

CHANGES IN STUDENTS' ATTITUDES TOWARDS CONSERVATION
RESULTING FROM OUTDOOR EDUCATION: A CASE STUDY

by

JOSEPH K. TUFUOR

B.Sc., (Education) University of Cape Coast, 1972

B.Sc., (Botany) University of Cape Coast, 1973

M.Sc., (Botany) University of Cape Coast, 1975

M.A., The University of British Columbia, 1978

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Department of Mathematics and Science Education

The University of British Columbia
2075 Wesbrook Place
Vancouver, Canada
V6T 1W5

Date November 24, 1981

ABSTRACT

In schools, enhancement of students' attitudes towards conservation of the environment and its resources is one of the most prevalent goals of outdoor education programs. It has been assumed by outdoor educators, that a positive change in the attitudes of students will be translated into the corresponding change in their behavior.

Even though some studies have been undertaken to find out if outdoor education programs result in enhancing students' attitudes, the results have not been very conclusive. In addition, no studies have been undertaken to find out if the change in attitudes resulting from these outdoor education programs lead to a corresponding change in behaviors, and no studies have been undertaken to find out the aspects of the programs which attribute to the positive change in attitudes.

This study investigated the nature of the change in attitude resulting from a residential outdoor education program, and the aspects of the program which contributed to or appeared to have contributed to the change in attitudes. The study restricted itself to conservation of three natural resources -- energy, plants, and wildlife.

An attitude questionnaire was developed, tried and used to assess the nature of the change in students' conservation attitudes following a residential outdoor education program. A triangulated case study approach using the views of students, counsellors, teachers and the writer, was used to investigate

factors which were considered to have enhanced the students' conservation attitudes.

The results of the attitude assessment study showed that the program enhanced the students' conservation attitudes. The results further showed that in the area of energy and plant conservation the positive change in attitudes was reflected in the students' behavior. In the area of wildlife conservation, however, the behavior of the students did not reflect a positive change in attitude, but this has to be interpreted with caution, since students had not been exposed to situations where they could practice wildlife conservation.

The results of the case study revealed that eight aspects of the program contributed or appear to have contributed to the positive change in students' conservation attitudes. These aspects are the pre-camp preparations, the field study sessions, the outdoor school environment, the attitudes and behaviors of both the teachers and the counsellors, the films shown at the outdoor school, the teaching strategies used, the individual attention received, and the post-camp activities.

The findings of the study led to two conclusions:

- (1) That residential outdoor education programs can and do enhance students' attitudes toward conservation of natural resources.
- (2) That many aspects of an outdoor education program contribute to or appear to contribute to enhancement of students' attitudes toward conservation of natural resources.

The generalization of the conclusions, however, have some

limitations: subjects were not selected randomly, and also because of the presence of the writer during the period of the study.

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CHAPTER I

THE PROBLEM

1.1 General Problem

The general problem which was investigated in this study was the change in attitude toward conservation of the natural environment presumed to take place among subjects in a residential outdoor education program.

Outdoor education programs vary in many respects (e.g., objective, content, scope and practice), but according to the literature, attitude development is one of the most pervasive goals of such programs (Linke, 1980; Stapp, 1970; Caldwell, 1970; and Hart, 1978). Although there have been many studies on attitude measurement in outdoor education programs, no systematic studies have been found on how these programs enhance the development of attitudes. The need for such a study has been documented as being helpful for training teachers and for improving outdoor education programs in general (Lucas, 1980; Roth, 1976; and Doran, 1977). Also, according to Lucas, very few studies have been done in outdoor education which show how the attitudinal changes which are recorded in the research literature actually lead to behavioral change. This study, therefore, investigates the nature of the attitude changes which occur in a residential outdoor education program, and how these attitude changes seem to influence overt behavior. It also investigates aspects in the program which contribute to, or

appear to contribute to the change in students' attitudes towards conservation of natural resources.

1.2 Definition of Terms

For a clearer understanding of this study, it is important to define several terms used in the study. These terms are:

1.2.1 Attitude: Fishbein's definition of attitude was adopted in this study. According to Fishbein (Fishbein and Ajzen, 1975), attitudes are conceptualized as learned predispositions to respond to an object, class of objects, acts, or events in a consistently favorable or unfavorable way. Consistent with the above, the attitude object was conservation of natural resources. The term "attitude towards the conservation of natural resources" was interpreted as meaning the "feeling for or against conserving natural resources."

1.2.2 Conservation: The term "conservation" is interpreted in this study to mean the use of natural resources so as to yield insofar as possible, maximum benefits on a sustained and permanent basis.

1.2.3 Natural Resources: The term "natural resource" was interpreted to mean any natural feature of the environment which has value or usefulness to humans.

1.2.4 Residential Outdoor Education Programs: The term "residential outdoor education programs" refers to those educational programs which are conducted in camps situated in urban or rural areas where students and instructors live together for a period of time of at least two days.

1.3 Background of the Study

1.3.1 Environmental Context of the Study

The existing quality of our biophysical environment, according to Perkes (1973), is evidence that our problems have far exceeded our solutions. For example, automobile fumes cling to the envelope of air which gives us life; lakes, streams and other water resources are polluted; soil washes away from fertile, tillable land; forests and farms are being cleared at an alarming rate, to be covered with concrete and asphalt; and space for recreation and wildlife is shrinking (Perkes, 1973; Askham, 1975; Laug, 1960; Black, 1954, Gustafson, 1949; Botkin, Elmandjra and Malitza, 1979; Rillo, 1967). All these problems are the consequences of human behavior and can be effectively improved by appropriately changing or modifying human behavior.

Many reports have shown that in the past people have taken the environment and natural resources for granted, and have not shown due concern about the future (Askham, 1975; Perkes, 1973; Rillo, 1967; and Laug, 1960). For example, wild animals were killed because they were considered to be enemies to humans; forests were burned down or cleared for various purposes without much consideration for the consequences of such actions; cheap energy was in abundance and people used it in any way they desired, to the point where the amount of energy consumed became an index of development, and environmental pollution was allowed to continue and to increase.

Although these attitudes and behaviors were quite universal during the early days (particularly soon after the industrial revolution), they could not be allowed to remain so for very

long. Many leaders started getting concerned about the depletion of fertile soil on farm lands (Black, 1954; Gustafson, 1949). Gustafson reported that interest in conservation grew against great public apathy. In the United States it was reported that attention to the problem of conservation had begun as early as 1873 by the federal government. This led to the formation of the National Conservation Commission in the United States; and in 1909 a Conference on Conservation in the American continent (United States, Canada, and Mexico) was held. Such events contributed to arousing public interest in conservation.

Environmental problems have escalated since the early 1900's. Several developments led to this reawakening. For example, in the 1930's, drought and depression combined to force the problem on the public mind (Funderburk, 1948). Informed people became concerned about environmental problems very early, and worked to influence education. Thus, appeals for teaching conservation and environmental issues started long ago. The literature shows that as far back as 1911, Frederic Burk, the then president of the State Normal School in San Francisco, made a direct appeal to teachers to teach the heritage of natural resources and their wise use, at an address before the Science Department of the National Education Association (Funderburk, 1948). Such pleas can still be found in the literature on outdoor education, as for example, in the works of Jaus (1978), Rocchio (1971), Huether (1973), Baltes (1973), and Allen (1975). The literature on outdoor education reports that in the 1920's laws were passed in some states asking schools to teach conservation (Public Acts of the State of Tennessee, 1921;

General Laws of Mississippi, 1926).

1.3.2 Educational Context of the Study.

The general educational system has been identified to be one way of modifying the behavior of the public (Commission on Educational Planning, 1972; Alberta Department of Education, 1974; Nixon, 1970; Jaus, 1978; Rocchio, 1971; Baltes, 1973; Allen, 1975).

In schools a large segment of the population (mainly the youth) are gathered for the purpose of attaining education, and this seems to be a suitable place to begin introducing people to the deteriorating conditions of the environment and dwindling natural resources.

At a meeting of the Congress for Recreation and Parks held in Washington, D. C., in 1966, Laurence S. Rockefeller stated:

If we accept a national commitment to a decent environment and man's responsibility as its steward, it is essential to educate our young people to this goal. Quality of the environment, like freedom, must be protected and achieved anew by each generation (Rillo, 1967).

Russell (1970) thinks similarly. He states:

We must help our young people to develop a sense of responsibility toward our natural resources and our total environment--a sense of responsibility to try to pass on to future generations through careful stewardship a better world than we now have (Russell, 1970).

Both Rillo and Russell feel that by educating young people we can make good headway. In recent years many educational institutions have embarked on programs directed to meet these environmental needs (Perkes, 1973). For example, Maben (1971) found that 80% of elementary schools in the Great Lakes area of the United States and 89% of those from the Far West offered conservation or environmental education. At the secondary school

level there were 55% and 68% respectively. Almost every school district in British Columbia has some outdoor education (McClaren and Ramsey, 1972). School boards have also encouraged the development of such programs. For example, in 1965 the Ontario Schools Administration Act was amended to permit school boards with an enrolment of over 10,000 students to buy their own property outside their jurisdiction for "the purpose of erecting a natural science school" and to allow them to "build and operate such a school thereon." It also mentions that boards may "conduct a natural science and conservation program in co-operation with a conservation authority."

