and pretest question 6). Of these relationships in the negative direction (contrary to Hypothesis 8), the relationship between the index variable, "clean environment" and the pretest score of question 6, had a correlation of -0.56. A third significant relationship was in the positive direction, the correlation of "clean environment" with pretest question 2a, (supportive of Hypothesis 8).

Correlations of the "clean environment" measure of interest in nature with the children's behavioral intentions measure (Quiz II-A) pretest scores and the overall pretest score revealed one was significant relationship (Table 49). This was a positive correlation (supportive of Hypothesis 8) of "clean environment" with the question 5 pretest score, displayed in Table 45. However, about one significant relationship would be expected due to chance alone.

In conclusion, little if any support was found for Hypothesis 8. Virtually no relationships between the pretest scores on the children's behavioral intentions measure and the three measures of interest in nature could be demonstrated.

Table 46. Significant Pearson's correlations between children's interest in recycling and Quiz III-A pretest scores (children's knowledge measure).

Significant Correlations:	**Children's support of recycling**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 6 pretest score Where do people in Portland get their drinking water? __The ocean __The rain and snow falling on the mountains __The Willamette River __Wells	-0.47	28	0.006
Question 8d pretest score: Fill in the blanks in the following story with the words provided: Predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special camouflage to protect themselves from predators. The color of their hair helps them blend into their woodland habitat. This is called_____.*	-0.28	28	0.08
Overall pretest score	-0.29	28	0.06

Table 47. Significant Pearson's correlations between children's interest in caring for wildlife/nature and Quiz III-A pretest scores (children's knowledge measure).

Significant Correlations:	**Children's caring for nature/wildlife**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 5 pretest score: Label the parts of a tree and its environment (draw a line from the word to the part of the tree described). Roots Trunk Branches Leaves Soil Water Air Squirrel	-0.36	26	0.03
Question 10 pretest score: We need to protect the earth; it is a special home. __Agree __Don't know __Disagree	0.34	26	0.05

Table 48. Significant Pearson's correlations between children's interest in a clean environment and Quiz III-A pretest scores (children's knowledge measure).

Significant Correlations:	**Children's support a clean environment**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 2a pretest score: Number of answers given for "Tell us what lives in a river?"	0.26	28	0.09
Question 5 pretest score: Label the parts of a tree and its environment (draw a line from the word to the part of the tree described). Roots Trunk Branches Leaves Soil Water Air Squirrel	-0.26	28	0.09
Question 6 pretest score Where do people in Portland get their drinking water? __The ocean __The rain and snow falling on the mountains __The Willamette River __Wells	-0.56	28	0.001

Table 49. Significant Pearson's correlations between children's interest in a clean environment and Quiz II-A pretest scores (children's behavioral intentions measure).

Correlations:	**Children's support of a clean environment**		
Quiz II-A, Children's Behavioral Intentions Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 5 pretest score: You have a day off from school. What would you do that day if you could do anything you wanted? __Go to a movie __Go to a park in your neighborhood __Go to a shopping mall __Go to a forest park outside the city	0.43	22	0.02

Hypothesis 9: The higher a child's indicated interest in nature, the more he/she will learn from the environmental education day camp.

Data analyses for this hypothesis employed the three measures of interest in nature ("support of recycling," "protection of nature/wildlife," and "clean environment") created for the tests of Hypothesis 8. To test Hypothesis 9, these three measures of interest in

nature were correlated with the individual item gain scores and the overall gain score for the children's knowledge measure (Quiz III-A) and the children's behavioral intentions measure (Quiz II-A).

When the "support for recycling" interest in the environment index variable was correlated with the thirteen individual item gain scores and the overall gain score on the children's knowledge test, two significant correlations were found, both in the positive direction (supportive of Hypothesis 9). Increased support for recycling was associated with the gain scores for questions 8a and 8d (Table 50).

When the "support for recycling" measure was correlated with the seven individual item gain scores and the overall gain score for the children's behavioral intentions measure (Quiz II-A), no significant correlations were found.

Correlations of the "caring for nature/wildlife" measure of interest in nature with the thirteen individual item gain scores and the overall gain score on the children's knowledge measure (Quiz III-A) revealed one significant positive relationship (supportive of Hypothesis 9). This was the relationship of "caring for nature/wildlife" with the gain scores for question 10, as displayed in Table 51. However, one significant relationship could occur by chance alone.

When the "caring for nature/wildlife" measure of interest in nature was correlated with the seven individual item gain scores and the overall gain score on the children's behavioral intentions measure (Quiz II-A), no significant correlation was found at the 0.1 level.

The "clean environment" measure of interest in nature was correlated with gain on thirteen individual items and one overall gain score on the children's knowledge measure (Quiz III-A). This analysis found two significant relationships, both in the negative direction (contrary to Hypothesis 9). These were the relationship between the "clean

environment" index variable with the gain scores for questions 2a and 7b of the children's knowledge measure (Table 52).

Finally, when the "clean environment" measure of interest in nature was correlated with the seven individual item gain scores and the overall gain score for the children's behavioral intentions measure (Quiz II-A), one significant relationship was found. This was the negative relationship (contrary to Hypothesis 9) between the "clean environment" measure of interest in nature and the gain score for question 5. However, one significant relationship would be expected due to chance.

In sum, very little support for Hypothesis 9 was found. Virtually no relationship was found between the children's behavioral intentions test gain scores and the three measures of interest in the environment. Also, very few significant relationships were found between the children's gain scores on the knowledge test and the three measures of interest in nature. Of those few found, no negative or positive trends predominate.

The overall lack of findings for tests of Hypotheses 8 and 9 could be due to the following reasons. First of all, there was very little variance in the measures of "interest in nature" ("clean environment," "caring for nature/wildlife," and "support of recycling"). For each of the pretest environmental attitudes questions used to create these three index variables, almost all of the children indicated the most "environmentally sensitive" answer. Little variance in these three measures of "interest in nature" would result in few significant correlations with amount of change in knowledge or behavioral intentions. Secondly, the small sample size used in the data analyses for Hypotheses 8 and 9 would have required the correlations to be fairly strong in order for the relationships to be found significant. Third, perhaps our three measures of "interest in nature" measured the children's interest in nature in a general sense, while the knowledge and behavioral intentions tests dealt with more specific issues. General attitudes have been shown to be

unable to predict knowledge of specific issues or specific behavioral intentions (Ajzen & Driver, 1991). Finally, perhaps the relationship between children's interest in nature and their performance on the knowledge and behavioral intentions measures is similar to the relationship found in Hypothesis 4, i.e., the relationship may be a positive curvilinear one.

Table 50. Significant Pearson's correlations between children's recycling supportive attitude and Quiz III-A gain scores (children's knowledge measure).

Significant Correlations:	**Children's support of recycling**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 8a gain score: Fill in the blanks in the following story with the words provided: Predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special camouflage to protect themselves from* _____.	0.28	28	0.07
Question 8d gain score: Fill in the blanks in the following story with the words provided: Predators, adaptation, food chain, camouflage, ears, skunks, teeth, prey, habitat. *Deer have special camouflage to protect themselves from predators. The color of their hair helps them blend into their woodland habitat. This is called*_____.	0.35	28	0.04

Table 51. Significant Pearson's correlations between children's caring for wildlife/nature supportive attitude and Quiz III-A gain scores (children's knowledge measure).

Significant Correlations:	**Children's caring for nature/wildlife**		
Quiz III-A, Children's Knowledge Measure	**Correlation**	**Number of Cases**	**Significance Level**
Question 10 gain score: We need to protect the earth; it is a special home. __Agree __Don't know __Disagree	0.34	26	0.05

Table 52. Significant Pearson's correlations between children's support of clean environment attitude and Quiz III-A gain scores (children's knowledge measure).

Significant Correlations:	Children's support of a clean environment		
Quiz III-A, Children's Knowledge Measure	Correlation	Number of Cases	Significance Level
Question 2a gain score: Number of answers given for "Tell us what lives in a river?"	-0.37	28	0.03
Question 7b gain score: Complete the following food chain by putting the plants and animals in the boxes in the correct order (to show what gets food from what) Use this list: Frogs, Plants, Fish. *Insects_____Bald Eagle*	-0.26	28	0.09

Table 53. Significant Pearson's correlations between children's support of a clean environment attitude and Quiz II-A gain scores (children's behavioral intentions measure).

Significant Correlations:	Children's support of a clean environment		
Quiz III-A, Children's Knowledge Measure	Correlation	Number of Cases	Significance Level
Question 5 gain score: Label the parts of the tree and its environment (draw a line from the word to the part of the tree described). Roots, trunk, branches, leaves, soil, water, air, squirrel.	-0.5	22	0.009

Overall Summary of Hypotheses Tests Results

Tests of Hypothesis 1 ("The higher a parent's indicated level of interaction with his/her child during the environmental education day camp, the more his/her child will learn from an environmental education day camp") revealed predominantly negative relationships between parental involvement and the children's gain in knowledge, environmental attitudes, and environmental behavioral intentions over the course of the day camp. Three environmental attitudes which were found to have a significant negative

relationship with parental involvement in Hypothesis 1 were attitudes dealing with recycling/littering.

One suggested reason for the overall negative findings was that the children did not take home materials related to test content, thus parents had no opportunity to become involved with the actual course material. Another postulated reason for the negative findings was that perhaps the way in which we measured parental involvement about the day camp content, i.e., the five questions on the parents' post-camp questionnaire, was not a good indication of parents' actual involvement. Uninvolved parents may have indicated they were involved because this is a socially desirable characteristic. Perhaps we also should have used a measure of the child's perceived level of his/her parent's involvement rather than the parent's perception.

Tests of Hypothesis 2 ("The higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for 'learning to love nature' reasons, the more his/her child will learn from the environmental education day camp. Likewise, the higher a parent's indicated level of importance for enrolling his/her child in the environmental education day camp for 'baby-sitting' reasons, the less his/her child will learn from the environmental education day camp") found moderate support for the notion that children learned more over the course of the day camp when their parents enrolled them to "learn to love nature." Tests of Hypothesis 2 also found some support suggesting that the more children were enrolled for "learning to love nature" purposes, the less their environmental attitudes improved over the course of the day camp. Children of parents who considered it important for them to learn about nature apparently already possessed very sensitive environmental attitudes before participating in the day camp, thus they had little room for any "improvement" in environmental attitudes.

Only a very small amount of support was found for Hypothesis 3 ("The more that families indicate they take trips to natural areas, the higher the scores exhibited by their children on environmental attitudes, behavioral intentions, and environmental knowledge measures"). This small amount of support suggested that the greater the number of past family visits to natural areas, the more a few of the children's environmental attitudes improved over the course of the day camp. Perhaps those few study attitudes which were found to be positively related to the number of previous visits to natural areas were only those whose content was somehow covered during previous family visits to natural areas.

Several factors may have influenced the lack of any relationship found between the children's knowledge and environmental behavioral intentions gain and previous family nature outings. Perhaps the small sample size strongly influenced the lack of hypothesized findings. Family visits to natural areas likely reflect a general positive attitude toward the environment, and these visits reinforce sensitive environmental attitudes. Many visits may however, not affect more specific environmental knowledge and behavioral intentions. Also, perhaps the day camp program content was not related to the kinds of concepts the children might have learned on previous nature trips. It is also possible that previous visits to natural areas were ineffective in inspiring the children's interest in the day camp's type of content (basic ecological concepts).

Very little support was found for Hypothesis 4, which suggested that those children who had either very few or very many past family visits to natural areas would learn less from the day camp than those children who had a moderate amount of past family visits to natural areas. Instead, we found a positive curvilinear relationship suggesting that children's learning rapidly increased as their number of past nature area visits increased. Perhaps those day camp children who had even the highest amount of previous family visits to natural areas had not reached a point where the day camp material

was so familiar it was boring. In addition, the day camp might have focused on material which was very different from the types of things children learned during past family visits to natural areas, and thus the content was not repetitive.

Tests of Hypothesis 5, 6, and 7 (hypothesizing that the children's knowledge, environmental attitudes, and environmental behavioral intentions would improve as a result of participation in the day camp, respectively) found very little support that the children's knowledge, environmental attitudes, and environmental behavioral intentions improved over the course of the day camp. The sample size for the tests of these hypotheses was very small, decreasing the likelihood of significant statistical gain in these three measures. In addition, the three children's tests were not specifically based on the content of the day camp, but rather pertained to more basic ecological concepts and themes addressed during the program.

The lack of gain in environmental attitudes and environmental behavioral intentions is also believed to be due to the very positive attitudes and behavioral intentions toward the environment which the children possessed before they participated in the day camp, as demonstrated by the raw data for these two tests.

For Hypothesis 8 ("The higher a child's indicated interest in nature, the more environmental knowledge he/she will possess") and Hypothesis 9 (" The higher a child's indicated interest in nature, the more he/she will learn from the environmental education day camp"), little support was found for the notion that those children who indicated they were interested in nature actually knew more about nature before the day camp and possessed more environmentally sensitive behavioral intentions. Nor was support found that they exhibited more gain in knowledge and environmental behavioral intentions over the course of the day camp. The lack of support found for these two hypotheses may be due to the fact that there was little variance in the three measures of "interest in nature."

Also, the small sample size used in the data analyses of these hypotheses possibly influenced the lack of significant findings. In addition, there could have also been a problem if the index variable "interest in nature" only measured interest in a general sense, and this general measure was then used to try to predict specific behavioral intentions and knowledge of specific issues. Ajzen and Driver (1991) have shown that general attitudes are not able to predict specific behavioral intentions and knowledge of specific issues.

CHAPTER FIVE: IMPLICATIONS AND CONCLUSIONS

Conclusions

A brief summary of study findings is discussed below, including a descriptive overview of the children's three tests, the parental response to the day camp, and the hypotheses test results.