Educators are optimistic about the ability of the educational system to meet these needs (Alaimo and Doran, 1978; Nuttall, 1969). Philosophers concur that worthy environmental education objectives must eventually deal with behavioral change. The widely accepted view is that many of our environmental problems are actually problems of human behavior (Swan, 1969). Thus, as Ames (1971) reports, "...in the final analysis the success of environmental education will be measured in terms of its ability to change the behavior of society".

In our present society and its institutions of education, behavioral change can be facilitated through various methods. Perhaps the most extreme of these methods would be to remove the free agency of the public to choose alternative actions (Perkes, 1973). As an illustration, the public will not have the choice of purchasing a "non-polluting" or a "polluting" automobile. Likewise, if a monopoly controls the production of an essential item, the consumer has no choice in his/her purchase.

Such changes in the availability of goods and services, therefore, essentially remove the opportunity of decision-making. However, the existence of alternative actions is the basis of a democratic society of individuals, an ideal which is widely accepted. Hence, in the schools, removal of action choices would not be philosophically esteemed.

Closely related to the removal of alternative action choices is the attachment of negative reinforcement (not punishment) to those actions which do not coincide with the public good (Perkes, 1973). (As used here, negative reinforcement involves decreasing an aversive external stimulus, which leads to an increase in response strength. This is different from punishment, which involves an unpleasant experience consequent on a certain course of behavior and mediated by an external agent or by the self acting as agent in the hope of providing retribution or of discouraging the repetition of the behavior. For example, during a residential outdoor education program a negative reinforcement would be one where a cabin group is given low cabin marks for leaving their lights on when not in use, while punishment would involve denying a cabin group the opportunity of taking part in a recreational activity which all students enjoy, because the group left the cabin lights on when not in use.) Such a method, if not widely successful, may result in governmental regulations and laws based on the undesirability of associated penalties. Such laws are necessary for the protection of society and its environment from offenders and would not be needed if undesirable behavior were not present. In this case the

individual does have a choice of breaking or of sustaining the laws, but out of fear of punishment his/her behavior is controlled. When this fear no longer exists, laws are violated. Since environmental behaviors are difficult to supervise and this supervision is subject to moral implications, this method of altering behaviors through negative reinforcement (not punishment, ref. West and Foster, 1976) is not usually acceptable as a preferred approach.

A more positive means for changing behavior, once used and accepted quite widely in education, according to Perkes (1973), is through external positive reinforcement. However, this approach might be designated as "coercion" (Perkes, 1973) or indoctrination (Rillo, 1967) and manipulation of behavior, and the expectation of external rewards seems to most, to be a pedagogically inferior mode of education. Again, rational judgement and decision-making are not emphasized in this behavioristic learning model (Perkes, 1973).

The most pedagogically acceptable route by which behavior may be changed is that where the behavior is preceded by a change in attitude (Rillo, 1967; Stapp et al., 1969; Perkes, 1973). This mode assumes that behavior is a logical consequence of an attitude or interaction of attitudes. Thus, in schools, these outdoor education programs are geared towards changing behavior via attitudes.

Schools facilitate the development of appropriate environmental attitudes through a combination of different ways. Teachers provide students with factual information about the environment, and take students out on field trips where they can

see and experience different aspects of the environment. Schools have also found that field trips which last for more than a day are more effective than short field trips, because they provide more time for students to undertake more scientific investigations on environmental issues. In addition, students work in small groups and thereby get the opportunity to interact with environmental issues. This belief in the efficacy of overnight trips has become universally accepted so that residential outdoor programs (at least in British Columbia) have been more popular than non-residential ones (Bateson and Worthing, 1976).

Outdoor education programs have traditionally emphasized environmental topics. They began at the turn of the century as an outgrowth of the nature study movement (Rillo, 1967; Archibald, 1971; and Hill and White, 1971). In the mid-fifties environmental concerns such as conservation and pollution had become important societal problems, and schools took children out to learn about and understand the environment. Recently ecology and conservation goals have emerged to be the main objectives for outdoor education programs (Herbert, 1966).

In British Columbia today, it appears that residential outdoor education programs are primarily designed to achieve conservation objectives (Woodward, 1973). The particular outdoor program which was used in this study had as its primary objective the conservation of energy, plants, and wildlife. These conservation topics were selected because they were of prime concern to the outdoor school program, and also because they seem to be most central to outdoor education programs in

general.

This study attempted to find out if an outdoor education program enhanced the conservation attitudes of students towards the three conservation topics (energy, plants and wildlife), and if so, to find out how the change in attitude was related to behavior. In addition, the study also examined the aspects of the program which contributed or appeared to have contributed to enhancement of students' conservation attitudes.

1.3.3 Theoretical Context of the Study

There are a number of theories about how attitudes develop and change. According to Zimbardo (1977), for example, there is the Yale attitude change approach; group dynamics; cognitive dissonance theory; attribution theory; social learning theory; the facet theory (Castro and Jordan, 1977); and a behaviorist theory (Fishbein, 1967, Fishbein and Ajzen, 1975; and Rhine, 1958). Fishbein's theory on how attitudes are developed and changed is current and widely used, and formed the theoretical perspective of this study. Fishbein's model for the acquisition of attitude, is a modification of an earlier model developed by Rhine (1958). This model is consistent with the works of Doob (1947), Lott (1955), Osgood et al., (1957) and others.

Castro and Jordan's theory was used to explore the relationship between attitude and behavior. Castro and Jordan (1977) propose that there are six levels of attitude (weak to strong), and that attitude changes at the higher (stronger) levels are more directly related to overt behavior than changes at the lower (weaker) levels of attitude. Three levels of Castro and Jordan's theory were employed because they were found to be

suitable. They were societal norms, personal feeling and personal action.

1.4 Specific Problems of the Study

From the above discussion it is clear that there is a need to change the behavior of the public towards the environment. However, "environment" is a complex concept, one aspect of which, the need to conserve natural resources, has attracted a lot of public concern. This study concerned itself only with conservation of natural resources as an attitude object.

The school system has been identified by many people to be one of the most promising places for inducing behavioral changes which will meet these environmental needs (Mesarovic and Pestel, 1976; Dasmann, 1975; Smith et al., 1972). Although there are many ways of doing this, changing the attitudes of people towards conservation of natural resources seems to be one of the most promising ways of influencing behavioral change. In the schools which were used in this study, such programs were referred to as "outdoor education." Experience and the literature show evidence to support the idea that residential outdoor education programs are better suited to changing these attitudes than the non-residential ones.

Although it is generally accepted that there is some relationship between attitudes and behavior, it is also known that there are different levels of attitude (Jordan, 1968, 1971a, 1971b; Castro and Jordan, 1977), and the effects of each level may vary according to the strength of the relationship to actual behavior. No research evidence has been found which shows

the nature and/or level of attitudinal change which outdoor education programs produce. The problem under study was focused by the following specific questions:

1. What effect does participation in a residential outdoor education program have on the attitudes of students toward conservation of natural resources?
2. What aspects of an outdoor education program contribute or appear to contribute towards positive attitudes towards conservation of natural resources?

1.5 Overview of Methodology

To address the above problems, this study proceeded in two parts. Part 1 was an attitude assessment study and Part 2 was a case study. The attitude study determined if the outdoor education program was effective in enhancing the conservation-related attitudes of students while, the case study investigated the factors in the program which were or which appeared to be related to the development of conservation attitudes.

1.6 Limitations of the Study

This study was limited by two factors. First, the subjects were not randomly selected from the target population. The sample was made up of students from schools which had agreed to participate in both the program and in the study.

Secondly, Part 2 of the study required the presence of the writer during all phases of the outdoor education program, as

well as interviews with students, counsellors and teachers. The mere presence of the writer, and the interviews with the participants of the camp program, may have affected the students.

CHAPTER II

REVIEW OF THE LITERATURE

2.0 Introduction

This chapter reviews literature relevant to the general problem area outlined in Chapter I. It begins with a discussion of studies related to the development of attitudes in outdoor education programs and the underlying assumptions and problems of these studies. This discussion is followed by an elaboration of Fishbein's theory on attitude acquisition, and Castro and Jordan's Facet Theory on the relationship between attitudes and behavior. Particular attention is paid to how these theories are related to the problems being studied. The chapter concludes with a review of the literature on components of outdoor education programs which appear to be important for the enhancement of attitudes.

2.1 Attitude Development Resulting from Outdoor Education Programs

Outdoor education programs address themselves to environmental issues, and many studies have been conducted on these programs. Most of the early programs operated under the assumption that the unwise use of the environment and natural resources was because the public did not know about the consequences of these human behaviors. Southern (1971), for example, explicitly proposed that "if a child acquires

particular broad environmental understanding [knowledge], he will develop a social conscience [attitude] that will affect his behavior [actions] toward the environment." Many of the early studies (e.g., Christiansen and others, 1969), therefore, used knowledge gains as the criterion for measuring the success of programs, and most programs were successful in this respect.

Although some studies have indicated that there is a positive relationship between environmental knowledge and environmental attitudes (e.g., Drawbaugh and Locandro, 1978; Hart, 1978; and Ramsey and Rickson, 1976), other recent studies have shown that knowledge per se is a necessary but not sufficient precondition for the development of attitudes (Lucas, 1980; Bowman, 1977; LaHart, 1978; Ditton and Johnsen, 1974; Cohen, 1973). Subsequently, there has been a shift in evaluation methods from measurement of knowledge to measurement of attitudes.

There have been many studies involving assessment of attitude changes resulting from outdoor education programs. Most of these studies have shown positive results. (e.g. Hounshell and Liggett, 1976; Rocchio, 1971; Kallingal, 1974; Wilson, 1975; Richmond and Morgan, 1977; Huckestein, 1976; Coons, 1973; Stronck, 1972; Hart and McClaren, 1978; Hepburn, et al., 1978; Simons, et al., 1977; and Horsley, 1977). In the study by Kallingal (1974), a semantic differential instrument was used on one group of grade six students to assess the effectiveness of an outdoor education program. More than 60% of the students were found to be in the ideal quadrant of the semantic space, from which it was inferred that the majority of the students had

developed desired levels of favorable attitudes towards the environment. Coons (1973) studied the effect of a two-week residential outdoor camp program on the attitudes of disadvantaged children (ages 10-13) toward the environment and towards their interpersonal development. In that study, the students in the experimental group were found to have developed a more positive attitude towards the environment than the control group. A longitudinal study by Hounshell and Liggett (1973, 1976) assessed students' (grade six) attitudes toward the environment and environmental issues. The study found that the students' attitudes became more positive and remained so after more than a year.

These studies have not been limited to only grade six students. Huckestein (1976), undertook a study involving the use of a pretest and posttest with grade five students. In that study he found that those who were involved in a one week residential outdoor education program had developed a more positive attitude towards the environment and environmental issues than those who were in the control group. Another study involving grade five students was undertaken by Richmond and Morgan (1977). Their study showed that students who had participated in various outdoor programs had more positive attitudes towards the environment than students who had not participated.

Other studies have also shown positive results beyond grades five and six. Rocchio (1971) used a wider range of students (13-18 yrs.) to evaluate a residential outdoor education program, and found that the students' attitudes

towards the environment and environmental issues were enhanced. The study by Wilson (1975), which involved grade nine students, produced the same kind of results. Similar results were again obtained by Hart and McClaren (1978), and also by Hepburn, et al., (1978). The last two studies involved the use of high school students. A longitudinal study by Simons et al., (1977), and by Harsley (1977), similar to the one by Hounshell and Liggett (1973, 1976), also showed a positive result on the students' attitudes towards the environment. Simons and his associates used secondary school students, while Harsley used college students. In a study by Stronck (1972), the attitudes of a wide range of teachers and students were measured, and again positive attitudes were recorded.

Other studies have, however, shown that not all programs have been able to produce significant changes in the attitudes of students (e.g., Carter, 1973; Quinn, 1976; Kostka, 1976; Day, 1971; Baker, 1975; Crater, 1977; Koch, 1975; and Howell and Warmbrod, 1974). The study by Kostka (1976) examined the effect of an on-going nature center program on the attitudes of inner city grade six students, and found that the program made little impact on the environmental attitudes of the students.

Day (1971), who investigated the opinions of high school students following a school program in which all the school curricula were oriented towards oceanology, did not find any change in the attitudes of the students. Carter (1973), in a survey, examined the effect of exposing students to the energy crisis and deteriorating environmental quality. The results of the survey showed that this exposure did not influence the

attitudes of the students. Baker (1975) studied one group of students (16 yrs. and over) to find out the effect of participation in an outdoor leadership school, and used a opinion questionnaire. He did not find any change in the students' attitudes, and attributed the lack of a change to the students' previous outdoor experience and their wilderness expeditions. Quinn (1976) examined the effect of using short lessons about current environmental problems accompanied by a series of questions on high school students, and found that it did not affect the students' attitudes toward the environment. The responses of the experimental group and the control group were similar, following the program. Koch (1975), who examined the views of teachers before and after an in-service outdoor education program found that it did not affect their attitudes towards environmental problems.

A study by Howell and Warmbrod (1974) examined the effect of a students' manual and the teachers' education on the attitudes of high school students towards the protection of the environment. The study revealed that the use of the students' manual did not produce any significant change in the attitudes of the students. However, it found that the positive effect of the program was more linked with the instructors' education.

There are several problems with these attitude studies. Firstly, even though most of the studies which have been carried out on outdoor education programs show positive results, these are not accompanied with detailed descriptions of what actually goes on during the programs, and so it is difficult to speculate about reasons for the successes or failures of these programs or

to relate any possible causal events with the outcomes (Lucas, 1980; Cohen, 1973; Howel and Warmbrod, 1974). Secondly, inconsistencies in the results may be explained by the fact that different definitions of attitude were used. The various definitions used and instruments constructed were not related to any clearly specified theory of attitude development. Thirdly, most of the studies dealt with attitudes toward the environment in general, without focusing on any specific aspect of the environment. Environment is such a broad topic that it is difficult to assess one's attitudes towards it in a manageable attitude study. For the above reasons it is difficult for the results of the different studies to be compared.

Historically, residential outdoor education programs purport to teach towards the development of positive attitudes about the environment. They claim success, and hope that these attitude changes will be translated into behavioral changes (Stapp et al., 1969; Perkes, 1973). This mode of thinking assumes that behavior is a logical consequence of an attitude or interaction of attitudes. But in outdoor education the attitude-behavior relationships have not been investigated. Studies on the relationship between attitudes and behavior in general show inconsistent results (Pettus, 1976; Barnett, 1971; Manning, 1979; Kromm, Probal and Wall, 1973).

The inconsistencies in these studies can also be related to the various and atheoretical definitions of attitude used in them. In particular, these studies did not use any well defined theoretical perspective on the relationship between attitude and behavior.

The review of the attitude studies in outdoor education shows that there are three types of problems. First, no well defined theory of attitude has been used; second, the outdoor education studies have not been related to behavior, and general studies on the relationship between attitude and behavior have not been based on a well defined theory; and third, the studies have not related the changes in attitudes to components in the programs. This study responded to these problems. First, a well defined attitude theory by Fishbein was used in constructing the instrument to measure changes in attitude. Second, ideas from a theory on the relationship between attitudes and behavior by Castro and Jordan were used as a guide in the development of the instrument to allow for relating any changes in attitude to behavior. Third, a case study approach was used to find out aspects of the program which contributed or appeared to have contributed to the enhancement of the conservation attitudes.

2.2 Fishbein's Theory of Attitude Acquisition

According to Fishbein (Fishbein, 1967; Fishbein and Ajzen, 1975), attitudes are conceptualized as learned predispositions to respond to an object, class of objects, acts, or events in a consistently favorable or unfavorable way. That is, attitudes are learned; they are predispositions and viewed as latent or underlying variables which are assumed to guide or influence behavior; and the response is consistent (Fishbein and Ajzen, 1975). In this study, it was the attitudes of subjects towards aspects of conservation of natural resources which were investigated.

Further, Fishbein (1967), holds that "an attitude may be characterized as a 'mediating evaluative response,' that is, as a learned implicit response that varies in intensity and tends to 'mediate' or guide an individual's more overt [evaluative] response to an object, [act, event] or concept." This idea is consistent with the work of Osgood and his associates (Osgood et al., 1957). The view of Osgood's associates (1957) is that attitudes are seen as responses toward an object along an underlying evaluative dimension of semantic space for the meaning of a concept. They hold that attitudes toward an object Ao can be thought of as components of Ao on the evaluative dimension of the semantic space of Ao. Fishbein, too, holds that attitude is a unidimensional concept referring to the 'evaluation' of a concept, as opposed to a multidimensional view of attitude in which there are underlying cognitive (beliefs), affective, and behavioral dimensions. He also points out that every point in semantic space has an evaluative component (Fishbein, 1967).

2.2.1 Model of Attitude Acquisition

According to Fishbein (1967), acquisition of attitude is a process of conditioning and chaining, although he uses the term "mediation" instead of "conditioning". His idea is that if a stimulus (S) or a group of stimuli (S....S) are presented to a subject, they produce an anticipatory goal response (r), which also leads to a mediational meaning response stimulus (s), and then a change (R) in behavior (overt). This model is represented

in the Figure 2.1 below:

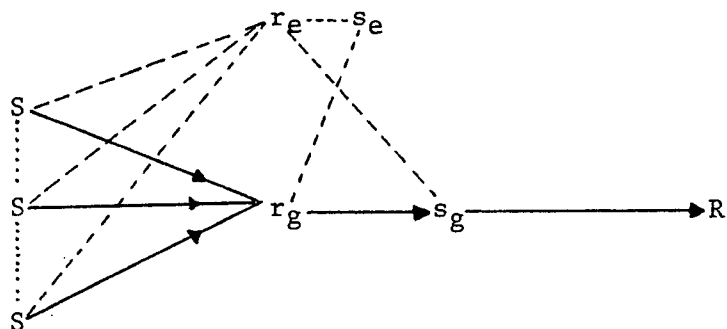


Figure 2.1.: Acquisition of Concept

According to this model, the link between S and r is learned differently by different people. Fishbein holds that during learning an individual also evaluates the instruction. Thus, the process of presenting a lesson may be the same, but the way it is learned may be different for different people, i. e., the response of people can be different for the same stimulus. He also considers an attitude to be a summation of beliefs and the evaluation of the beliefs about the attitude object. One part of this study will focus on identifying the level(s) at which a residential outdoor education program changes the attitudinal responses of subjects.