Quizzes I-A, II-A, and III-A: A Descriptive Overview of Children's Responses

Several things can be concluded from the children's knowledge, environmental attitudes, and behavioral intentions tests. First of all, the children exhibited very high pretest scores on the environmental attitudes and environmental behavioral intentions measures, even before participating in the day camp. These high pretest scores are suspected to be the cause of so little apparent gain in positive environmental attitudes and behavioral intentions due to the day camp.

Secondly, the actual scores for the children's knowledge measure suggest two things. First of all, from the rather low pretest scores exhibited, it appears that the day camp children had relatively low knowledge of many of the concepts covered in the day camp. A second conclusion is that it appears from the actual scores that the children gained considerably in knowledge over the course of the day camp.

The children's scores on two individual test questions will be summarized below because of their interesting trends. Of all the questions on the children's knowledge test, the content of question 6 ("Where do people in Portland get their drinking water?") was emphasized most often throughout the day camp. As might be expected, the children's

scores demonstrated the largest gain on this item. The largest gain in the actual scores on the behavioral intentions test occurred for question 5: "You have a day off from school -- what would you do that day if your parent said you could do anything you wanted?" After the day camp, many more of the children indicted that they wanted to visit "a park in their neighborhood" or a "forest outside the city," rather than "go to a movie" or "go shopping at a mall." This large gain suggests that for the children enrolled in the day camp, the program positively influenced the children's views of natural areas.

Descriptive Overview of Parents' Response

Several conclusions can be drawn from the parental response to the day camp. First of all, it appears that the parents were very pleased with the day camp. They rated the quality of the day camp as very good and made very positive comments about the day camp on several open-ended questions. The parents also indicated that in general, the day camp did a very good job of satisfying their reasons for enrolling their children in the program. In addition, the parents indicated that they believed strongly that the Portland Bureau of Parks and Recreation should provide more nature education programs in the future.

Another conclusion that can be drawn from the parental response to the day camp is that on average, the families attending the day camp were somewhat above the mean income level for both program neighborhoods. This was especially true for the families of the Matt Dishman day camp session. It appears that the day camp attracted almost no families who were at the very lowest income level for each neighborhood population, i.e., the 0-$10,000 income level.

A final conclusion drawn from the parental response to the day camp is that the day camp was not well-attended by African American families. This especially applies to the Matt Dishman day camp session, where the racial make-up of the nearby Eliot neighborhood is 55% African American (Johnson, 1993).

Hypotheses

Several conclusions can be drawn from the tests of the nine hypotheses. A small amount of support was found for a negative relationship between parental involvement and how much the children improved in knowledge, environmental attitudes, and environmental behavioral intentions over the course of the day camp (Hypothesis 1). Three explanations of this finding were postulated. First, perhaps if the children had taken program content home with them and had homework, giving parents an opportunity to be involved with actual program content, parental involvement may have improved student achievement on the three tests. Second, perhaps because of social desirability issues, parents may have indicted high involvement with their child about the day camp when in fact there was little such involvement. Third, we should have measured the child's perceived level of his/her parent's involvement rather than the parents' perception.

The hypothesized positive relationship found between the strength of parents' enrollment of their children in the day camp because they wanted them to learn to about nature and the children's performance on the knowledge test was moderately supported (Hypothesis 2). A moderately negative relationship was found between the children's performance on the environmental attitudes test and the parents' motives for enrolling their children in the day camp for learning about nature. Apparently the children of parents

who considered it important for them to learn about nature already possessed positive environmental attitudes before participating in the day camp, leaving little room for improvement.

Very little support in general was found for the relationship between the children's past frequency of family visits to natural areas and their pretest scores and gain on the study's three tests (Hypotheses 3 and 4). A small amount of support was found to suggest that the greater the number of previous visits to natural areas, the more some of the children's environmental attitudes improved (Hypothesis 3). Perhaps these environmental attitudes were those whose content was covered during the children's past nature visits with their families.

A little support was found suggesting that children's learning rapidly increased as their number of past family visits to natural areas increased. Apparently, those children with many previous family nature visits had not reached the point beyond which the day camp content was so familiar that it was no longer interesting. Also, the type of material focused on during the day camp might have been different from the sort of things children learned during their visits to natural areas with their families.

It also appears that generally, few significant gains in knowledge, environmental attitudes, and environmental behavioral intentions (Hypotheses 5, 6, and 7) over the course of the two-week day camp program occurred in a statistically significant sense. This is suspected to be due in part to the small sample size, which would have reduced the likelihood of significant results. In addition, perhaps the three children's tests were not "sensitive" enough to the day camp content because they were developed before the program was established. Also, the scores for the children's environmental attitudes and environmental behavioral intentions tests were very high on the pretest, leaving little room for positive gain.

Little support was found to suggest that children who were interested in nature knew more about nature and possessed more positive environmental behavioral intentions before they participated in the day camp (Hypothesis 8). Neither was the relationship suggesting that the higher a child's indicated interest in nature, the more he/she would learn from the day camp (Hypothesis 9) supported in a statistical sense. This was possibly due to the fact that there was very little variance in the three measures of "interest in nature." The small sample size used to test these hypotheses also may have influenced the overall lack of positive findings. In addition, it is possible that our three measures of "interest in nature" only measured interest in nature in a general sense, while the knowledge and environmental behavioral intentions tests measured knowledge of specific issues and specific behavioral intentions. According to Ajzen and Driver (1991), general attitudes do not predict specific behavioral intentions and knowledge of specific issues.

Implications for Environmental Education Programming

Study findings suggest the following implications for environmental education programming for programs similar to "Into the Woods," i.e., an environmental education day camp for inner city elementary school-age children. The suggestions are grouped into six different areas, including planning, counselors, program characteristics, community centers, the neighborhood community, and program content.

Planning

An environmental education program with a scope or outreach similar to "Into the Woods" should allow possibly three months of planning time on-site in order to be well-organized and properly carried out. Field planning for the "Into the Woods" day camp began the last week in May, 1994. The first day camp began on July 11. This allowed just over six weeks for the planning of the day camp program and development and testing of program evaluation instruments. Six weeks was simply not enough time. A great amount of preparation time is needed in order to advertise an environmental education program, organize transportation, schedule field trips, contact resource specialists, contact elementary schools, etc.

Plenty of time should be allotted to develop, pretest, and evaluate the reliability and validity of the evaluation instruments. The preparatory steps might take place a full year before the actual evaluation begins (Marcinkowski, 1993).

If resource specialists are contributing to the content of an environmental education program, planning should allow for the time needed to acquire their program's objectives, themes, and content. This process can be time-consuming, as it is difficult to locate resource specialists who are often outdoors. Not enough time was allowed for this process in the "Into the Woods" day camp program (two weeks). Only 50% of the resource specialists were able to respond on time to the request for their program content, themes, and objectives. Others eventually responded to this request, but several weeks too late.

Adequate office space for the person in charge of planning the day camp program should be provided. Access to a separate phone line is essential, for such details as allowing parents to call for information about the environmental education program, advertisement of the program, scheduling resource specialists, and acquiring program

materials. An answering machine is also necessary, to manage countless phone calls and to reassure parents that someone will contact them.

One final suggestion for environmental education planning is to advertise the program to the targeted population (i.e., elementary school-age inner city children) as early as possible. Substantial time is required for flyers to be distributed through the school classroom and community centers. Targeted families often plan their summer vacations early as well. It is suggested that two months be allowed for the advertisement of the program within the targeted schools and community centers.

Day Camp Counselors

College students are frequently employed as counselors in environmental education day and residential camps. Those that are hired are typically selected on the basis of maturity and leadership ability, knowledge and interests about nature, and ability to work with children. In this study, however, high school students were selected as the counselors. This was done purposefully, because a separate part of the overall research project was to assess the benefits of such leadership positions upon the self concepts and environmental interests of the high school students. Because of this project's objectives, we purposely did not select teen counselors who necessarily exhibited high achievement, high leadership skills, high interest in the environment, and who had demonstrated talent at working with children.

For an environmental education program, it is crucial to have reliable and trustworthy counselors to assist with the program responsibilities. Some of the "Into the Woods" day camp counselors were at times under-equipped to perform their

responsibilities as counselors and teachers of the children. Occasionally, some of the counselors were more of a behavior problem than the day camp children themselves.

The behavior and performance problems of the day camp counselors were made more crucial to program success, by the fact that the camp children appeared to look up to and admire the high school teen counselors. If the objectives of a program are to simply provide a quality environmental education learning experience for young children, the hiring of qualified, responsible counselors who interact well with children and exhibit a knowledge of and interest in nature seems necessary, whether the counselors are teenage or college age. If an environmental education program has the dual objectives of a successful environmental education program and the enhancement of the self-esteem/learning benefits for teenagers, it must provide considerable training for the counselors. Those teens who might be targeted for enhancement of self-esteem and learning benefits from involvement in such a program are likely not equipped to work with children and may not share an interest and enthusiasm about nature.

In order to attract quality teen counselors for an environmental education program, the job positions should be advertised as early as possible before the start of the program. The "Into the Woods" day camp was only advertised for a few weeks within the career offices of several high schools near the targeted communities for the program.

If African American children are included in the targeted population for the environmental education program, some African American teen counselors seem vital to the success of the program. African American children in the "Into the Woods" program chose to spend the majority of their time with teen counselors who were African American. Again, if African American counselors in an environmental education program were interested in nature, these counselors would likely have a greater impact in getting the day camp children excited about and interested in nature.

It is also important for all the counselors to spend a lot of time together before the environmental education program to get acquainted with one another and to allow for "bonding" among the counselors. The counselors should also visit the field trip sites (if any) beforehand and discuss teaching opportunities in these locations.

Adequate training for the environmental education program counselors is essential to the success of the program. The "Into the Woods" counselors received minimal training, consisting of a two-day *Project Learning Tree* (American Forest Foundation, 1994) workshop, which acquainted them with environmental education concepts, teaching techniques, and materials. More training for the counselors, especially about the behavior of young children, how to communicate and interact with them, and how to manage their behavior was needed.

One final suggestion referring to counselors would be to allow previous environmental education program "graduates" (i.e., day campers from previous years' "Into the Woods" programs) to participate in the environmental education program again as "junior counselors." This would provide an opportunity for these children to continue to be involved in the environmental education process over the long-term, as well as provide positive role models for the younger children enrolled in the environmental education program. Research shows that in order for environmental education to be successful, repeated exposure over a long period of time to program content and processes is required, in order to move the student through the succession of stages including knowledge, changes of affect, skill development, and eventually to environmentally responsible behaviors (Marshall, 1993).

Program Characteristics

The "Into the Woods" day camp program appeared to benefit from the high counselor-to-camper ratio (almost 1:2). This allowed for close supervision of the children as well as more interaction between the counselors and day campers. A high counselor-to-camper ratio is recommended for environmental education programs for inner city children, where positive role modes can be difficult to find.

The "Into the Woods" program served twenty-four children per day camp session. This group size was often rather unmanageable while implementing environmental education activities, despite the high number of counselors (11). The large group size also made transportation very expensive (requiring a bus). In addition, hikes with resource specialists in wildlife areas were very noisy, and consequently, little wildlife was seen.

Although a smaller group is recommended so that the group is more manageable, some research shows that children do not necessarily learn more in natural environments in small group settings. In evaluating the effectiveness of an interpretive program for fourth through sixth grade school children at Indiana Dunes National Lakeshore, Roggenbuck and Passineau (1986) found that small groups (< 20 children) did not perform better on the study's knowledge, attitude, and behavioral intentions tests than the large groups (> 20 children).

Since affecting long-term change in environmental attitudes and behavior is an important goal in environmental education, a long-term environmental education program is suggested. The "Into the Woods" day camp program was conducted for two weeks. Research suggests that very long periods of time are needed for changes in environmental knowledge, behavioral intentions, and attitudes to occur. In a study by Marans et al. (1972), changes in high school students' environmental concern and knowledge were measured over the course of several four to eight-week, residential Youth Conservation

Corps (YCC) programs combining environmental education and work experience. This study showed that the participants demonstrated almost no change in environmental concern, and only slight increases in environmental knowledge -- much lower than was expected. The authors concluded that even longer involvement in environmental education programs is necessary for substantial changes to occur in environmental knowledge and concern.

A longer environmental education program would also allow for the undertaking of long-term program projects, such as mural designing, community gardens, stream monitoring, monitoring of environmental problems, and journal writing. To continue the environmental education process for the day camp children throughout the year, a summer environmental education program might be extended to include activities in the schools during the school day, after school, or on weekends.

Community Center Aspects

Several suggestions involving the community centers are recommended here. If an environmental education program is to be based at a community center, the community center must be made aware of this long before the event (perhaps six months). The community centers in the "Into the Woods" program were not adequately and continually informed about the day camp occurring at their location. Communication with these community centers earlier would have enabled such opportunities as reserving a room for environmental education activities and finding needed storage space for the program materials. An available room in the community center is a tremendous asset, facilitating smoother drop-off and pick-up of day camp children, a waiting location for field trip transportation arrival, and a convenient place to meet resource specialists.

Lastly, it is important that the counselors get a "feel" for the community center environment before the start of the environmental education program. The community centers are bustling centers of constant activity, and it is important to be familiar with this environment before attempting to carry out an environmental education program there.

Neighborhood Community Aspects

Incorporating the community into the environmental education program might be beneficial in finding support for the environmental education program, increasing community pride, and giving the day camp children a sense of connection and importance for their participation in the environmental education program.

The "Into the Woods" program attempted to do this by inviting families of the day campers to an ice-cream social at the conclusion of the day camp. At this ice-cream social, the children showed their parents various craft and art projects done during the day camp as well as shared stories of their experiences with the entire group. In general, the response of the parents to the day camp program at the ice-cream social was extremely positive. Events involving families in an environmental education program could be planned at the beginning of a community-based environmental education program as well as at the end. Such an event at the beginning of a program might include a special orientation for children and their families.