The development and changing of attitudes, according to Fishbein, is through conditioning, and in outdoor education the way teachers present information (knowledge) is via a similar process. According to the classical conditioning theory of

attitude (using an example from conservation), an unconditioned stimulus (UCS) e.g., flower, produces an unconditioned response (UCR) e.g., beautiful, and if a conditioned stimulus, e.g., a picture of a tree, is repeatedly presented together with the unconditional stimulus (flower) to the subjects, some stimulus-response connections are made, which enable the conditioned stimulus (tree) to produce the unconditioned response. This is illustrated in Figure 2.2 below.

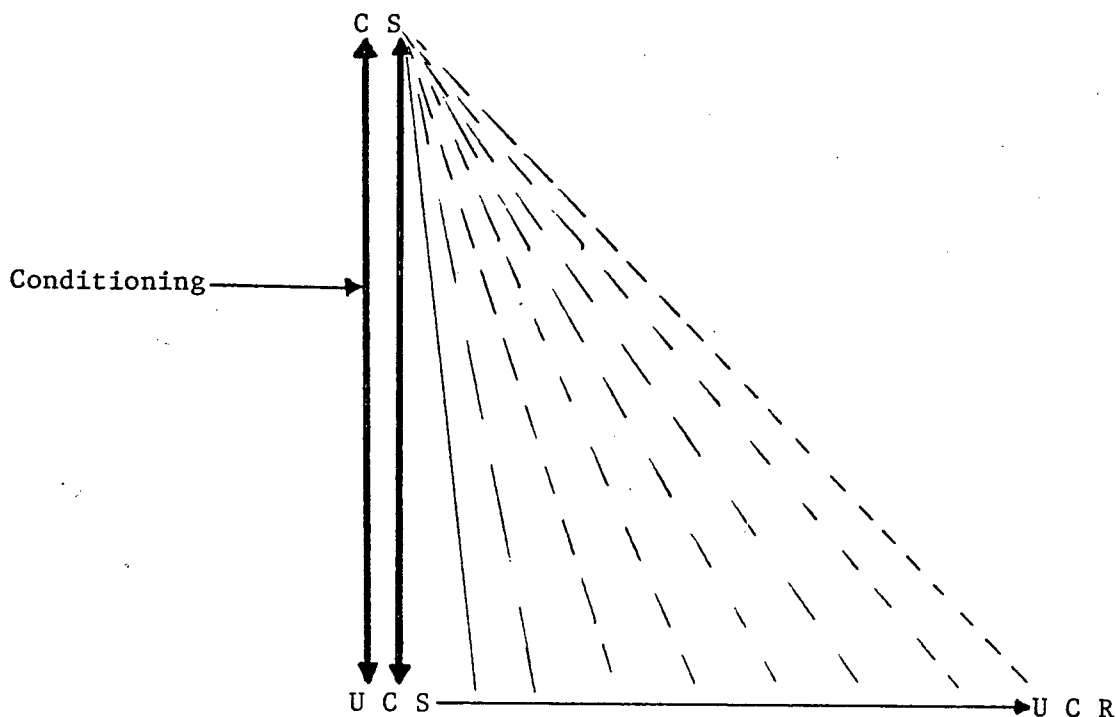


Figure 2.2: Classical conditioning process leading to attitude formation.

2.2.2 Changing Attitudes

2.2.2.1 Positive Attitudes

Outdoor education programs are organized to change attitudes, and the approach used is similar to the formats suggested by Fishbein. For example, according to the format used in the New Jersey State School of Conservation (Russell, 1970), a positive attitude toward, say, keeping our lakes free from oil and fumes from motorboats, would be acquired (or developed) in a residential outdoor education program as follows. Subjects are first exposed to lakes, where they learn about the use of lakes - e.g. providing food (fish), recreation, exercise, etc., the idea being that humans derive many benefits from lakes. Subjects are then exposed to the composition and ecology of lakes, to develop some association between the aspects of lakes and how these help to maintain the lake in providing better uses for humans. That is, by association, the nature, components, and ecology of lakes are established as good, and by implication, subjects are encouraged to maintain these good ecological practices.

After establishing these basic patterns, subjects are exposed to stimuli which enable them to learn how oil spills and fumes affect lakes. For example, oil spills affect respiratory processes in the lake, make lakes unsuitable for swimming, and also affect the ecology of the lake. Thus, subjects are gradually made aware that oil spills are bad, because they prevent humans from obtaining maximum use of the lake insofar as the benefits (e.g., in the amount of fish available) are concerned.

The next stage in this process is to try to identify how oil spills and fumes affect lakes (here motorboats will be stressed). By association, it becomes established that motorboats in lakes produce bad effects. This association has been presented pictorially in Figure 2.3 below.

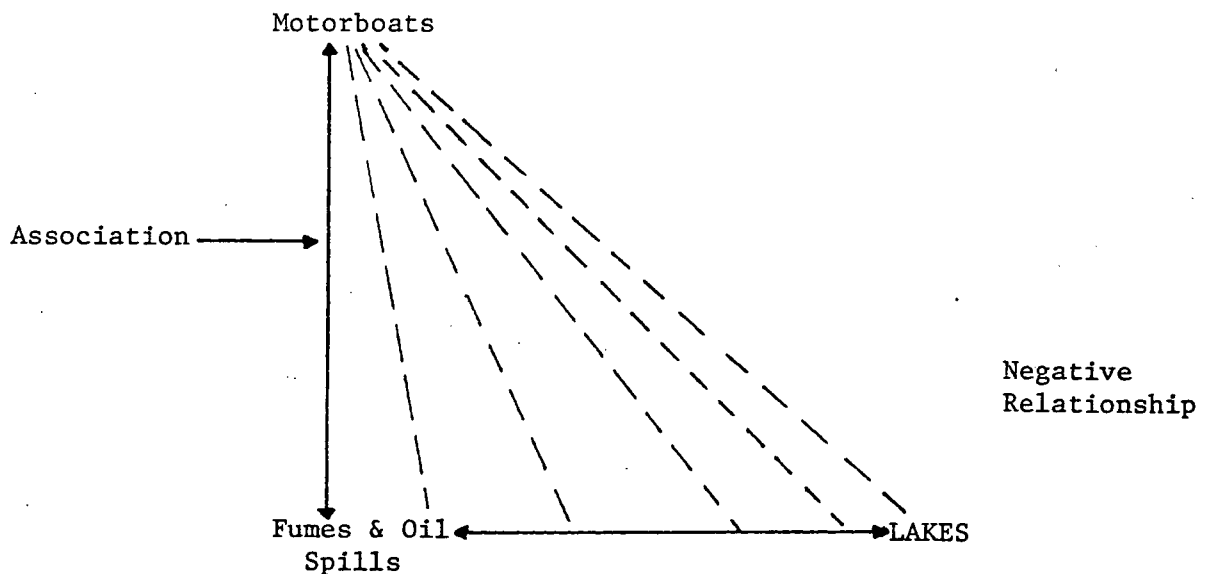


Figure 2.3: Development of association between motorboats and oil spills and fumes, leading to negative effects in lakes.

Also with the New Jersey approach, the process ends by a discussion of how these (oil spills and fumes) can be prevented. In this case it can be done by developing some ideas about controlling motorboats. This makes the subjects aware of some concerns, and they develop positive attitudes toward keeping our lakes free from oil spills and fumes from motorboats.

2.2.2.2 Negative Attitudes

The other side of the efficiency of motorboats is that they produce oil spills and fumes which pollute lakes. If these negative aspects are brought to the attention of subjects during the learning process, they develop a negative attitude towards indiscriminate use of motorboats in lakes, because motorboats produce oil spills and fumes.

2.3. Castro and Jordan's Facet Theory

Castro and Jordan's (1977) Facet Theory was used to determine the attitudinal levels. According to these authors, there are five facets of an attitude-behavior universe, namely: Referent (A), Referent Behavior (B), Actor (C), Actor's Intergroup Behavior (D), and Domain of Actor's Behavior (E). They have reported that there are two 'elements' in each facet which are ordered low (subscript 1) and high (subscript 2). For example in Facet A, the referent "other" (a₁) is weaker than the referent "self-I" (a₂). Castro and Jordan (1977) report that selection of elements, combinations, or profiles, together form what they call the "Cartesian product of the facets of the total universe under consideration". These new sets, profiles, or combinations which may be called attributes, subuniverses or subscales have been divided into attitude-behavior levels by degree of strength, or interpersonal intimacy. Although the five, two-element facets permit the generation of 32 combinations or profiles, Jordan (1971) has established that only 12 of these are logically and semantically consistent, psychologically relevant, and nonredundant. Table 2.1 shows the

variables of the attitude-behavior universe.

Table 2.1 Variables in the attitude-behavior universe.

FACETS	A Referent	B Referent Behavior	C Actor	D Actor's Intergroup Behavior	E Domain of Actor's Behavior
ELEMENTS	a ₁ others	b ₁ belief	c ₁ others	d ₁ comparison	e ₁ hypothetical
	a ₂ self (I)	b ₂ experience (overt behavior)	c ₂ self (my/mine)	d ₂ interaction	e ₂ operational

These 12 profiles group into six levels of strength. They chose these six profiles to develop their attitude behavior scales, as shown in Table 2.2. Levels 1 and 2 (societal stereotype and societal norm) are characterized by cognitive (knowledge) components. Level 3 (personal moral evaluation) deals with evaluation of the affective component. Levels 4 and 5 (personal hypothetical action and personal feeling) deal with a combination of both the affective and conative components, and Level 6 (personal action) deals with the conative aspect. On the relationship between attitudes and behavior, Castro and Jordan (1977) have shown that there is a progression through the levels, with Level 1 (societal stereotype) being the weakest, proceeding through to Level 6 (personal action), the strongest.

The authors have provided guidelines for constructing

Table 2.2: Levels of attitude-behavior scale proposed by Castro and Jordan (1977).

Subscale Type-Level	Number of Strong Elements	Profile by Notational System in Table 2.1	Attitude Level Descriptive Term
1	0	$a_1 b_1 c_1 d_1 e_1$	Societal stereotype
2	1	$a_1 b_1 c_1 d_2 e_1$	Societal norm
3	2	$a_2 b_1 c_1 d_2 e_1$	Personal moral evaluation
4	3	$a_2 b_1 c_2 d_2 e_1$	Personal hypothetical action
5	4	$a_2 b_2 c_2 d_2 e_1$	Personal feeling
6	5	$a_2 b_2 c_2 d_2 e_2$	Personal action

questionnaire items for each level. The levels of attitude proposed by Castro and Jordan were adopted and used as a guide for constructing the questionnaire items. However, only three of the levels, those considered to be the prime concern of the outdoor program, were used.

2.4 Ways of Enhancing Conservation Attitudes

In order to meet the conservation objectives of outdoor education programs, schools arrange to take students out on field trips where they learn about the natural environment.

Curriculum materials have also been developed for different environmental topics, and usually there are experienced resident outdoor teachers at the camp to help in the instruction. In addition, facilities like a library, teaching aids, and other outdoor equipment are often also available.

No study has been found which examines the way in which the various aspects of a residential outdoor education program as a whole contribute towards the enhancement of conservation attitudes (Hart and McClaren, 1978). Some outdoor education books and journal articles suggest ways of teaching outdoor education programs and a few correlational studies have also examined the relationship of some of the outdoor education practices with changes in attitude. In addition, there are studies in social psychology which show that certain variables influence attitude development.

Horsley (1977) and also Richmond and Morgan (1977) have found that field trips which last for more than a day are more successful in achieving the objectives of outdoor programs than short excursions. This belief in the efficacy of overnight trips has become universally accepted, and has resulted in the many residential outdoor programs that currently exist.

In order to meet the objectives of outdoor education programs in general, adequate preparation and preplanning have been suggested in many textbooks (Freeberg and Taylor 1961; Hammerman and Hammerman 1968; and Munzer and Brandwein, 1960). The importance of adequate preparation has been reported in many outdoor education program manuals (e.g., Robertson and Shields, 1980a), and it appears to Gross and Railton (1972) that adequate

preparation is characteristic of all outdoor programs. From experience, Freeberg (1961) has suggested that prior to an outdoor education program the objectives of the program should be clearly defined and accompanied by adequate library research, to enable the program to be successful. The importance of adequate preparation prior to an outdoor education program has also been suggested by Cordier (1966) and by Stapp (1964).

Although the teaching methods suggested in outdoor education books (e.g., Hammerman and Hammerman, 1970) are not different from the teaching methods used in normal school situations, experienced outdoor educators have suggested that emphasis should be placed on direct observation and that the use of an ecological approach is more effective (Falk, 1975; Mitchell and Lunneborg, 1973; and Falk and McCormack, 1974). Mitchell and Lunneborg (1973) have also suggested that, if during the teaching, students are encouraged to value ecologically sound practices, their attitudes are enhanced. Blackwood (1966) found that the use of the discovery teaching approach promoted attitude development. Regan and Fazio (1977), and Songer-Nocks (1976) have also suggested that direct experience affected the development of attitudes.

In their book, Freeberg and Taylor (1961) held that an outdoor teacher who had the technique to challenge, to motivate, and to impart knowledge to students was more likely to influence the attitudes of his/her students. On the background of the teacher, Jaus (1978) found in a study that teachers with training in outdoor education seemed to show a more positive attitude and personal commitment towards teaching outdoor

education topics than teachers who did not receive training. It appeared to Jaus that teachers with training were more likely to enhance the attitudes of students on these programs. Yaakobi (1981) suggested that the background knowledge and attitudes of the teacher had an influence on the attitudes which students acquired in outdoor programs.

Pettus et al., (1978) also found out in a correlational study that teachers with science background were better able to enhance the attitudes of their students than teachers who had no science background. However, an earlier study by Crump et al., (1977), found no significant difference between the conservation attitudes of science and non-science teachers.

Studies by Falk, Martin and Balling (1978) and by Martin, Falk and Balling (1981) have also shown that unfamiliarity with the outdoor setting inhibited learning of concepts for which the trip was intended. Similar views have been expressed in other journal articles (e.g., Lucas, 1980; Spotlight on the Northwest, 1978). A study by Askham (1975) found that peoples' perception of wildlife was dependent on their history, but that as their exposure to wildlife increased their attitudes became modified accordingly.

Landes and Hetherington (1979) have also implied that the use of small groups of students in outdoor activities enhanced the development of attitudes. Recent studies in education by Glass and Smith (1979) show that class size affects achievement, but this is a controversial issue in education.

According to Fishbein and Ajzen (1975), if learning is associated with pleasant feelings, an attitude is developed or

modified with respect to what is learned. Other studies in outdoor education (Alaimo and Doran, 1978) and in social psychology (Cialdini, Petty and Cacioppo, 1981) have argued that, if an individual finds that what he/she is learning is interesting and/or valuable, he/she develops a positive attitude towards the content of what is being learned.

Social psychologists have found that mere exposure (Harrison, 1977) and the use of discussion were effective for influencing attitudes (Cook and Flay, 1978; Cialdini, Petty and Cacioppo, 1981; Crano, 1977; Ronis et al., 1977; and Webb, 1979).

Edgar (1971) and Hershey et al., (1971) have suggested that attitudes can be developed by practicing conservation methods, while Bandura (1971) and Gorman (1974) argue that people copy and practice the attitudes and behaviors of those who are seen as models. Similar views have been expressed in outdoor education by Gage (1976). Other psychologists have reported that the effect of models is greater if the subjects are seeking recognition from the adults (Jacob, 1957; Lehmann, 1963). In outdoor education, Howenstine (1962) has attributed the inability of some outdoor education programs to achieve their objectives to staff members who do not practice good conservation methods themselves.

Bandura (1971), a social psychologist, suggests that a repetition or a review of what has been learned in other forms, helps to reinforce old attitudes. The need for follow-up activities after an outdoor education program has also been mentioned in textbooks and outdoor education manuals.

Thus the available literature shows that there are many potential variables which can influence the development of favorable attitudes in a residential outdoor education program. For example, the adequacy of the preparations which are done prior to an outdoor program, the manner of presenting the field study lessons, the behavior and attitudes of the teachers, the size of the field study groups, the value of what is taught, the opportunities which students get to practice good conservation methods and what occurs after the camp program, all can influence the attitudes of students. Although there are a few correlational studies which look at attitude development and isolated variables, there are no studies which look at the variables in a program as a whole.

CHAPTER III

METHODOLOGY OF THE STUDY

3.0 Introduction

For the convenience of the reader, the specific problems to which this study addresses itself are restated below:

- (1) What effect does participation in a residential outdoor education program have on the attitude of students toward conservation of natural resources?
- (2) What aspects of an outdoor education program contribute to or appear to contribute to enhancement of students' attitudes towards conservation of natural resources?

To address the above problems, this study proceeded in two parts. Part 1 was an attitude assessment study and Part 2 was a case study. The attitude assessment study determined if the outdoor education program was effective in enhancing the conservation-related attitudes of students, while the case study investigated the factors in the program which were related to the development of conservation attitudes.

Before the methodology of these two studies is described, the population and the treatment are described.

3.1 Population

The target population of this study included grade six students in the North Vancouver School District. In this school district a well-coordinated year-long plan is made for all grade

six classes to participate in the district's residential outdoor education program. Two or three intact classes go to the district's outdoor camp at a time, and they stay there for a week (Monday to Friday).

The accessible population available for the purposes of the study was made up of all grade six students in those classes which were willing to participate in the program and the study.

3.2 Sample

3.2.1 Subjects

The subjects in the experimental group were members of three intact classes of grade six students from the population; that is, three intact classes which were taking part in the residential outdoor program at the same time. The subjects in the control group were members of four intact grade six classes which had not participated in the residential outdoor education program before and during the period of the study. The actual selection of both the control and experimental groups of students was limited by the difficulty of simultaneously obtaining the consent of the school board, school principals, camp director, participating teachers, and the parents of students who were scheduled for the outdoor program in the spring of 1981.