In addition, the involvement of the media in the community aspects of the environmental education program could be an effective way to increase community pride and enhance the children's self-esteem for learning how to improve the quality of the environment. The media could be asked to advertise the program and its benefits to the community, in an effort to get the community aware of and involved in the program.

Children's self-esteem might be increased by having some of their community-based environmental education activities covered by the local newspaper.

Environmental education activities involving the community are also recommended. Environmental activities in the community would give the children a sense of connection to the natural environment in and around their neighborhood communities. Environmental activities based in the children's neighborhood community might also increase community pride and reduce the field trip transportation costs. In addition, the day camp children might gain confidence in dealing with local environmental problems by directly and indirectly teaching other children of their neighborhood community about environmental education concepts.

One final way to involve the neighborhood community might be to have a portion of an environmental education program consist of teaching parents the importance of their role in fostering and supporting their child's interest in nature. Such parental involvement in an environmental education program might also be met with greater gains in knowledge, environmental attitudes, and environmental behavioral intentions exhibited by the children if the parents were involved in the specific content and projects of the environmental education program.

Programming

The following suggestions are made for environmental education programming for inner city children. Whenever possible, the "Into the Woods" program performed environmental education activities in smaller groups. The group size of twenty-four children was often too large to manage during the environmental education activities. It was felt that the day campers worked and learned better in small groups with a counselor.

While Roggenbuck and Passineau (1986) found in their Indiana Dunes National Lakeshore study that small groups did not learn more than large groups, the two group sizes did not vary all that much, i.e., small groups averaged about 17 children and large groups averaged 23 children.

A good environmental education program should be organized so that themes presented over the course of the program can be connected to each other. Activities should be designed to branch across different program themes. Connecting program themes could increase the children's understanding of the connections in the program content and help them see the larger picture of ecological relationships and how people interact with the environment.

For a program such as the "Into the Woods" day camp, more local field trips are recommended instead of trips to distant natural areas. After some of the "Into the Woods" field trip bus rides of an hour or more, the day camp children were hyperactive and had trouble concentrating on learning-intensive environmental education activities at the field trip sites. Indeed, some research suggests that for young children, better learning may be accomplished in short forays to natural settings, such as schoolyard nature areas and local natural areas or forests. In a study by Falk and Balling (1982), it was found that third-grade children learned relatively little from a science activity done at an unfamiliar nature center, where setting novelty was high, while a similar group of third-graders learned more from the same science activity that was done in their schoolyard.

Trips to more local natural areas and urban wildlife areas would have reduced the cost and complications of long field trip journeys. In addition, more trips to local natural areas and urban wildlife areas could have given the day camp children a better awareness of the natural environment surrounding their city as well as an opportunity to observe more of the effects of humans on the natural environment.

The "Into the Woods" day camp children were very fond of the hands-on activities, such as owl pellet dissections, "paper-making," and craft projects. These types of hands-on, experiential activities are suggested for environmental education programs because the children enjoyed them, focused on them, and asked lots of questions about them. The use of real equipment for environmental education activities such as for the measurement of water quality was also very interesting to the children and held their attention. While using real equipment (such as thermometers and pH tests) to conduct water quality experiments, the children also recorded the data that they found. The children seemed to really enjoy and learn from the opportunity to become "scientists."

In addition, an environmental education program for inner city children should include activities dealing with the community. Activities focusing on the community or occurring in the community area might help increase children's awareness of their community and help raise community pride. This seems especially important if the environmental education program is designed to be long enough to address a long-term community-wide problem. An example of this type of program might be the monitoring of a nearby community stream over time. Involvement in a long-term activity such as this might help children see the dependency of the health of their community on the health of the environment.

Another way to involve the community might be for the children in an environmental education program to construct a mural about what things they learned about the environment. This mural could be displayed in a central area, such as the community center, to encourage community awareness and the support of the local environmental education program.

Finally, an environmental education program for inner city children should strive to meet the primary goal of environmental education, i.e., the development of individuals

who behave responsibly toward the environment. Such an environmental education program should aim to foster environmental sensitivity, knowledge, skills, and commitment among its participants. In order to do this, an environmental education program for inner city children should be planned to run for several weeks and continue intermittently throughout the year such as within the school curriculum, on an occasional weekend, or on afternoons after school.

Counselors who care about the environment and who show an enthusiasm for nature might help to foster environmental sensitivity by spending time with the environmental education program children in natural settings. A long-term environmental education program could involve past participants in the program as "junior counselors." This and other strategies for involving environmental education program participants over time might help to bring about the desired long-term change of attitudes and behaviors toward the environment. In addition, a long-term environmental education program might allow time for the development of eventual problem-solving skills. Development of such skills is part of the desired time-intensive progression in environmental education : awareness $\Rightarrow$ knowledge $\Rightarrow$ skill development $\Rightarrow$ environmentally sensitive behaviors. Ideally, an environmental education program for inner city children would help guide its participants through these steps by providing instruction, skill development, and "real world" environmental activities for participants over the course of several years.

Implications for Environmental Education Evaluation

The following suggestions for environmental education evaluation focus on four main areas: design of the overall evaluation procedure and instruments, administering the tests, further suggestions for "pencil and paper" tests, and alternative assessment methods.

Design of the Overall Evaluation Procedure

The following steps are recommended for designing both an environmental education program similar to "Into the Woods" and its evaluation:

- Write out and establish the environmental education program objectives, goals, and themes
- Design the environmental education program activities around these objectives, goals, and themes.
- Pilot test the environmental education program on a group of children similar to the targeted population
- Make necessary changes in the environmental education program, based on the pilot test
- Design the evaluation instruments based on the refined environmental education program
- Pilot test the evaluation instruments on the environmental education program; assess the reliability and validity of the test instruments
- Analyze the data, look for problems with the individual instrument items. Look for problems of a ceiling effect.
- Ask those who administered the evaluation instruments for any problems that they may have observed with the tests
- Revise the evaluation instruments

(Adapted from Marcinkowski & Toth-King, 1995)

Due to a lack of time, the "Into the Woods" day camp program only followed the first two of these steps. There is no doubt that both the day camp program and its evaluation would have gone much more smoothly and would have been more successful had there been time to pilot test the program and the evaluation measures. Pilot testing of

the day camp program would have enabled the program to be refined and changed, if needed, before it was evaluated. In addition, the counselors would have been more comfortable with the camp schedule (especially the hectic first day events such as registration and orientation) before attempting to allot time for the program evaluation.

A pilot test of the day camp before any evaluation was attempted would have also enabled the counselors to be more aware of the length of the environmental education activities, and thus helped them to know if there was enough time allocated for the testing of the children. Originally, the evaluation was to consist of six children's tests, i.e., Quizzes I-A, I-B, II-A, II-B, III-A, and III-B. These six tests were administered throughout the first day of the first session of day camp. Each of the six tests took about ten to fifteen minutes for all the children to complete. During completion of the six tests, the children complained about the length and number of the tests and quickly lost interest in them.

Perhaps some of the six tests could have instead been completed on day 2. However, this was decided against because day 2 was a busy field trip day with little time for testing, and the children would have already been exposed to some of the day camp content before all of the pretests were completed. For the posttesting period at the end of the day camp, there was also only one day allocated for testing (day 10), since day 9 was a field trip day. Scheduling field trips on day 2 and day 9 reduced the available time for pre- and posttesting, but this was done to provide incentives for the children to attend the day camp and to continue attending the day camp over the course of the two- week program. Due to the one-day limited testing period for both the pretests and posttests, and because the children grew tired and impatient after completing six tests in one day, it was decided that only three of the six tests would serve as the evaluation instruments, i.e., Quizzes I-A, II-A, and III-A.

Had the evaluation instruments (i.e., the three children's tests) for the "Into the Woods" day camp been developed and pilot tested after the environmental education program content was established and refined, the test questions could have more precisely assessed the actual day camp content. In this study, the tests questions addressed more basic environmental education concepts and general themes that were to be emphasized throughout the day camp program, rather than specific day camp content actually covered. The three children's tests were thus not designed to be as sensitive to the day camp content as desirable. This fact is suspected to have strongly influenced the failure of the data analyses to demonstrate significant gains in knowledge, environmental attitudes, and environmental behavioral intentions over the course of the two-week environmental education program.

One question on the knowledge test did specifically address actual day camp content. This was question 6: "Where do people in Portland get their drinking water?" On this particular question the data showed the largest gain in knowledge from pretest to posttest, and the data analyses demonstrated significant gain for this question. This suggests that had the test been more sensitive to the actual day camp content, greater gains in knowledge might have been apparent.

Another factor that may have also influenced the lack of significant gains in the children's knowledge, environmental attitudes, and environmental behavioral intentions was that perhaps the program content covered by the counselors was not consistent. Many of the programs that were implemented during "Into the Woods" were taught by several counselors simultaneously in small groups. Due to the lack of adequate training for the counselors before the day camp, the counselors may not have been consistent with each other in the activity material covered in small groups. In addition, the counselors

may have not been consistently effective in covering activity objectives and content, upon which the evaluation measures were based.

Pilot testing the evaluation instruments (i.e., the three children's tests) would have also allowed for problems with the test instruments to be detected. For example, pilot testing might have identified that day camp children generally entered the day camp with very positive environmental attitudes and environmental behavioral intentions. If pilot testing of the evaluation instruments had identified this, possibly the testing instruments could have been refined so that they were both more sensitive to the day camp content and more sensitive to changes in the children's environmental attitudes and behavioral intentions. Or perhaps, different types of tests could have been developed to remedy this problem.

Secondly, pilot testing of the three children's tests could have identified any problems that the children had with the reading level or design of the tests. For example, the day camp counselors administering the knowledge tests noticed that the children had particular trouble with questions 8a-8d ("Fill in the blanks in the following story with the words provided..."). These questions required the children to complete several consecutive sentences by filling in blanks from a list of nine words. This points to the possibility that the entire test, either in the wording of the questions, the reading level required, or the complexity of the tasks, may have been too difficult for the ability level or the age of the children in the day camp.

The overall evaluation procedure of the "Into the woods" day camp could have also been improved with the inclusion of a control group in the study. A control group would have allowed for comparisons in the gains in knowledge, environmental attitudes, and behavioral intentions between those children exposed to the environmental education program and those not exposed to it. Possible populations from which to select a control

group might be same-age children from schools where the "Into the Woods" program was advertised or same-age children from other non-environmental education community center programs.

The evaluation of an environmental education program should also include as many children as possible. This suggests that the environmental education program be conducted many times, in order to include as many children and replications in the evaluation as possible. The small data set most certainly affected the findings about the success of the "Into the Woods" program. The data set was small to begin with, consisting of 48 children who attended either of the two day camp sessions. In addition, many children did not complete both a pretest and posttest for the knowledge, attitudes, and the environmental behavioral intentions tests. For many of the study's hypotheses tests, these children had to be removed from the data set. This reduced the size of an already small data set, making it increasingly difficult to detect statistically significant gains in the children's performance.

One final suggestion for the overall design of an environmental education evaluation effort would be to put separate people in charge of the environmental education program evaluation and the environmental education program implementation. In the case of the "Into the Woods" day camp, one person was in charge of both of these tasks. Being responsible for both of these large tasks was extremely difficult to manage, and it was virtually impossible to perform both of these well simultaneously. The program evaluation did not receive the priority it required. In part, this is the reason that not all of the day camp children completed each of the pretests and posttests. Secondly, the teen counselors were not very committed to the evaluation effort, due to the lack of adequate training, and so not every counselor made sure that the children completed all the required tests. Also, there was a fairly high absentee rate among the children for the first and last

days of both of the day camp sessions. In some cases, the children came too late on the first day in order to take the pretests. Quite a few children (approximately four or five children per day camp session) also failed to attend the day camp on the last day, especially since the program was ending and all the field trips had already occurred. In addition, four of the forty-eight children enrolled in the day camp only attended the day camp for one of the two weeks. In each case, the person in charge of the day camp was not notified ahead of time, so that these children's "slots" could be given to other children who could attend for the entire two weeks. Several ways to improve the response rate to the test instruments might be to elect one counselor to have only the primary responsibility of being sure that all pre- and posttests are completed properly by each child present, provide adequate training for the counselors about the evaluation effort, verify with families that their child can attend the program for its entire duration, and provide more incentives for the children to attend the day camp for the entire two weeks, especially on the first and last days of the program.

Administering the Children's Test Instruments

The following suggestions are made for the administering of "pencil and paper" tests to the participants in the environmental education program. First of all, plenty of time should he provided for the children to complete the tests. At least the first two and last two environmental education program days should be left "open" for pretesting and posttesting, respectively. If field trips are part of the program agenda, it is important not to schedule field trips too close to the pretesting and posttesting period, to allow plenty of time for the tests to be completed, and to allow for unforeseen delays. A field trip on day 2 of the "Into the Woods" program was one reason why only the "A" tests were administered to the day camp children.

The administering of the test instruments worked the best for the "Into the Woods" day camp when small groups of children were separated by some distance. This allowed for each counselor to be responsible for a few children and to assist them if they had questions or reading difficulties. Putting distance between the small groups seemed to keep the children from being distracted and frustrated if some of the other children completed the tests very quickly.

The evaluation of the "Into the Woods" program also made it evident that in general, the day camp children did not like taking the pencil and paper tests. The children complained that the tests were too lengthy, and less fun than the typical day camp activities. It is suggested that for an environmental education program similar to "Into the Woods," those in charge of the program and its evaluation should consider "rewarding" the children for completing the tests. For the second of two "Into the Woods" day camp programs, the counselors provided a few "treats" for each child, such as cookies, animal crackers, and fruit candies, after all the children had completed the tests. This seemed to reduce the children's complaints about the tests.

One final suggestion for improving the administering of the evaluation instruments is to change the appearance of the posttests. The content of the posttest should stay the same, but the appearance of the test should not. Such changes might include a different color of paper and changing the order of the questions. When posttests were administered during the "Into to Woods" program, the children sometimes complained about having to take the same tests again. Changing the appearance of the test might have helped remedy this problem.