One set of three grade six classes, scheduled to take part in the outdoor education program agreed to participate in the study. They formed the experimental group, comprised of 70 students--43 boys and 27 girls. The second set of students,

consisting of four grade six classes scheduled to take part in the program after the study, also expressed their willingness to participate, and formed the comparative group. There were 80 students in this group, 43 boys and 37 girls. Subjects from both the experimental and comparative groups were from public schools, as opposed to private schools in that school district.

3.2.2 Counsellors

Ten counsellors (three females and seven males) were involved in the study. Eight of them were grade 12 students, one was a university student on vacation, and one was a recent high school graduate. They were all from North Vancouver. All had volunteered to participate in the program and took part in a week-end training program, and all had had experience with similar outdoor camps and programs. Eight of the counsellors had participated as students in the North Vancouver Outdoor School program in the past. The two counsellors who had not participated in the program as students had previously served as counsellors.

3.2.3 Teachers

Six professional teachers and one recreation director were involved in the outdoor education program. Three of the teachers were males and three were females. Three of the six teachers were from the visiting school, and the others were resident teachers at the Outdoor School. All six had university degrees, and they had taught for between two and one-half and ten years. Their individual grade six teaching experience ranged from one year to six years. All of the visiting teachers had been to the Outdoor School prior to the study, and all six teachers had some

experience teaching conservation-related topics. Two of the visiting teachers were regular grade six teachers in the school. The third regular teacher was unable to take part in the camp program and another teacher who was interested in the program took her place. All teachers instructed during the field study sessions, and they also supervised the students throughout the camp program.

In addition to the six teachers there was a recreation director. She was not a teacher by profession, but her role in the program was of a teacher. She had a university degree in physical education and had been the recreation director for one year. She supervised all the recreation activities, and ordered, previewed and selected all of the films shown at the Outdoor School. She supervised the screening of two of the films. She was a resident Outdoor School staff member, responsible for supervising and coordinating the work of the counsellors throughout the camp program. She organized and supervised most of the activities which were held after field studies, each day. For example, she supervised the camp fire, the square dancing, and the team charades.

3.3 Treatment

The treatment used in this study was attendance at a residential outdoor education program. In general, programs of this type are highly complex, and differ in many aspects, including site, facilities, staff, time-tabling, prevailing environmental problems within the community, interests of students and teachers, and so on. In addition, numerous

unanticipated and unpredictable events do occur during the week at camp, which modify the planned program. For example, weather conditions may prohibit conducting an anticipated activity. As such, it is impossible to determine precisely in advance the exact details of a treatment used in a study such as this.

3.3.1 General Outdoor Education Treatment

In the North Vancouver School District, the Outdoor School program is generally made up of a preparation period, a week at the Outdoor School, and usually a one week follow-up after the camp program.

The preparation period starts approximately ten days before the trip. During this period students are told the sort of things which they may want to take to the camp, such as suitable types of clothing. They also learn some conservation rules like: keeping on trail while hiking to avoid stepping on plants, returning all living specimens back to their natural environment, and/or keeping the environment as natural as possible. They are also prepared to expect good energy conservation practices at the Outdoor School. There is also a slide presentation on the camp, which is aimed at giving the students an impression of how the camp is set up, where they will be living, and some of the conservation concerns at the camp. In most cases the schools arrange to show some conservation films; also schools encourage students to read books about some of the activities which they will be doing during the camp program.

When students arrive at the camp, they are reminded of the

concerns about the environment, pollution, and conservation. This reinforces what they learned in class. Throughout their stay at the camp, teachers and counsellors supervise the students to make sure that they practice good conservation methods. Eight field study sessions of approximately two hours each are set aside, during which students receive instruction and carry out field study activities. They work in groups with students from other classes. These field study groups are always smaller than the regular class sizes. Furthermore, within each field study group, students often work in yet smaller groups on activities or projects. Teachers are aided by the counsellors in supervising the students. Most of these field study sessions deal with conservation topics. Soon after lunch, on Tuesday, Wednesday, and Thursday, students meet in the auditorium, where they relax while watching a film. Most of the films are about conservation, and are selected to parallel the specific activities planned for the field study sessions.

When the students return to their regular classrooms after the camp, follow-up activities are arranged. This is also a very important stage of the program. Many ideas are available to the teachers and students. For example, a class, as a unit, may plan a parents' night or school assembly to share the experiences of the Outdoor School, write letters to various Outdoor School staff members, write articles for the school newspaper, plan ways in which the school grounds might be made to look more attractive, study municipal and provincial pollution control legislation, make a detailed study of air and water pollution, write to various resource agencies for pamphlets on

conservation, or invite resource agency personnel into the classroom for presentations. Usually the first thing which is done when students return to the regular classroom is to discuss what they did at camp in their groups, and to share their ideas and findings with the rest of their classmates. Teachers also discuss anything which the students had difficulty with, while at the camp.

The description given above is the general picture of the treatment. A description of the actual treatment is presented in Appendix A.

3.4 Attitude Assessment Study

The specific question which was addressed in the attitude assessment study was: what effect does participating in a residential outdoor education program have on students' attitudes toward conservation of natural resources? This study was concerned with three conservation topics, namely energy, plants, and wildlife; and three of the attitude levels proposed by Castro and Jordan (1977), namely societal norms, personal feelings, and personal action. These conservation topics and levels of attitude were selected because they were of prime concern in the North Vancouver Outdoor School program and they seemed to be most central to outdoor education programs in general.

The effect of the program was determined by comparing pretest and posttest scores on nine attitudinal dependent variables. These variables have been presented as items in the cells of Table 3.1. This seemed to be a reasonable procedure,

because in a complex program any impact is likely to be on a number of variables at the same time. This simultaneous multivariate outcome was found to be the case in the pilot study. The program was organized in such a way that during the week, students were exposed to different aspects of conservation, and were encouraged to develop different levels of attitudes towards these aspects.

Table 3.1

Table of Specifications for the Items Used in
Obtaining Scores on the Nine Dependent Variables

Attitude Levels* (A)	Aspects of Conservation			Marginal Totals
	Energy (B1)	Plants (B2)	Wildlife (B3)	
Societal Norms (A1)	10 items Y(A1B1)	10 items Y(A1B2)	10 items Y(A1B3)	30 items Y(A1.)
Personal Feeling (A2)	10 items Y(A2B1)	10 items Y(A2B2)	10 items Y(A2B3)	30 items Y(A2.)
Personal Action (A3)	10 items Y(A3B1)	10 items Y(A3B2)	10 items Y(A3B3)	30 items Y(A3.)
Marginal Totals	30 items Y(.B1)	30 items Y(.B2)	30 items Y(.B3)	90 items Y(..)

* Description of terms, (Castro and Jordan, 1977)

3.4.1 Research Hypotheses

The specific problem which the attitude assessment investigated lends itself to two research hypotheses.

1. Given no pretest differences, there will be statistically significant differences between the

experimental and control groups' posttest scores on the nine dependent variables, taken simultaneously.

The justification for this hypothesis stemmed from the objectives of the North Vancouver outdoor education program. From the stated objectives in the teachers' handbook (Robertson and Shields, 1980a), and what the teachers said their objectives were, attitude enhancement was an expected outcome of students who take part in that program.

Also from the description of what usually goes on during the program, which has been described in the treatment section in this chapter, it was reasonable to postulate that students might acquire a more positive attitude, after the program.

2. It is postulated that the experimental and comparative group centroids will differ significantly on the discriminant function which will include the nine dependent variables.

It was difficult to predetermine which, if any, of the nine dependent variables would be significant in discriminating between the two groups, since the program was aimed at producing a change on the nine variables simultaneously.

3.4.2 Statistical Hypotheses (Null)

- (1) Given no pretest differences, the experimental and comparative population group dispersions of the posttest scores on the nine dependent variables, taken simultaneously, are equal.

$$H_0: \underbrace{\Delta}_e = \underbrace{\Delta}_c$$

- (2) Given no pretest differences, the population centroids (population mean vectors) of the experimental and control groups on the posttest scores will not differ significantly.

$$H_{02}: \mu_e = \mu_c$$

If significant differences between population centroids were found to exist, it was planned to determine a discriminant function in order to differentiate between the two groups in terms of the dependent variables.

Since there were only two groups in the study, there could be only one discriminant function for discriminating group differences.

3.4.3 Design of the Study

Since randomization of subjects and treatments was impossible, Campbell and Stanley's (1963) Design 10, the non-equivalent control group design was employed. There were three grade six classes in the experimental group (N=70) and four grade six classes in the control (comparative) group (N=80). All the students in both the experimental and comparative groups were tested two weeks before the trip. The pretest was to measure existing pre-conditions prior to the treatment; therefore it was administered two weeks prior to the trip, so that it would not be affected by the preparation part of the program.

The design can be diagrammed as follows:

Oe	X1	Oe
Oc	X2	Oc

where X1 represents the experimental treatment (the outdoor education program) and X2 is the treatment received by the comparative group (the regular class program).

After the pretest, the experimental group started with the usual preparations and took part in the residential outdoor education program, while the comparative group proceeded with the regular school program in normal fashion.

All students in both the experimental and comparative groups were then posttested, again with the attitude questionnaire, one week after the program. It was later decided to administer the questionnaire again to both groups, 10 days after the posttest. In the experimental group this was to find out if the attitude change found after the program would persist after 10 days, while in the comparative group it was to find out if similar effects would be observed, since the comparative group also took part in the program after the first posttest.

3.4.4 Instrument

The effects of the program were determined through the use of a questionnaire. After analysis of over 30 attitude instruments which have been used in outdoor education programs, one of these (by Hounshell and Liggett, 1973) was found to be suitable in terms of coverage of conservation topics, and suitable in terms of readability and level of scientific concepts for grade six students. It was therefore used in a

pilot study with 65 grade six students.

A post hoc analysis of the items using the levels of attitude proposed by Castro and Jordan (1977) revealed that it did not cover all the levels of attitude which were of interest in the study. Teachers complained that the number of items was too great. Because of these findings a new questionnaire totally independent from the one used by Hounshell and Liggett was developed a priori to cover all the nine dependent variables of interest.

There were ten questionnaire items for each of the nine dependent variables specified in Table 3.1, thus providing a total of 90 items on the whole questionnaire. This approach was more suitable for the purpose of the study because it focused on only the nine dependent variables which were being studied. This approach has been suggested in the literature by Alaimo and Doran (1978) to be appropriate for assessing attitudes. Also, by using 90 items, instead of 120 items (as were used in the pilot study), it was expected that students would require less time to complete the whole questionnaire.

A Likert-type response scale was used for all the questionnaire items. The questionnaire has been presented as Appendix B.

3.4.4.1 Development of the Questionnaire

The questionnaire was piloted in two classes (class A and class B). Table 3.2 represents the results of the internal consistency of the questionnaire on the dependent variables. The results showed that the reliability coefficient for some of the dependent variables was low. Subsequently the writer interviewed

the teachers and students. From the interview it was found that the students were not used to the type of questionnaire being used. Therefore it was decided to have a trial questionnaire (Appendix C) before the main questionnaire.

Table 3.2

Reliability Coefficients of the Subtests
for the Classes Used in the Pilot Study

Subtests (dependent Variable) -	Class A	Class B
Societal Norm - Energy	.46	.57
Societal Norm - Plants	.47	.80
Societal Norm - Wildlife	.81	.74
Personal Feeling - Energy	.61	.72
Personal Feeling - Plants	.78	.72
Personal Feeling - Wildlife	.70	.76
Personal Action - Energy	.70	.70
Personal Action - Plants	.81	.85
Personal Action - Wildlife	.75	.76
Hoyt's Coefficient *	.92	.94
Cronbach's Alpha **	.88	.88

* An internal consistency measure of the total test.

** A coefficient indicating the correlation between the subtests and the total.

According to Fishbein (1967, p. 257), "attitudes are conceptualized as learned predispositions to respond to an object or class of objects in a consistently favorable or unfavorable way." This implies that for the questionnaire to be considered reliable for determining attitudes towards the nine variables, the questionnaire responses on each subtest were expected to be consistent. That is, the same type of responses should be obtained over repeated testings, if an individual has

the same attitude. This type of reliability was determined by administering first the trial questionnaire (Appendix C), followed with the main questionnaire on two occasions to a separate group of 26 grade six students from the target population. One week was allowed between the two administrations of the test. The questionnaire responses were subsequently analysed using the U.B.C. LERTAP computer program (Nelson, 1974). The correlation coefficient between the pretest and posttest scores on the nine dependent variables was calculated using the U.B.C. SPSS computer program: pair-wise comparison (Kita, 1980).

The results have been presented in Table 3.3. The correlation coefficients were high, ranging from .84 to .89. These results showed that the questionnaire which was employed in this study was reasonably reliable for measuring the stability of the conservation attitudes.

Another consideration for reliability was that, if the instrument was to be a measure of a construct (e.g., attitude towards conservation of energy), the responses on each of the items on the subtest should be internally consistent. In this study the internal consistency on each of the subtests was determined using Hoyt's method of estimating reliability. Cronbach's alpha (Cronbach, 1951) was also calculated, to find the extent to which each of the subtests measured conservation attitudes.

Table 3.3

Test-retest Reliability Coefficients For
Dependent Variables In The Questionnaire

Dependent Variable	Correlation Coefficient*
Societal Norm-Energy	.89
Societal Norm-Plants	.88
Societal Norm-Wildlife	.86
Personal Feeling-Energy	.88
Personal Feeling-Plants	.88
Personal Feeling-Wildlife	.88
Personal Action-Energy	.84
Personal Action-Plants	.88
Personal Action-Wildlife	.86
Overall	.87

* n = 26

3.4.4.2 Validity

3.4.4.2.1 Content Validity

The questionnaire was developed to cover the relevant aspects of the course content of the North Vancouver outdoor education program. However, the final questionnaire was sent to the teaching staff of the North Vancouver Outdoor School and their approval was used as the criterion for establishing that the instrument covered aspects of conservation and levels of attitude which were dealt with at the camp.

3.4.4.2.2 Face Validity

The questionnaire was also given to three experienced outdoor educators for them to act as judges in determining if the questionnaire appears to measure attitude toward conservation of energy, plants and wildlife.

3.4.4.2.3 Readability

Five of the teachers who took part in the study and six

other teachers found the readability level to be appropriate for grade six students. In addition, Fry's readability test (Fry, 1968) was conducted on the questionnaire and the questionnaire was found to be appropriate for grade six students.

3.4.4.3 Administration of the Instrument

The same method was followed for administering the questionnaire in all of the classes. The questionnaire was administered by the regular class teacher, with the writer being present as a non-participant observer. The instructions to the teachers for the administration of the questionnaire have been provided as Appendix D.

There was an introduction and also a short trial questionnaire (Appendix C) to acquaint the students with the format of the questionnaire, before they responded to the main questionnaire. At the end of the administration students were reminded to check their responses before giving the questionnaire to their teacher. When all questionnaires had been returned, the teacher proceeded to teach the normal lesson, without any discussion of the questionnaire items.

3.4.5 Method of Analysis

3.4.5.1 Scoring of Item Responses

Each item response on the questionnaire was scored on a 5-point basis, according to Likert's procedure (West and Foster, 1976; and Edwards, 1957).

Although students were encouraged to respond to all items, it was anticipated that some students might omit one or more items. An extra category was created, so that students could

indicate if they did not know, or could not decide how to respond to any item. Any item which was not responded to was interpreted to mean that the subject was neutral to the item, and was therefore given a score of 3 (i.e., a neutral response). Items which received a "don't know" response, were also scored 3.

3.4.5.2 Analysis of Questionnaire Responses

The responses on the pretest and posttest were analyzed by item, subtest, and total test scores, using the U.B.C. LERTAP computer program. The total score on each of the nine dependent variables was used to test the statistical hypotheses.

3.4.5.2.1 Analysis of Pretest Scores

Initially a between-group analysis was carried out on the pretest scores on the nine dependent variables, taken simultaneously, to test for equivalence of the two groups. Multivariate analysis of variance (which in this case was equivalent to Hotelling T^2) was employed. Even though Cooley and Lohnes (1962) have reported that the test for group centroids is robust under moderate departures from homogeneity of dispersions, they have also suggested that the value of the test for homogeneity of dispersions lies in its capacity to lead to an important research finding in its own right, particularly if it happens to lead to a rejection of the null hypothesis. Thus two tests were carried out on the pretest scores on the nine dependent variables: the test of homogeneity of dispersions which Cooley and Lohnes call the test for H_1 , and the test for equality of population centroids, which the same authors refer to as the test for H_2 .

The statistical hypotheses which were tested are:

- (1) The group dispersions on the nine dependent variables, taken simultaneously, are equal.

$$H_{01}: \triangle_e = \triangle_c$$

$$H_{11}: \triangle_e \neq \triangle_c$$

H_{02} was to be tested regardless of the results of H_{01} , because the test for H_2 is insensitive to moderate departures from homogeneity of dispersions.

H_{01} would be tenable under normal conditions, but H_{01} would be rejected if one group responds to the dependent variables in a uniform fashion, and if the other group members share alternate points of view. Since the pretest preceded the visits to the schools for the case study, it made it convenient to find out why the groups differed, using the conditions for rejecting H_{01} which have been stated above. The pretest analysis was carried out immediately after its administration, so that if H_{01} had been rejected teachers and some students could have been interviewed soon after, to find out why there were group differences.

- (2) The population centroids of the experimental and control groups on the pretest scores do not differ significantly.

$$H_{02}: \mu_e = \mu_c$$

$$H_{12}: \mu_e \neq \mu_c$$

Since Ho2 was tenable, the analysis of the pretest scores ended.

3.4.5.2.2 Analyses of Posttest Scores

Because the pretest analyses led to acceptance of Ho2, it was assumed that the performance of the two groups on all nine dependent variables, taken simultaneously, was comparable despite the non-randomization of subjects in the design. Therefore, the posttest analyses followed exactly the same procedure outlined for the pretest (i.e., the same hypotheses were tested). However, since Ho2 was not tenable in the posttest, discriminant analysis was performed on the posttest scores to find the relative importance of each of the variables in discriminating between the two groups.

3.5 Case Study

The specific question addressed in Part 2 (case study) was: what aspects of an outdoor education program contribute or appear to contribute to enhancement of attitudes towards conservation of natural resources?