Suggested Improvements for the "Into the Woods" "Pencil and Paper" Test Instruments for Children

First of all, the development of the children's tests, i.e., Quizzes I-A, II-A, and III-A, could have been improved had an expert on child development/child learning been consulted. Knowledge of child psychology concepts would have enabled a better development of testing instruments. As already mentioned, the children experienced difficulty with the design of questions 8a-8d on the knowledge test, which asked them to fill in the blanks in a story from a list of nine words. It is possible that the design of other questions on the other tests were rather difficult for the day camp children as well. In addition, some of the children exhibited a lot of reading difficulty with the three tests. Perhaps the reading level of the tests was too difficult for the age or the ability level of some of the children.

Another way in which the three children's tests could have possibly been improved is by including more open-ended questions, to allow the children to elaborate more on what they learned throughout the day camp program. In addition, the tests could have been designed to be more "fun" for the children. One suggestion might be to create a special "envelope" to hold each test. The envelope could include a "viewing window" cut into it. The children could progress from one question to another by sliding the test until the next test question appeared in the window. Another possible "fun" way to design "pencil and paper" tests would be to include more questions which require the child to connect related concepts with lines.

Finally, the way in which the environmental behavioral intentions were measured (Quiz II-A) for the "Into the Woods" program may not have been a very strong method for measuring gain in environmental behavioral intentions . While administering the behavioral intentions test, it occurred to the counselors that the children were actually

answering what they thought was the "right" answer or the "correct way to behave" rather than how they actually would behave. For example, although the day camp children scored very highly on the environmental behavioral intentions test questions dealing with recycling and littering, the counselors consistently observed the children not picking up their lunch litter left in the park and not recycling their styrofoam lunch plate by placing it in a nearby recycling box. This raises the question whether such written tests are the most appropriate way to measure gains in environmental behavioral intentions over the course of an environmental education program. This inconsistency between the children's answers to test questions and their actual behavior suggests that some sort of observation of child behavior throughout the day camp might be a better measure of behavior than "pencil and "paper" tests. Some alternatives to "pencil and paper" tests for evaluating gains due to environmental education programs are discussed in the next section.

Alternative Approaches to Assessing Gain in Environmental Education Programs

Some brief suggestions are made here about some alternative ways to assess gains in environmental education. The environmental education literature seems nearly devoid of information on alternative assessment approaches to the commonly used paper and pencil tests. Alternative assessment approaches are more thoroughly addressed in the body of general education literature. Marcinkowski (1993) notes that because the field of environmental education research and evaluation is not yet well-established, more research into alternative assessment approaches for measuring gains in environmental education is needed.

In a chapter addressing evaluation of environmental education in the classroom setting, Marcinkowski (1993) concludes that in some instances, alternative assessment approaches make it more simple for children to exhibit learning in relation to the objectives and goals of environmental education . For example, during the investigation of a problem such as monitoring the quality of water in a stream, children gather information and learn to employ skill in real-life settings. Level of skill in water-quality monitoring can best be measured when children are actually observed planning, implementing, recording, and evaluating information about their investigations.

The suggestions made here for alternative assessment approaches to environmental education are limited to those more appropriate for the age-group attending the "Into the Woods" day camp program , i.e., seven to nine year-old children. In addition, the alternative assessment approaches mentioned are limited to those which could be implemented in a nonformal setting, i.e., outside of the classroom in a location where the environmental education program takes place (such as a park).

The alternative assessment approaches briefly discussed here include: manipulative tasks, interviewing, journal writing, observations of behavior, and evaluation of children's drawings.

Manipulative Tasks

Manipulative tasks are those activities which might entail part of the scientific process -- the development of hypotheses, the implementation of experiments, recording the results, applying the skill of measurement, and understanding scientific concepts. For an environmental education program for seven to nine year-olds, these steps might have to be somewhat simplified. Manipulative tasks in an environmental education program

might include a stream monitoring program, the investigation of a local environmental problem, or an investigation of the population characteristics of insects in a plot of grass (Marcinkowski, 1993).

After learning this investigation process, the environmental education program children could be evaluated on their ability to carry out these steps and make conclusions about their findings.

Interviewing

Because children of ages seven to nine years are generally not yet strong writers, they could be examined orally before and after an environmental education program to assess gain in knowledge, environmental attitudes, and environmental behavioral intentions. Such a process might involve interviewing each environmental education program participant by asking them questions (such as knowledge of ecological and environmental concepts) and recording their response on a video camera. These responses could later be converted to paper form. Several open-ended questions might be asked, allowing the children the opportunity to expand as much as possible on what they know.

Journal Writing

Children of ages seven to nine do not generally possess well-developed writing skills, so keeping a journal might not be a good way to assess gain in an environmental education program. However, perhaps if the environmental education program participants were mainly nine year-olds, this form of assessment would be feasible. If an

environmental education program were to occur for a number of weeks, comparisons of the journal content over the course of the environmental education program could be conducted. The journals could include such things as: information collected during ecological investigations, investigations of local environmental problems, other writings such as reflections and impressions of the environmental education program activities, and drawings (Marcinkowski, 1993).

Observations of Behavior

Observations of children's behavior could be made over the course of a environmental education program to assess changes in behavior. Such observations might include recording the amount of trash not thrown away after lunch each day by the children. This amount of recorded lunch garbage not properly disposed of by the children each day could then be compared to the amount of improperly disposed of lunch garbage occurring on those days following an anti-littering program. Another example might be to observe how many children recycle their styrofoam lunch trays each day, and compare this to the amount of lunch trays recycled by the children after exposure to a recycling program. One more example might include observing children's behavior on a nature trail (i.e., do the children stay on the trail, do they purposely damage vegetation, do they litter) before and after exposure to a program that emphasizes "proper behaviors in the woods."

Evaluation of Children's Drawings

As part of an effort to assess gain in an environmental education program known as "VINE" (Volunteer-Led Investigations of Neighborhood Ecology), members of the

University of Denver Bureau of Educational Service's Evaluation Team used children's drawings to evaluate the outcomes of the program for students (Burrus, Judson, & Harris; August, 1994). For this assessment, elementary school-age children were asked to draw the types of living things that they had observed in their schoolyard before and after exposure to a VINE activity which led them to investigate schoolyard nature. A random sample of 105 drawings was used to evaluate the students' outcomes from the schoolyard-based VINE program. The 105 drawings were evaluated based on three established criteria: "application," "organization or content," and "complexity" (Burrus, Judson, & Harris; August, 1994).

The "application" criterion for the drawings referred to the application of the information delivered during the VINE program. An example of a change in application from before the VINE program to after the program might be the inclusion of a bird's nest in a tree after the VINE program, whereas only a tree was drawn before the VINE program (Burrus, Judson, & Harris; August, 1994).

"Organization or content" was defined as "the logical coherence of the picture" (Burrus, Judson, & Harris; August, 1994). Examination of the children's pre-program and post-program drawings revealed that the children used different ways to organize their pictures. Some children drew literal representations of the schoolyard, while others drew a diagram or made a list of creatures seen in the schoolyard. For those drawings which were literal representations, change was considered if more was added to these literal representations. Likewise, change in a diagram or listing of objects was indicated by the number of items drawn or listed (Burrus, Judson, & Harris; August, 1994).

The "complexity" criterion was defined as the "amount and type of detail in the drawing" (Burrus, Judson, & Harris; August, 1994). An example of change in

"complexity" was a change such a randomly-placed legs on an insect (pre-program) becoming correctly placed legs (post-program).

To evaluate the drawings, a team of evaluators chose a set of pre- and post-program drawings from the same students and from these, established criteria indicating "no change," "some change," and "noticeable change." Examples of drawings rated as having "noticeable change" are included in Appendix E. Once the standards for demonstrated change and the three criteria were developed, the overall evaluation of the 105 drawings was conducted by a single evaluator, so as to control for subjective influences as much as possible (Burrus, Judson, & Harris; August, 1994).

Results of the analyses of the 105 children's pictures revealed that of the three evaluation criteria ("application," "organization and content," and "complexity"), "application" demonstrated the most change (75% of the children exhibited change in "application"). Forty-seven percent demonstrated "some" or "noticeable change" in "organization or context," while 40% exhibited "some" or "noticeable change" in complexity. The researchers concluded from this study that in general, the children were able to apply in their drawings the information they learned from the schoolyard activity (Burrus, Judson, & Harris; August, 1994). This study suggests that some alternative forms of assessment in environmental education, such as the evaluation of children's drawings, may be successful in demonstrating gains in environmental education concepts.

In summary, then, we believe that environmental education programming for inner city children might best be enhanced by involving inner city children over a number of years, helping to guide them through the entire environmental education process and ultimately to environmentally responsible behavior. Ideally, a program would get inner city children involved with their neighborhood community, and provide instruction, skill development, and "real world" experiences for participants.

Evaluation of any gains or benefits due to an environmental education day camp for inner city children might be improved by pilot testing the environmental education program and the evaluation instruments and evaluating the reliability and validity of the evaluation instruments. Adequate training for counselors is also necessary for both their commitment to the evaluation effort, and their consistency in program delivery. Allocating the duties of "camp director" and the job of undertaking the evaluation procedure to separate people is also essential to the successful evaluation of an environmental education day camp. Also, evaluation of gains in environmental education programming would be improved by including many children in the program and evaluation, allowing the data set to be as large as possible. In addition, the use of a variety of assessment instruments and procedures is recommended.

LITERATURE CITED

Ajzen, I., & Driver, B.L. (1991). Prediction of leisure participation from behavioral, normative, and control beliefs: An application of the theory of planned behavior. *Leisure Sciences.* 13: 185-204.

American Forest Foundation. (1994). *Project Learning Tree.* Second Edition. Washington, D.C.

Atyeo, H. (1939). *The Excursion as a Teaching Technique.* New York: Columbia University Press.

Bachman, J.G., Johnston, L.D., & O'Malley, P.J. (1980). *Monitoring the Future: Questionnaire Responses from the Nation's High School Seniors, 1978.* Ann Arbor: Institute for Social Research, The University of Michigan.

Balling, J.D., & Falk, J.H. (1979). The effects of environmental novelty and complexity on field trip learning and behavior. Final Report to National Science Foundation, Grant #SED77-18913.

Becher, R.M. (1984). Parental involvement: A review of research and principles of successful practice. In A.T. Henderson (Ed.). *The Evidence Continues to Grow: Parental Involvement Improves Student Achievement.* Columbia, Maryland: National Committee for Citizens in Education. 17-18.

Bennett, W. (1993). Is our culture in decline? *Education Week.* XIII(28): 32.

Bloom, B.S. (1985). *Developing Talent in Young People.* New York: Ballentine Books.

Borden, R. (1986). Ecology and identity. Proceedings of the Ecosystems and New Energetics Conference, Hamburg, Germany.

Borrie, W.T., & Roggenbuck, J.W. (1993). Portland parks and recreation: A managerial and research context in which to implement a benefits-based management approach. Unpublished report to the Portland Bureau of Parks and Recreation.

Braus, J. (Ed.). *Naturescope - Trees are Terrific!* Washington, D.C.: National Wildlife Federation, 1992.

Brooks, P. (1972). *The House of Life: Rachel Carson at Work.* Boston: Houghton Mifflin Company.

Bruns, D., Driver, B.L., Lee, M.E., Anderson, D., & Brown, P.J. (1994). Pilot tests for implementing benefits-based management. Fifth International Symposium on Society and Resource Management. Fort Collins: Colorado.

Bunting, T.E., & Cousins, L.R. (1985). Environmental dispositions among school-age children. *Environment and Behavior.* 17(6): 725-768.

Bureau of Planning. (June, 1993). *Mt. Scott - Arleta Neighborhood Plan.* Portland, OR: City of Portland, Bureau of Planning.

Burrus-Bammel, L.L. (1977). Information's effect on attitude: A longitudinal study. *Journal of Environmental Education.* 9(4): 41-51.

Burrus, J.D., Judson, J., & Harris, L. (August, 1994). *VINE (Volunteer-Led Investigations of Neighborhood Ecology): An Evaluation of Outcomes for Students and Teachers Participating in the VINE Program at Three Sites. Evaluation Report, Year 2.* Denver, Colorado. Unpublished Report by University of Denver Bureau of Educational Service's Evaluation Team.

Chawla, L. (1989). *Kentucky conservationists.* Oral History Collection, University of Kentucky, Lexington, KY. Cassette recording and transcriptions.

Chawla, L. (1990). Ecstatic places. *Children's Environments Quarterly.* 7(4): 18-23.

Chawla, L. (1992). Research priorities in environmental education. *Children's Environments Quarterly.* 9(1): 68-71.

Childress, R.B., & Wert, J. (1976). Challenges for environmental education planners. *Journal of Environmental Education.* 7(4): 2-6.

Childress, R.B. (1978). Public school environmental education curricula: A national profile. *Journal of Environmental Education.* 9(1): 2-12.

Clinchy, E. (1993). Needed: a Clinton crusade for quality and equity. *Phi Delta Kappan.* 74(8): 605-612.

Cohen, J., & Cohen, P. (1975). *Applied multiple regression/correlation analysis for the behavioral sciences.* Hillsdale, N.J.: Lawrence Erlbaum Associates.

Culen, G.R., Hungerford, H.R., Tomera, A.N., Sivek, D.J., Harrington, M., & Squillo, M. (1986). *Journal of Environmental Education.* 17(3): 24-32.

Deci, E.L. (1992). The relation of interest to the motivation of behavior: A self-determination theory perspective. In K.A. Renninger, S. Hidi, & A. Krapp (Eds.). *The Role of Interest in Learning and Development.* Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers. 43-70.

Driver, B.L., & Johnson, L.A. (1984). A pilot study of the perceived long-term benefits of the Youth Conservation Corps. *Journal of Environmental Education.* 15 (2): 3-11.

Duffy, T.M., Higgins, L., Mehlenbacher, B., Cochran, C., Wallace, D., Hill, C., Haugen, D., McCaffrey, M., Burnett, R., Sloane, S., & Smith, S. (1989). Models for the design of text. *Reading Research Quarterly.* 24: 434-457.

Falk, J.H. (1973). Life in early California: A new approach to the outdoor field trip. *Science and Children.* 11(1): 18-19.

Falk, J.H. (1983). Field trips: A look at environmental effects on learning. *Journal of Biological Education.* 17(2): 137-142.

Falk, J.H., Martin, W.W. & Balling, J.D. (1978). The novel field trip phenomenon: Adjustment to novel settings interferes with task learning. *Journal of Research in Science Teaching.* 15(1): 127-134.

Falk, J.H., & Balling, J.D. (1982). The field trip milieu: Learning and behavior as a function of contextual events. *Journal of Educational Research.* 76: 22-28.

Friedman, E.S. (1993). *The facts of life in Portland Oregon.* Portland: Portland Possibilities, Inc.

Geisel, T.S. (1971). *The Lorax*, by Dr. Seuss. New York, Random House, Inc.

Gregoire, T.G., & Driver, B.L. (1987). Type II errors in leisure research. *Journal of Leisure Research.* 19(4): 261-272.

Harvey, M.R. (1990). Relationship between children's experiences with vegetation on school grounds and their environmental attitudes. *Journal of Environmental Education.* 21(2): 9-15.

Hendee, J.C. (1972). Challenging the folklore of environmental education. *Journal of Environmental Education.* 3(1): 19-23.

Henderson, A.T. (1987). Introduction. In A.T. Henderson (Ed.). *The Evidence Continues to Grow: Parental Involvement Improves Student Achievement.* Columbia, Maryland: National Committee for Citizens in Education. 1-10.

Herman, M.L., Passineau, J.F., Schimpf, A.L., & Treuer, P. (1991). *Teaching Kids to Love the Earth.* Duluth, MN: Pfeifer-Hamilton Publishers.

Hidi, S., & Anderson, V. (1992). Situational interest and its impact on reading and expository writing. In K.A. Renninger, S. Hidi, & A. Krapp (Eds.). *The Role of Interest in Learning and Development.* Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers. 215-238.

Hines, J.M., Hungerford, H.R., & Tomera, A.N. (1986-87). Analysis and synthesis of research on responsible environmental behavior: A meta-analysis. *Journal of Environmental Education.* 18(2): 1-8.

Hoyle, J. (1993). Our children: Dropouts, pushouts, and burnouts. *People and Education.* 1(1): 26-41.

Hungerford, H.R., & Peyton, R.B. (1976). *Teaching environmental education.* Portland, ME: J. Weston Walch.

Iozzi, L. (1984). Monographs in environmental education and environmental studies #2. Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education.

Iozzi, L. (1989). What research says to the educator; Part one: Environmental education and the affective domain. *Journal of Environmental Education.* 20(3): 3-9.

Irvine, D.J. (1979). Parental involvement affects children's cognitive growth. In A.T. Henderson (Ed.). *The Evidence Continues to Grow: Parental Involvement Improves Student Achievement.* Columbia, Maryland: National Committee for Citizens in Education. 41.

Jaus, H.H. (1982). The effect of environmental education instruction on children's attitudes toward the environment. *Science Education.* 66(5): 689-692.

Jaus, H.H. (1984). The development and retention of environmental attitudes in elementary school children. *Journal of Environmental Education.* 15(3): 33-36.

Johnson, S. (1993). A social profile of the service areas of Mt. Scott Community Center and Matt Dishman Community Center. Unpublished draft report. Portland, OR: Center for Urban Studies - Portland State University.

Jordan, J.R., Hungerford, H.R., & Tomera, A.N. (1986). Effects of two residential environmental workshops on high school students. *Journal of Environmental Education.* 18(1): 15-22.

Keen, M. (1991). The effect of the sunship earth program on knowledge and attitude development. *Journal of Environmental Education.* 22(3): 28-32.

Knoke, D., & Bohrnstedt, G.W. (1994). *Statistics for Social Data Analysis.* Itasca, Illinois: F.E. Peacock Publishers, Inc.

Knopf, R.C. (1987). Human behavior, cognition, and affect in the natural environment. In D. Stokols & I. Altman (Eds.). *Handbook of Environmental Psychology.* New York: John Wiley & Sons. 783-825.

Kostka, M.D. (1976). Nature center program impact. *Journal of Environmental Education.* 8(1): 52-64.

Krapp, A., Hidi, S., & Renninger, K.A. (1992). Interest, learning, and development. In K.A. Renninger, S. Hidi, & A . Krapp (Eds.). *The Role of Interest in Learning and Development.* Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers. 3-25.

Ladd, F.C. (1977). City kids in the absence of legitimate adventure. *Children, nature, and the urban environment: Proceedings of a symposium-fair.* General Technical Report NE-30. USDA Forest Service. 77-81.

Linke, R.D. (1981). Achievements and aspirations in Australia EE. *Journal of Environmental Education.* 12(2): 20-23.

Lisowski, M. & Disinger, J.F. (1991). The effect of field-based instruction on student understandings of ecological concepts. *Journal of Environmental Education.* 23(1): 19-23.

Marans, R.W., Driver, B.L., & Scott, J.C. (1972). *Youth and the Environment: An Evaluation of the 1971 Youth Conservation Corps.* Ann Arbor: Institute for Social Research, The University of Michigan.

Marcinkowski, T.J. (1988). An analysis of correlates and predictors of responsible environmental behavior. Carbondale, IL: Southern Illinois University. 749 p. Ph.D. dissertation.

Marcinkowski, T.J. (1993). Assessment in environmental education. In R.J. Wilke (Ed.). *Environmental Education: Teacher Resource Handbook. A Practical Guide for K-12 Environmental Education.* Millwood, New York: Kraus International Publications. 143-197.

Marcinkowski, T.J., Volk, T.L., & Hungerford, H.R. (1989). An environmental education approach to the training of middle level teachers: A teacher education programme specialization. Paris, France: UNESCO. 177 p.

Marcinkowski, T.J., & Toth-King, S. (1995). Building environmental education programs: A three year evaluation study. Unpublished report for the Pine Jog Environmental Education Center, West Palm Beach, Florida.

Marshall, K. (1993). State-level curriculum guidelines: An analysis. In R.J. Wilke (Ed.). *Environmental Education: Teacher Resource Handbook. A Practical Guide for K-12 Environmental Education.* Millwood, New York: Kraus International Publications. 106-134.

Martin, W.W., Falk, J.H. & Balling, J.D. (1981). Environmental effects on learning: The outdoor field trip. *Science Education.* 65: 301-309.

McDill, E.L., Rigsby, L., Myers, E. (1969). Educational climates of high schools: Their effects and sources. In A.T. Henderson (Ed.). *The Evidence Continues to Grow: Parental Involvement Improves Student Achievement.* Columbia, Maryland: National Committee for Citizens in Education. 46-47.

McKenzie, G.D., Utgard, R.O., & Lisowski, M. (1986). The importance of field trips. *Journal of College Science Teaching.* 16(1): 17-20.

Metro. (1991). *Goals for Metropolitan Greenspaces, a report on the goal-setting workshops.* Portland: Metropolitan Service District.

Peterson, N.J., & Hungerford, H.R. (1981). Developmental variables affecting environmental sensitivity in professional environmental educators. In A.B. Sacks, L.A. Iozzi, J.M. Schultz, & R. Wilke (Eds.). *Current issues in environmental education and environmental studies*, Vol. 7 (pp. 111-113). Columbus, OH: ERIC.

Poracsky, J., & Houck, M.C. (1994). The metropolitan Portland urban natural resources program. In R.H. Platt, R.A. Rowntree, & P.C. Muick (Eds.). *The Ecological City.* Amherst: University of Massachusetts Press. 251-267.

Ramsey, J., Hungerford, H.R., & Tomera, A.N. (1981). Effects of two residential environmental workshops on high school students. *Journal of Environmental Education.* 20(3): 15-22.

Renninger, K.A., & Wozniak, R.H. (1985). Effects of interest on attentional shift, recognition, and recall in young children. *Developmental Psychology.* 21: 624-632.

Roggenbuck, J.W., & Passineau, J.F. (1986). An evaluation of the effectiveness of the Bially/Chellberg interpretive program. Unpublished Final Report to the Indiana Dunes National Lakeshore National Park Service.

Roggenbuck, J.W., Loomis, R.J., & Dagostina, J.V. (1991). The learning benefits of leisure. In B.L. Driver, P.J. Brown, & G.L. Peterson (Eds.). *Benefits of Leisure.* State College, PA: Venture Publishing, Inc. 195-213.

Roth, R.E. (1970). Fundamental concepts for environmental management education (K-16). *Journal of Environmental Education.* 1(1): 65-74.

Schellhammer, F. (1935). The field trip in biology. *School Science and Mathematics.* 35: 170-173.

Schiamberg, L.B., & Chum, C.H. (1986). The influence of family on educational and occupational achievement. In A.T. Henderson (Ed.). *The Evidence Continues to Grow: Parental Involvement Improves Student Achievement.* Columbia, Maryland: National Committee for Citizens in Education. 56-57.

Schiefele, U., Krapp, A., & Winteler, A. (1992). Interest as a predictor of academic achievement: A meta-analysis of research. In K.A. Renninger, S. Hidi, & A Krapp (Eds.). *The Role of Interest in Learning and Development.* Hillsdale, New Jersey: Lawrence Erlbaum Associates, Publishers. 183-212.

Shephard, C.L. & Speelman, L.R. (1986). Affecting environmental attitudes through outdoor education. *Journal of Environmental Education.* 17(2): 20-23.

Sia, A.P., Hungerford H.R., & Tomera, A.N. (1985). Selected predictors of responsible environmental behavior: An analysis. *Journal of Environmental Education.* 17 (2): 31-40.

Sorrentino, A., & Bell, P. (1970). Comparison of attributed value with empirically determined values of secondary field trips. *Science Education.* 54: 233-236.

Stapp, W.B. et al. (1969). The concept of environmental education. *Journal of Environmental Education.* 1(1): 30-31.

Stapp, W.B. (1971). Environmental encounters. In *Outlines of Environmental Education.* C. Schoenfeld. Madison, WI: Dembar Educational Research Services, Inc.

Tanner, T. (1980). Significant life experiences: A new research area in environmental education. *Journal of Environmental Education.* 11(4): 20-24.

Wade, S.E. (1992). How interest affects learning from text. In A.T. Henderson (Ed.). *The Evidence Continues to Grow: Parental Involvement Improves Student Achievement.* Columbia, Maryland: National Committee for Citizens in Education. 255-277.

Wade, S.E., & Adams, W.T. (1990). *Effects of importance and interest on strategic reading.* Paper presented at the Annual Meeting of the National Reading Conference, Miami.

Wendling, R.C., & Wuensch, K.L. (1985). A fifth-grade outdoor education program: Expectations and effects. *Journal of Interpretation.* 10(1): 11-20.

Wise, K., & Okey, J. (1983). A meta-analysis of the effects of various science teaching strategies on achievement. *Journal of Research in Science Teaching.* 20: 419-435.

Wright, E.L. (1980). Analysis of the effect of a museum experience on the biology achievement of sixth-graders. *Journal of Research in Science Teaching.* 17 (2): 99-104.

Appendix A

FLYER ADVERTISING THE "INTO THE WOODS" DAY CAMP PROGRAM

INTO THE WOODS!

A special summer day camp experience... Investigation of Neighborhood Ecology

Rising third and fourth grade students are invited to participate in exciting natural and neighborhood adventures! Places such as Hoyt Arboretum, Oxbow Park, Mt. St. Helens, and Mt. Hood National Forest, will be our destinations as we discover the special life around us. Come join us to uncover caterpillars in the sidewalk cracks, tiny birds in the treetops, and small critters peeping out from under green leaves! 'Into the Woods is a 10 day program. Nature Specialists will help us discover nature's wonders through field trips and excursions within the Mt. Scott and Dishman Community Center neighborhoods.

About "Into the Woods" Day Camp...

Who can participate: Students entering the third and fourth grade

Where are the camps located: *Into The Woods!* is offered at two locations:
Mt. Scott Community Center, 5530 SE 72nd and Matt Dishman Community Center, 77 NE Knott.

How much does it cost: *It's Free! Lunch and transportation to field trip destinations is provided.*

How do I sign up: *Registration is limited to 25 people per site so pre-register right away by completing the attached registration form and turning it in to the staff at Mt. Scott Community Center or Matt Dishman Community Center.*

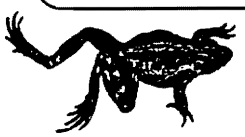
What are the Dates and Times to get "Into The Woods":

The Mt. Scott Session is Monday through Friday, July 11 - July 22. Mt. Scott is located at 5530 SE 72nd.
The Dishman Session is Monday through Friday, August 1 - 12. Dishman is located at 77 NE Knott.
The program runs during the hours of 10am and 3pm except for two longer field trip days, which will occur from 9am to 5pm; see schedule below.

SCHEDULE OF ACTIVITIES–

TIME	DESTINATION	Mt. Scott Dates	Dishman Dates
10am-3pm	Orientation & Nature Activities	July 11	August 1
10am-3pm	Tree Farm	July 12	August 2
10am-3pm	Hoyt Arboretum	July 13	August 3
9am-5pm*	Mount Hood National Forest	July 14	August 4
10am-3pm	Nature Activities	July 15	August 5
10am-3pm	Oxbow Park	July 18	August 8
10am-3pm	Washington Park	July 19	August 9
10am-3pm	Nature Activities	July 20	August 10
9am-5pm*	Mt. St. Helens	July 21	August 11
10am-3pm	Nature Activities	July 22	August 12

** Note longer time*



FOR MORE INFORMATION CALL THE NATURE LADY, JANE AT 326-2073

Return this completed REGISTRATION FORM to the Recreation Instructors at Mt. Scott or Matt Dishman Community Center

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In participating in INTO THE WOODS, sponsored by Portland Parks and Recreation AND USDA Forest Service, I hereby acknowledge that the student named below has the physical capacity reasonably necessary to engage in the activities. I do hereby waive all claims which I might have against the City of Portland or any of its officers, agents or employees. In case of emergency, accident or illness, I give permission to be treated by a professional medical person. I have read the above information.

*CAMPER'S NAME*_____ *PHONE*_____

*ADDRESS*_____ *ZIP CODE*_____

*EMERGENCY CONTACT & PHONE*_____

*GUARDIAN'S SIGNATURE*_____

Appendix B

LETTER TO RESOURCE SPECIALISTS AND STANDARDIZED FORM REQUESTING THEM TO INDICATE THE KNOWLEDGE, ATTITUDINAL, AND BEHAVIORAL OBJECTIVES OF THEIR ENVIRONMENTAL EDUCATION PROGRAM

June 17, 1994

Dear _____:

Thank you for agreeing to provide a program on _____ for the children who will be participating in the INTO THE WOODS program sponsored by Portland Bureau of Parks & Recreation, the USDA Forest Service, and Oregon State University.

As you recall, we are scheduled to visit your site on _____ AND _____ from the hours of _____ TO _____. At each date, 25 third and fourth-grade children and 11 counselors will be participating.

Portland Parks and Recreation, USDA Forest Service, and Oregon State University are funding the INTO THE WOODS program in order to assess the benefits that such an environmental education program provides for the children, their parents, and their communities.

We will be testing the children's environmental knowledge, environmental attitudes, and behavioral intentions both prior to and after the ten-day program. We want to assess any "gains" that children make due to our program. Since we would like to include testing questions which refer to the content material covered at your site, we would like you to tell us the learning objectives and themes that you will be communicating to the children while at your site. Continued support by the Portland Bureau of Parks & Recreation and the USDA Forest Service for environmental learning programs such as INTO THE WOODS depends in part upon the extent of learning by the children.

Because we are now developing the instruments to assess and evaluate student learning, we need to know the themes, learning objectives, and critical content that you will be presenting in your program. To help you plan your program, we are enclosing a summary of our theme and learning objectives for the entire ten day program. We would like you to review the broad program goals, and fit your presentation with our framework if possible. Then, we need for you to list the specific learning objectives of your program, and the important content that you will want the children to learn. Please note that your desired outcomes might include greater knowledge of the environment, increased sensitivity and support for resource conservation, and/or more responsible environmental behavior. We need to know specifically the major concepts (4 or 5) that you will be covering so that we can assess the children's knowledge about content at the end of the program.

To help you tell us about your program (and permit us to develop our assessment instruments) we have enclosed a short program planning form. Please complete this and return it to me by July 1, at the following address:

Jane Dombroski
Portland Bureau of Parks & Recreation
1120 SW 5th Avenue
Room 1302
Portland, OR 97204-1976

If you have any questions, please don't hesitate to call me at 326-2073.

We thank you for your help, and look forward to our visit. We believe that efforts such as yours will help us gain increased financial and institutional support for environmental education.

Sincerely,

Jane Dombroski

INTO THE WOODS!

Program Planning Sheet

Environmental Day Camp, July 11-22 and August 1-12

PLACE:_____ DATE:_____

Your presentation

topics:_____

_____

_____

Your overall

themes:_____

_____

_____

Your program

objectives:_____

_____

_____

_____

_____

A) Key concepts to be learned by the children (please list up to five concepts you want the children to learn.)

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

B) Sensitivity and support for environmental protection (please list up to five gains in environmental respect or support for resource conservation that you hope the children will achieve because of your program)

1. _____

_____

2. _____

_____

3._____

_____

4._____

_____

5._____

_____

C) Behavior change (please list actual behavior changes in how children act toward the environment that you hope will result from your program.)

1._____

_____

2._____

_____

3._____

_____

Thank you for your time and cooperation.

Appendix C

THE CHILDREN'S EVALUATION INSTRUMENTS: QUIZZES I-A, II-A, III-A, I-B, II-B, AND III-B (CORRECT ANSWERS INDICATED)

QUIZ I-A FOR CHILDREN
Feelings About Nature and Parks

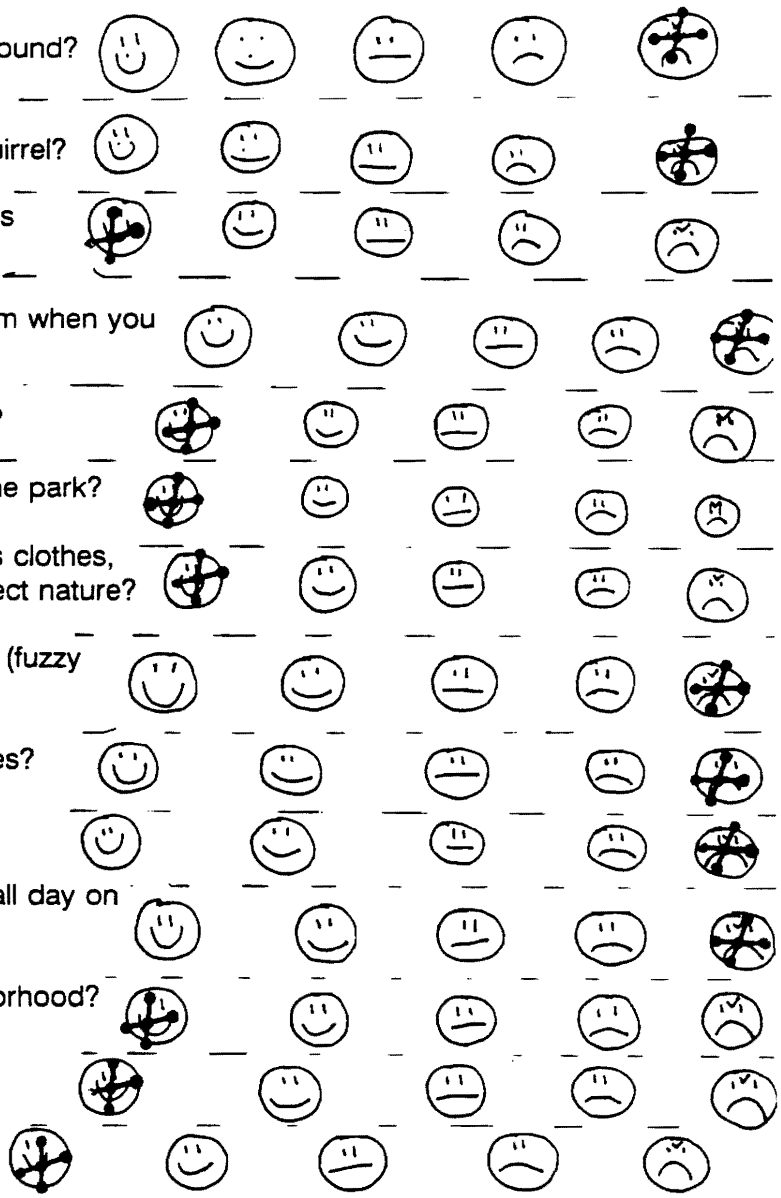
Name: _____

We would like to know how **YOU** feel about nature and things you do in parks.
Please put an "X" on the face that best tells how **YOU** feel.

How do you feel when:

Example: You go to the movies:

1. You see an empty can on the ground? At your park?
2. Someone throws stones at a squirrel?
3. Saving and recycling your family's newspaper?
5. Leaving the lights on in your room when you leave?
6. Going to a forest or wildlife area?
7. Writing a story about wildlife in the park?
8. Living with fewer things - such as clothes, TVs and games - if it would protect nature?
9. Your friend steps on a caterpillar (fuzzy worm) on the sidewalk?
9. Children who kill frogs and snakes?
10. Seeing smoke from a factory?
11. Seeing water sprinklers running all day on your neighbor's lawn?
12. Visiting the parks in your neighborhood?
13. Living in your neighborhood?
14. Living in Portland?



15. Helping to pick up paper litter to keep the school yard clean?

16. Seeing someone use the recycling cans at school?

17. Throwing away things that could be used by others?

18. Watching a TV program about scientists who work to keep rivers clean?

QUIZ II-A FOR CHILDREN

Things You Like To Do

Name: _____

We would like to know about the kinds of things you like to do at nature places. Please read the story and place an "X" on what you would do if you were in the story. **Mark only one "X" for each question.**

1. While walking along a path in the park you find an aluminum can dropped on the ground. What would do with it?

   ___ Leave it there.
   ___ Pick it up and put it in a trash can.
   X Pick it up and put it in a recycling box so the aluminum can be used over.
   ___ Cover it with leaves.

2. You and your friend are visiting a park. He brings his new pocket knife and wants to try it out in the park. He asks you when he should try it out. What would you tell him to try the knife on?

   ___ A live oak tree.
   ___ A trail sign.
   X A dead branch on the ground.
   ___ A live Christmas tree.

3. You are walking in the park and eating a candy bar. When you finish eating the candy, what would you do with the candy wrapper?

   ___ Throw it on the ground.
   ___ Give it to your friend.
   ___ Give it to your dog.
   X Put it in a trash can.

4. Your teacher brings a live snake to the classroom to teach you about animals. She holds it and describes how it eats. Then she asks if any of the children in the class want to hold it. What would you do?

   ___ Hide behind the student in front of you and hope your teacher doesn't call on you.
   ___ Tell your teacher the snake is too ugly.
   ___ Turn your face away from the snake.
   X Tell your teacher you would like to hold the snake.

5. You have a day off from school. What would you do that day if your parent said you could do anything you wanted?

___ Go to a movie.
X Go to a park in your neighborhood.
___ Go shopping at a mall.
X Go to a forest park outside the city.

6. Your Mom or Dad leave a room in your house and leaves the light on. You see that no one is using the room. What would you do?

___ I would do nothing.
X I would go and turn out the light.
___ I would turn on additional lights in the room.
___ I wouldn't notice anything wrong.

7. You and your friend are playing outside. You are thirsty. You and your friend go inside the house to get a drink of water. Which of the following would you do?

___ Let the water from the faucet run a long time so the water is cold.
___ Fill up the glass of water, drink what I want, and dump the rest.
___ Fill up a big glass of water to impress your friend.
X Take only as much water as I will drink.

QUIZ III-A FOR CHILDREN
Knowledge of Nature and Parks

Name: _____

1. In the space provided below, draw a picture of an insect.

2. Tell us what lives in a river.

3. Your teacher will hold up six different kinds of plants listed in the box below. You need to write in the blank provided the name of the six plants.

Plant 1 _____

Plant 2 _____

Plant 3 _____

Plant 4 _____

Plant 5 _____

Plant 6 _____

Choose from the following plants:

- Moss
- Grass
- Pine/Fir tree
- Maple tree
- Wildflower
- Fern

4. Your teacher will hold up six different animals listed in the box below. You need to write in the blank provided the name of each of the six animals.

Animal 1 _____

Animal 2 _____

Animal 3 _____

Animal 4 _____

Animal 5 _____

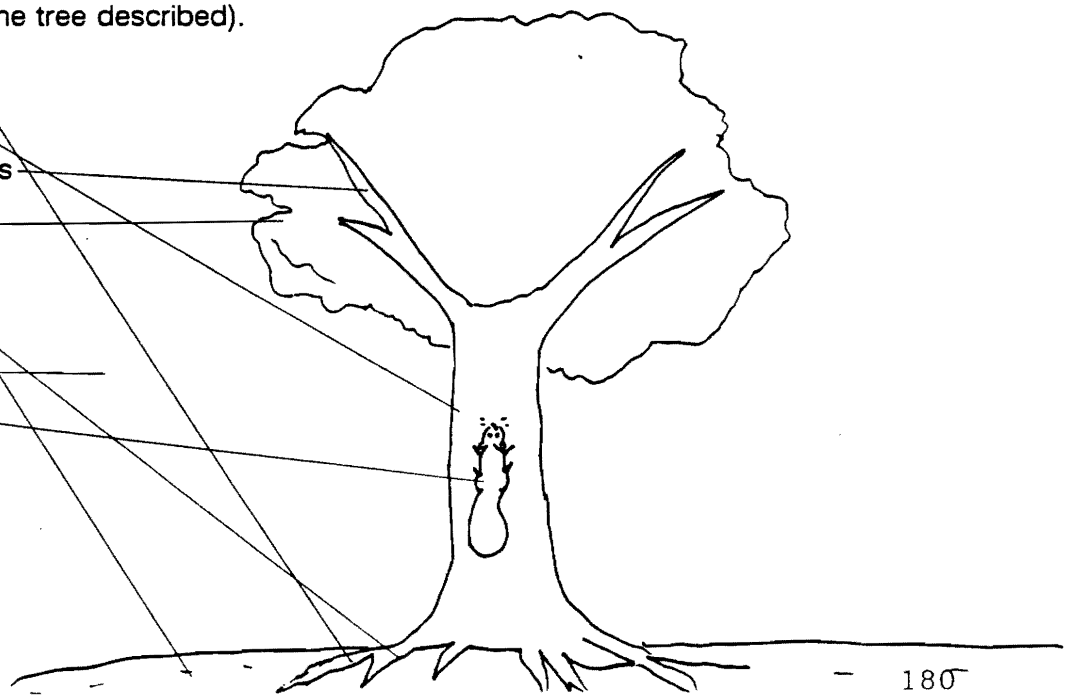
Animal 6 _____

Choose from the following animals:

- Snake
- Bird
- Squirrel
- Insect
- Frog
- Fish

5. Label the parts of the tree and its environment (draw a line from the word to the part of the tree described).

Roots
Trunk
Branches
Leaves
Soil
Water
Air
Squirrel



6. Where do people in Portland get their drinking water?

___ The ocean

X The rain and snow falling on the mountains

___ The Willamette River

___ Wells

7. Complete the following food chain by putting the plants and animals in the boxes in the correct order (to show what gets food from what).

Use this list

Frogs
Plants
Fish

Sun	Plants	Insects	Fish	Bald Eagle

8. Fill in the blanks in the following story with the words provided.

predators	camouflage	teeth
adaptation	ears	prey
food chain	skunks	habitat

Deer have special camouflage to protect themselves from predators.
The color of their hair helps them blend into their woodland habitat.
This is called adaptation.

9. I can help prevent pollution

X Agree
___ Don't know
___ Disagree

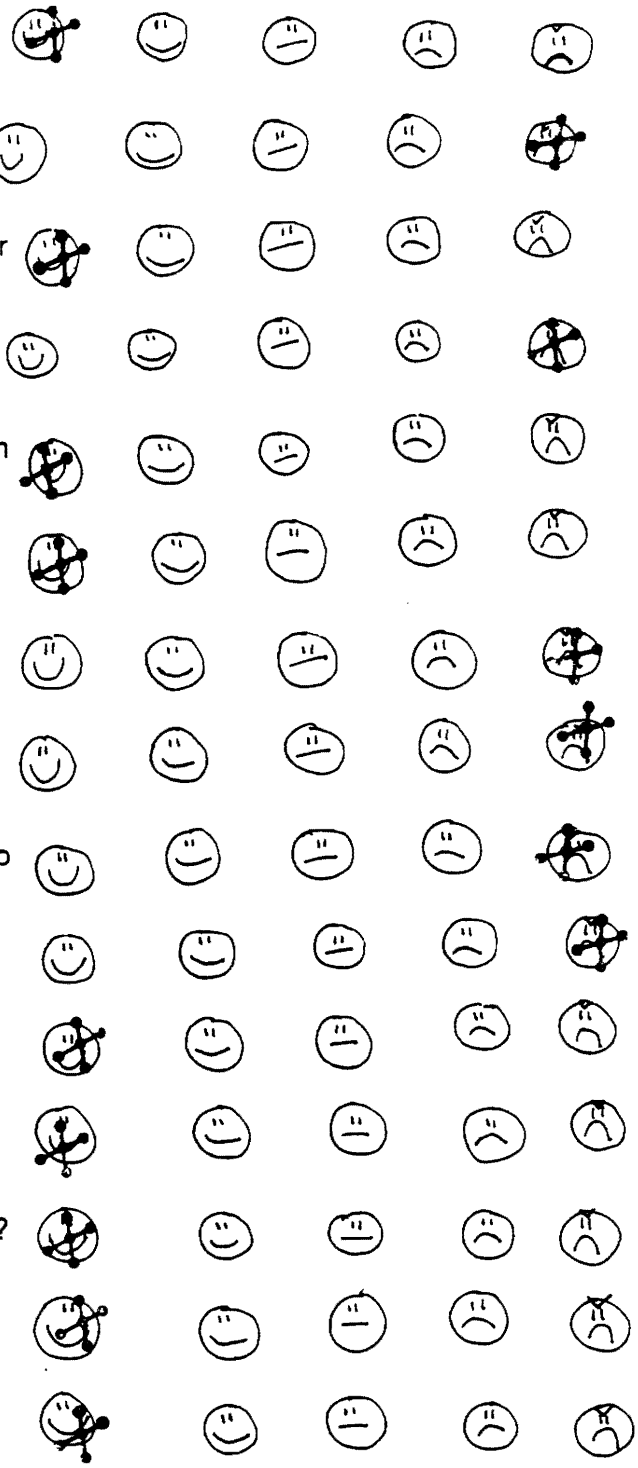
10. We need to protect the earth; it is a special home.

X Agree
___ Don't know
___ Disagree

QUIZ I-B FOR CHILDREN
Feelings About Nature and Parks

Name: _____

19. Your friend picks up candy wrappers from the ground?
20. Your friend uses his pocketknife to carve letters in a tree?
21. Using old things over and over again, rather than throwing them away?
22. Completely getting rid of such plants and animals as snakes and weeds?
23. Saving and recycling your family's aluminum cans?
24. Reading books and magazines about nature?
25. Seeing a broken glass bottle on the street near your house?
26. Breaking off tree branches to make toys to play with?
27. Taking long showers when you get up or go to bed?
28. Washing the car with lots of soap?
29. Repairing and using old houses and buildings?
30. Using my allowance to help clean up the river?
31. Turning off the lights to help save electricity?
32. Helping to keep my neighborhood clean?
33. Telling others about things to do for Portland?



QUIZ II-B FOR CHILDREN

Things You Like To Do

Name: _____

8. While walking in a park you and your best friend find a frog hopping along the path. Your friend gets a stick and pokes the frog to see if it will go faster. What would you do?

___ Join the fun and poke at the frog too.
___ Just watch your friend and the frog.

Tell your friend to stop poking at the frog.
___ Leave your friend and go explore another path in the park.

9. Your family is finished reading the newspaper, and your parent asks you to get rid of it. What would you do?

___ Help your parent burn it.
___ Throw it in the wastepaper basket.

Take it to a recycling bin at school, at church, or at the community center.
Take it to a friend's family so they can read it too.

10. You and your friend are playing in the front yard and you find a bottle that someone dropped. It is at the edge of the street in front of your house. What would you do?

___ Pick it up and put it in a trash can.
___ Do nothing.

Pick it up, put it in a box in the house, and ask your parent to take it to a recycling center.
___ Pick it up and throw it farther down the street.

11. Your teacher takes you to a park to learn about nature and have fun. She gives you some time to do whatever you want. What would you do?

___ Play kick ball with my friends on the ball field.
___ Stay on the lawn area of the park to talk to my friends.

Go into the woods to look for birds and their nests.
Go into a brushy field to look for bugs and butterflies.

12. Your Dad or Mom takes you and your friend to a park. At the park there is a small stream in the forest. Your parent tells you it is okay to play in the stream. What would you do?

___ I wouldn't go in the water.
___ I would go in the water and splash my friend.

I would go in the water and look for little creatures among the rocks.
___ I would go in the water and try to stir up the mud.

13. Your Dad or Mom turn on the water sprinkler to water the lawn. After the sprinkler has been on for a few hours, you wonder if your parent has forgotten about it. What would you do?

___ Play in the water.

Turn the sprinkler off.
Tell your parent about the sprinkler.
___ Do nothing.

QUIZ III-B FOR CHILDREN
Knowledge of Nature and Parks

Name: _____

11. Indicate whether the following statements are true or false. Circle a T if the statement is True and F if it is False.

(T) F Snakes eat mice and rats.

(T) F The bald eagle is an endangered species.

(T) F Beavers have webbed feet.

T (F) Animals do not change their environment.

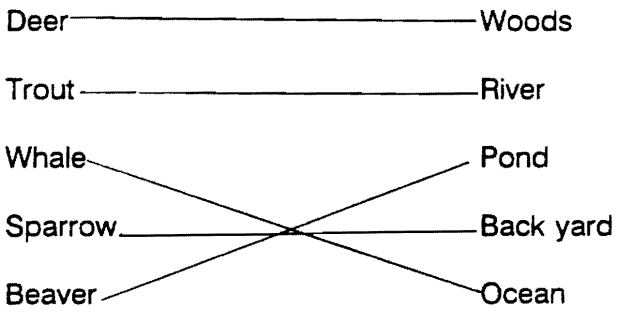
(T) F A salmon lives in both the ocean and in rivers during its life.

(T) F Trees help to clean the air.

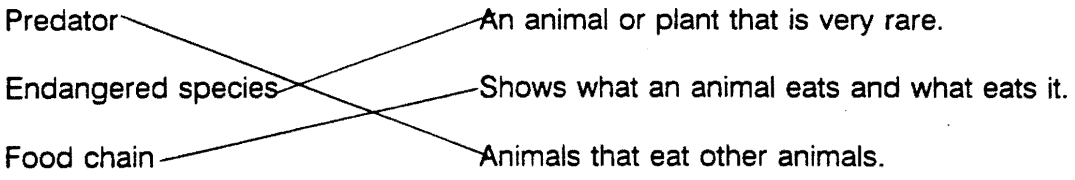
T (F) Trees are the first plants to move onto a land destroyed by a volcano.

(T) F Plants use energy from the sun to make their food.

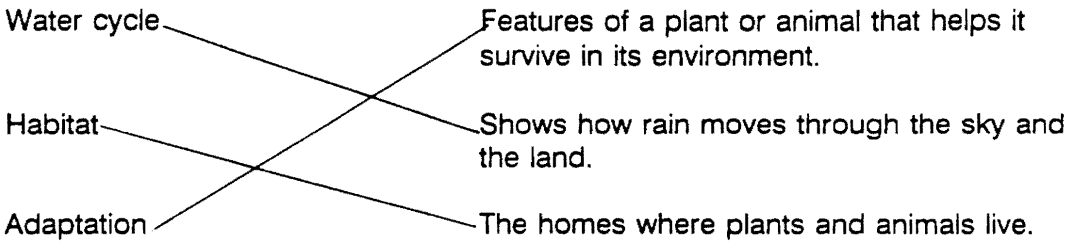
12. Draw a line connecting the following animals with their homes.



13. Match the following words with their meanings. Draw a line from the word to its meaning.



14. Match the following words with their meanings. Draw a line from the word to its meaning.



15. How does water get from the clouds to your drinking faucet? Circle the best answer.

(a) clouds → snow → river → pipes → faucet

b) clouds → ocean → river → faucet

c) Clouds → pipes → faucet

16. Complete the following food chain (that might exist in your back yard) by putting the plants and animals in the boxes in the correct order (to show what gets food from what).

Use this list

Cat
Tree
Robin

Sun	Tree	Worm	Robin	Cat

17. Indicate whether the following statements are true or false. Do so by circling the T if you believe the statement is True, and F if it is False.

T (F) My use of water in my home doesn't hurt the salmon.

(T) F Turning the lights out in my room when I leave can help protect salmon in the river.

(T) F Using fertilizers and sprays on my lawn hurts the bugs that live there.

(T) F Dropping trash on the street hurts fish in the river.

(T) F Dirty air hurts trees.

T (F) Using the bus rather than cars increases air pollution.

18. A park near you is going to be made into a parking lot for cars, and the trees will be cut down. What will you do? (Choose one answer.)

___ Nothing -- what can a kid do anyway?

 Ask my parents to do something.

 Write a letter asking them to stop.

 Get a group of kids together and ask my teacher how we can stop the parking lot.

Appendix D

PARENTS' QUESTIONNAIRES: PRE-CAMP "PARENTS' INFORMATION FORM" AND POST-CAMP "PARENTS' EVALUATION FORM"

"INTO THE WOODS" NATURE CAMP

Parents' Information Form

This morning we welcomed your child into our "Into the Woods" nature camp program. Over the next ten days we plan to help your child learn about the environment, enjoy nature, and have fun. Please help us provide the best possible program for your child by answering the questions below. We want to learn the reasons why you are enrolling your child in our program.

1. How important are the following reasons in your decision to enroll your child in the "Into the Woods" nature camp program? (Check the appropriate box for each statement.)

	How important are these reasons?				
	Not at all	**Somewhat**	**Moderately**	**Very**	**Extremely**
It seems like a safe place for my child.	( )	( )	( )	( )	( )
I want my child to learn about nature.	( )	( )	( )	( )	( )
It is free.	( )	( )	( )	( )	( )
It seems like good child day care service.	( )	( )	( )	( )	( )
I want my child to learn about the beauty of Portland.	( )	( )	( )	( )	( )
I want my child to lose his/her fear of nature.	( )	( )	( )	( )	( )
I want my child to have good role models (someone to look up to)	( )	( )	( )	( )	( )
It offers a free lunch.	( )	( )	( )	( )	( )
I want my child to get away from the television.	( )	( )	( )	( )	( )
I want my child to learn to respect the earth.	( )	( )	( )	( )	( )

	Not at all	Somewhat	Moderately	Very	Extremely
I want my child to learn to get along in a group.	( )	( )	( )	( )	( )
I want my child to be proud of his/her neighborhood.	( )	( )	( )	( )	( )
I want my child to go on trips to forests and parks outside the city.	( )	( )	( )	( )	( )
I want my child to learn to behave properly.	( )	( )	( )	( )	( )
I want my child to learn to take actions to protect the environment.	( )	( )	( )	( )	( )
I want my child to have good teachers.	( )	( )	( )	( )	( )

Any other reasons important to you? Please describe them. _____

_____

_____

_____

Your Name: _____

Address: _____

_____

Phone Number: _____

Child's Name: _____

Thank you for your help. Please return the completed form with your child <u>tomorrow</u> morning. If you have questions, call Jane, the Nature Lady at 326-2073.

Portland Parks and Recreation

"INTO THE WOODS" NATURE CAMP

Parents' Evaluation Form

We have now completed our first "Into the Woods" nature camp program. We enjoyed having your child with us. The Portland Parks and Recreation and the USDA Forest Service would like to provide the best possible nature education programs for you, your family and the community. To do this, we need your help. Please answer the questions below, and tell us what you liked and disliked about our program.

1. Your Name: _____

   Address: _____

   _____

   Phone Number: _____

2. Child's Name: _____

3. Your relationship to child (check one):

   _____ Parent

   _____ Grandparent

   _____ Brother/Sister

   _____ Guardian

   _____ Other (please describe)

   _____

   _____

4. Please tell us how well the "Into the Woods" program satisfied your reasons for enrolling your child (Check the appropriate box for each statement.)

The program:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
• Provided a safe environment for my child.	( )	( )	( )	( )	( )
• Had good role models for my child.	( )	( )	( )	( )	( )
• Helped my child lose his/her fear of nature.	( )	( )	( )	( )	( )
• Provided good lunches.	( )	( )	( )	( )	( )
• Taught my child to respect the earth.	( )	( )	( )	( )	( )
• Helped my child to learn about nature.	( )	( )	( )	( )	( )
• Was a good day care for my child.	( )	( )	( )	( )	( )
• Took my child to see beautiful forests and parks outside the city.	( )	( )	( )	( )	( )
• Helped my child get along well in the group.	( )	( )	( )	( )	( )
• Taught my child to take actions to protect the environment.	( )	( )	( )	( )	( )
• Taught my child to behave properly.	( )	( )	( )	( )	( )
• Helped my child to be proud of his/her neighborhood.	( )	( )	( )	( )	( )
• Showed my child the beauty of Portland.	( )	( )	( )	( )	( )
• Had good teachers for my child.	( )	( )	( )	( )	( )
• Helped my child get away from the television.	( )	( )	( )	( )	( )

5. Please tell us how the "Into the Wood" nature camp affected your child's behavior at home during the two-week long program. (Check the appropriate box for each statement.)

	How often did your child do these things?				
	Not at all	**Rarely**	**Sometimes**	**Often**	**All the time**
• Talked to you about the program.	( )	( )	( )	( )	( )
• Told his/her brothers or sisters about the program.	( )	( )	( )	( )	( )
• Showed you the things he/she did during the program.	( )	( )	( )	( )	( )
• Urged you to conserve water in the home.	( )	( )	( )	( )	
• Asked you to take him/her to the places visited during the program.	( )	( )	( )	( )	( )
• Picked up litter in the yard or neighborhood.	( )	( )	( )	( )	( )
• Wanted to watch nature programs on TV.	( )	( )	( )	( )	( )
• Urged you to recycle some of your glass bottles, cans, or other household goods.	( )	( )	( )	( )	( )
• Read books about nature.	( )	( )	( )	( )	( )
• Visited neighborhood parks or community parks on weekends.	( )	( )	( )	( )	( )
• Asked you about ways to protect nature.	( )	( )	( )	( )	( )
• Turned out lights that weren't being used.	( )	( )	( )	( )	( )

6. How often did you ask your child about her "Into the Wood" nature program of encourage his/her involvement?

	How often did you take these actions?				
	Not at all	**Rarely**	**Sometimes**	**Frequently**	**All the time**
• I asked my child about the program's content.	( )	( )	( )	( )	( )
• I took my child to parks or nature areas.	( )	( )	( )	( )	( )
• I helped my child to protect or clean up the environment.	( )	( )	( )	( )	( )
• I helped my child get more information about nature.	( )	( )	( )	( )	( )
• I asked my child whether he/she liked the program.	( )	( )	( )	( )	( )
• I asked my child about the program's content.	( )	( )	( )	( )	( )

7. Describe in your own words what your child liked most about the "Into the Woods" nature program?

   1. _____
   2. _____
   3. _____

8. Describe in your own words anything that your child disliked about the "Into the Woods" nature program.

   1. _____
   2. _____
   3. _____

9. Please give us your overall evaluation of the "Into the Woods" program.

   a) How do you rate the quality of the "Into the Woods" nature program?

   ___ Poor ___ Good ___ Excellent

   ___ Fair ___ Very Good

   b) Would you send your child (Or another son or daughter) to an "Into the Woods" nature education program next year?

   ___ Definitely not ___ Undecided ___ Definitely yes

   ___ Probably ___ Probably yes

   c) Should Portland Parks and Recreation provide more nature education programs?

   ___ Definitely not ___ Undecided ___ Definitely yes

   ___ Probably not ___ Probably yes

   d) Is there anything else about the program that you would like to comment on (such as its organization, effect on your child's behavior, what your child learned, or places visited)?

   _____

   _____

   _____

10. Finally, to help us know what kinds of families are taking advantage of this program, we would like to ask a few questions about you and your household.

   a) Your age _____

   b) Your gender: Male ___ Female ___

   c) Your race:

   ___ African American ___ Hispanic ___ Asian

   ___ European American ___ Native American ___ Mixed

   d) Which of the following describes your household?

   ___ Single parent family ___ Two parent household

   e) If two parent household, how many parents work outside the home?

   ___ One parent ___ Both parents

f) How many people live in your household? _____

1. Of these how many are adults (18 or over)? _____

   And how many are children or adolescents (under 18)? _____

g) What is your occupation? _____

h) Check your family's total combined income in 1993.

___ $0 - $10,000 ___ $20,000 - $30,000 ___ Over $40,000

___ $10,000 - $20,000 ___ $30,000 - $40,000

i) How long have you lived in Portland? _____ years.

j) How often does your family participate in the following recreation programs offered by Portland Parks and Recreation? (Please check the appropriate box for each type of program.)

	Frequency of Participation		
	Not at all	**Sometimes**	**A Lot**
Sports (like basketball or soccer)	( )	( )	( )
Swimming	( )	( )	( )
Crafts programs (like basketmaking)	( )	( )	( )
Nature recreation (like trips to forests)	( )	( )	( )
Art (like dance and painting)	( )	( )	( )
Washington Park Zoo	( )	( )	( )

k) How often does your family go to:	**Not at all**	**Sometimes**	**A Lot**
Mount Hood	( )	( )	( )
Mount St. Helens	( )	( )	( )
Oregon Coast	( )	( )	( )

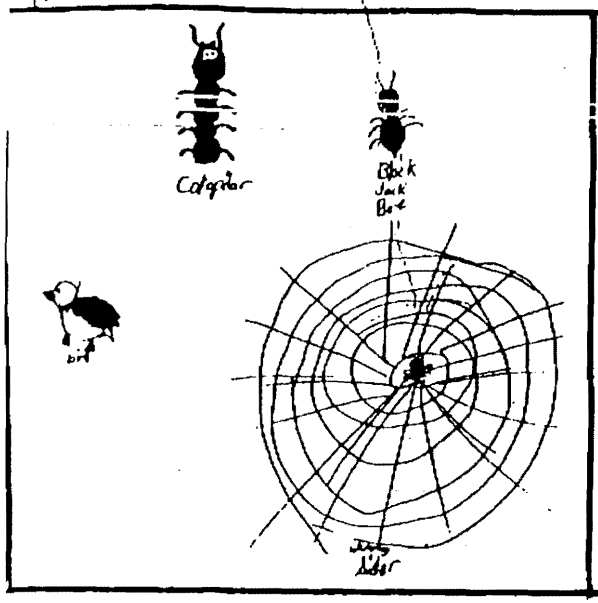
Thank you for your help. Your ideas will permit us to provide better recreation programs for the people of Portland.

Portland Parks and Recreation
USDA Forest Service
Oregon State University
Virginia Tech

Appendix E

ELEMENTARY SCHOOL-AGE CHILDREN'S DRAWINGS RATED AS "NOTICEABLE CHANGE" USED IN AN EVALUATION OF THE VINE (VOLUNTEER LED INVESTIGATIONS OF NEIGHBORHOOD ECOLOGY) PROGRAM

pre



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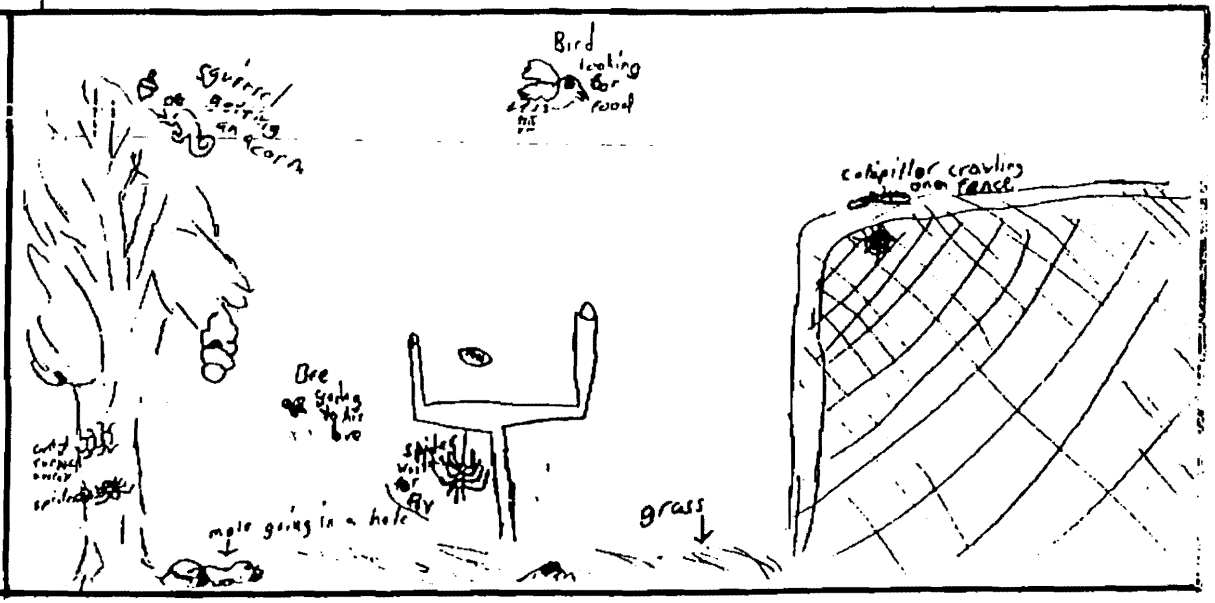

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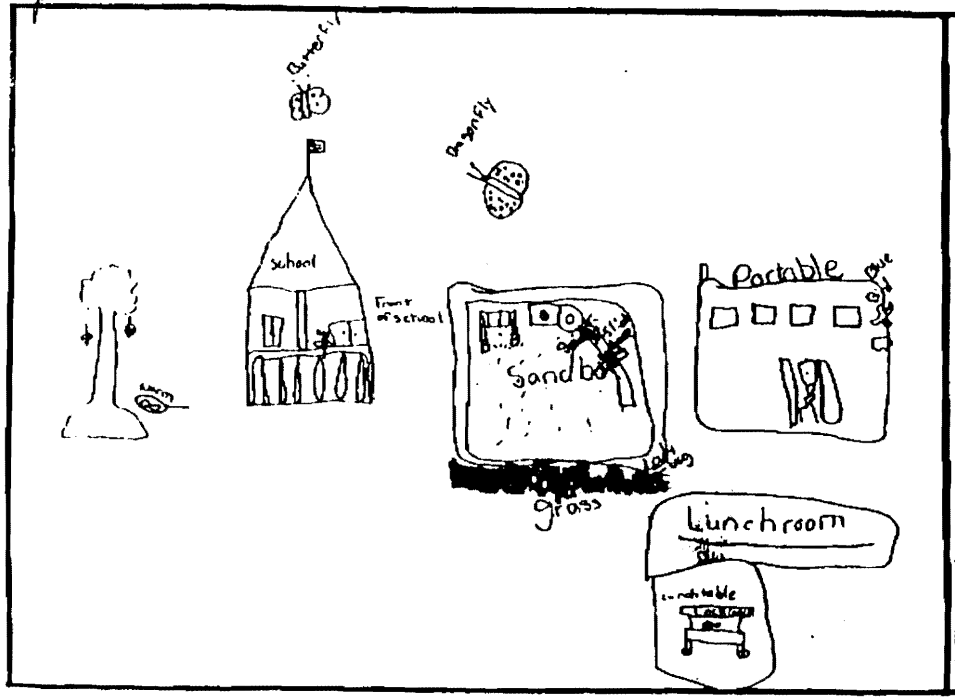

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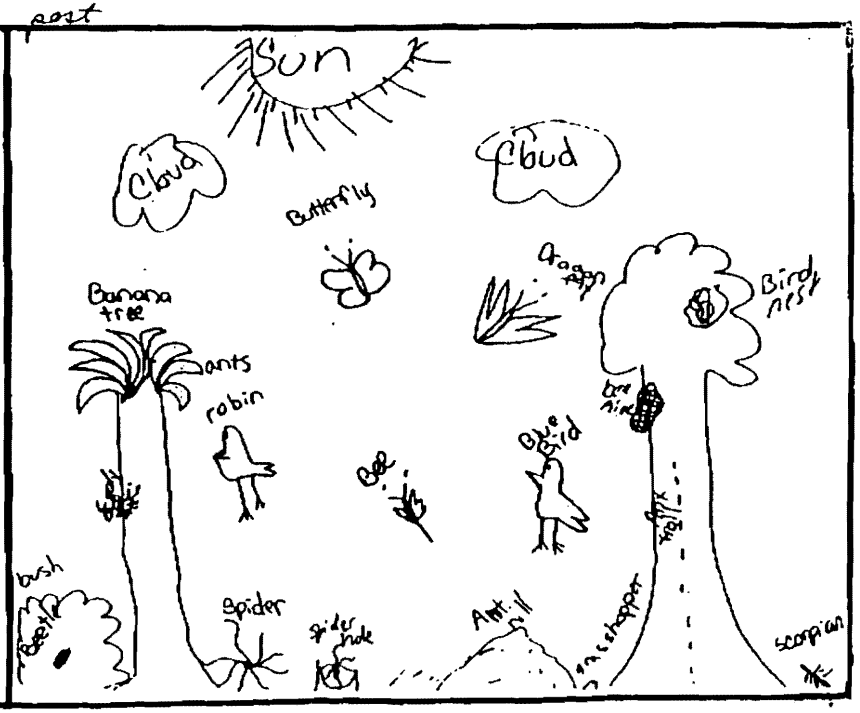

VITA

Jane Elizabeth Dombroski completed her Bachelor of Arts degree in Sociology at Wofford College in Spartanburg, South Carolina. She received her Master of Science degree from Virginia Polytechnic Institute and State University in 1995, specializing in outdoor recreation. Her Master's thesis focused on the learning benefits of an environmental education day camp program for inner city elementary school-age children. Throughout her undergraduate and graduate education, she has worked as an environmental interpreter and environmental educator. Currently, she is working as an environmental and historical interpreter in North Carolina's Pisgah National Forest at the birthplace of scientific forestry, the Cradle of Forestry in America.