This part of the study was piloted with 65 grade six students during the pilot study of the attitude assessment instrument developed by Hounshell and Liggett (1973). The pilot study led to a realization of the need to audio-tape the interviews. It also helped the writer prepare for administration of the main study.

3.5.1 General Approach to the Case Study

In order to relate the attitudinal changes to what occurred during the program, a case study method was employed. The writer

assumed the role of a non-participant and unobtrusive observer, and observed and recorded all relevant information relating to the development of attitudes in the program. Counsellors and students were interviewed at different times before, during, and after the program, while teachers were interviewed on the last day of the camp program. Parents were served with a questionnaire (Appendix E) through their children, to find out if any effects had been observed by them.

Because of the experiences gained from the pilot study, it was decided to use a tape recorder for all the interviews. A checklist was developed to guide the writer in observing each activity session, and leading questions were formulated for use in the interviews. All these instruments have been presented in the appendices.

Before the program, the writer visited the schools which took part in the study to meet with teachers and students. The writer visited the classes on a regular basis as a non-participant observer, to observe the way students were prepared for the Outdoor School camp program. The writer also attended the meetings which were related to residential outdoor education program.

3.5.2 Behavior of the Researcher

It is known that the way a researcher is introduced and acts in a class affects the behavior of students (Smith and Geoffrey, 1968). In this study teachers were requested to introduce the writer to their students as a teacher who had come to the school to study how outdoor education programs are organized.

The basic strategy which was used was to always be interested in what went on in the teaching-learning process. The writer sat quietly during visits and wrote down the way students were being prepared for the program, for example, the way the conservation rules were presented to students, the way students reacted to these rules, and any other types of preparation (e.g., type of assignments) which were related to the conservation topics which had been planned for the outdoor camp program. The writer was open to the teachers and pupils, but remained outside any discussion and interplay.

It was also arranged that after the instructional period students could visit and talk to the writer, if they so desired. It was found in the pilot study that this pupil-writer interaction helped the writer to know more about what the students were thinking about. It was also found that this method appeared to make the students accommodate the presence of the researcher.

As was envisaged, pupils sometimes came to the writer to ask for some help on a lesson (as happened in the pilot study). In handling such student requests, the writer restated and/or clarified the problem, and pointed out the possibilities, while leaving the decision to the pupil to select his/her own course of action.

During the last few days prior to the trip, the writer spent more time in the school and interviewed some of the students. This interview centered around their expectations of the Outdoor School.

3.5.3 Relationship with Other Teachers in the School

One factor which could have affected the data in this study was the relationship between the writer and the other teachers in the participating schools. Although this study was cleared with the school authorities and the grade six teachers, it was felt that it would not guarantee that the other teachers in the schools would know about it. It is also known that teachers want to know about studies going on in their schools, particularly when new people are conducting the study.

The writer introduced himself to the rest of the school staff as a graduate student from U.B.C. who was studying how children acquire conservation attitudes through outdoor education programs. During recess and at lunch time the writer took part in the social life in the hallway and staff room with other teachers; however, more time was spent with grade six students and their teachers.

3.5.4 Data Gathering Procedures

3.5.4.1 Data Gathered Before the Trip to the Outdoor School

Apart from observing the way students were prepared for the trip and the periodic interviews which were conducted during recess, the writer interviewed some students and the counsellors before they went to the Outdoor School. The student interviews centered around how they had been prepared for the outdoor camp program, and what the students were expected to learn there. The basic questions for the interview have been presented as Appendix F. The interview with counsellors was aimed at finding out what their expectations were and about the development of

conservation attitudes. The basic questions for this interview have been presented as Appendix G.

3.5.4.2 Data Gathered During the Camp Program

The writer stayed with the students throughout the week at the Outdoor School, and kept a diary of all daily events for the whole period of the study. One problem which was encountered was that students worked in groups, that each activity group worked on a different field study topic at any one time, and that there were many field study sessions taking place at the same time. The groups rotated, so that by the end of the week all groups had the opportunity to work through all of the field study topics.

Since it was not possible to observe all field study sessions at the same time, only one field study topic was studied during each field study period. One study group was selected randomly before the first session and it was only that group which was observed during field study periods throughout the week. Teachers were, however, asked how the instruction with the other groups went, and/or differed from the ones observed. McGrath and Altman (1966) point out that this method is the best observational scheme, if events, rates or relative frequencies of behavior are of primary importance in a study.

An observation instrument (Appendix H) was used to direct the observation. Things of interest included the subject matter content dealt with, the method of presentation, the type of things students did, the extent of student involvement, the evidence of student enthusiasm, and the way all these are related to the conservation topics of interest. Also, during an

activity session, students who were more likely to be helpful for interviewing were identified, and they were contacted after the activity session. Because students used name tags while at the camp, it was easy to identify the students by their names.

The student interview questions (Appendix I) concentrated on what they learned about conservation of energy, plants, and wildlife, what they liked and/or did not like, and how the activity enhanced or inhibited the development of positive attitudes towards conserving these resources.

Counsellors were also interviewed to find out what their views were, and about the way the activity was likely to enhance or inhibit the attitudes of the students. A copy of the questions for the interview has been presented as Appendix J. The same approach which was being used for the field study sessions was also used for the afternoon films.

During the recreation session, the writer visited some of the sessions each day, and arranged the visits in such a way that all the different sessions were observed by the end of the week. Because none of the recreation sessions was related to the conservation topics (unlike the case in the pilot study), there were no interviews on them.

3.5.4.3 Data Gathered After the Camp Program

At the end of the week, all the counsellors were interviewed individually, to find out how, in their view, the program might have enhanced or have inhibited the development of the appropriate attitudes. The questions asked have been presented as Appendix K.

All the resident teachers were also interviewed

individually. The interview questions centered around two areas--the field studies which they conducted individually, and their views about the whole program. The questions used for the interview on the field studies are presented in Appendix L. The same questions which were used with the counsellors after the program (Appendix K) were used to obtain the views of the resident teachers too.

The visiting teachers were also interviewed, using the same interview questions which were put to the resident teachers. In addition, some questions were asked to elicit general background information on their experience in conservation-related issues, and some information about how they prepared the students in school prior to the trip (Appendix M). The writer also observed the follow-up activities and discussed, with the class teacher, relevant aspects of those activities (i.e., those which had a bearing on conservation attitudes) which went on in the classroom after the outdoor camp program.

After the posttest scores had been gathered and analysed, 12 students who had made the greatest shifts (increase and/or decrease in attitude scores) were identified and were interviewed about their item responses, to find out why they had changed their minds, and whether there was anything in the program or outside the program which could have contributed towards the shifts. Other students were interviewed as well, using the questions in Appendix N.

A questionnaire was sent to all parents after the trip (Appendix E). The purpose of the questionnaire was to find out if parents had observed any evidence of conservation practices

in students after the program. One week was allowed following the program before the questionnaires were sent out.

3.5.5 Analysis of the Case Study Data

After the program, all the written data which had been collected, and all the transcribed interview data were analysed. The data for each phase of the study were analysed separately. The views of teachers, students, counsellors, and the writer were compared to determine which aspects of the program each of the different groups of people perceived as having enhanced students' conservation attitudes.

For the preparation period there was a description of the way the students were prepared for the Outdoor School. The expectations of teachers, students and counsellors in so far as development of conservation attitudes is concerned were considered.

Like the other analyses carried out, there was a "triangulation" of data. Triangulation is a method which involves presenting different views of what is being observed (Sevigny, 1978). In this case four views were presented: the views of the writer, teachers, students and the counsellors. This method offered a stronger foundation for cross-validation of information. A triangulated approach, according to Glasser and Strauss (1967), allows one to get to other plausible interpretations from differing participant perspectives.

Each field study session which took place during the program was analysed to find out which factors were considered to be contributing towards the development of favorable attitudes towards conservation of plants, wildlife, and energy.

The views of these factors as seen by the teachers, counsellors, students, and the writer were reviewed. There was also a triangulation analysis of the data on the program as a whole, to show the factors which were considered to influence the development of favorable attitudes, as seen by the teachers, students, counsellors, and the writer.

The follow-up activities which occurred in the classroom and the parents' comments were also analysed, but these were not triangulated; they were used to shed some light on findings which came out of the attitude study.

CHAPTER IV

RESULTS OF THE STUDY

4.0. Introduction

For the convenience of the reader the specific problems to which this study addressed itself have been restated below:

- 1) What effect does participation in a residential outdoor education program have on the attitude of students toward conservation of natural resources?
- 2) What aspects of an outdoor education program contribute to or appear to contribute to enhancement of students' attitudes towards conservation of natural resources?

The rest of this chapter will begin with a brief statement of the statistical hypotheses which were tested and the reliability results of the attitude assessment instrument, then will proceed to the results of the statistical analyses and the case study. The chapter will conclude with a summary of the main findings of this study.

4.1 Specific Problem #1

4.1.1 Statistical Hypotheses Tested

The statistical hypotheses corresponding to the first specific problem tested in this study are stated below.

Ho1: Under the condition of no pretest differences, the experimental and comparative population group dispersions of the posttest scores on the nine dependent variables, taken simultaneously, will be equal. Mathematically, $\text{Ho1: } \Delta_e = \Delta_c$

Ho2: Under the condition of no pretest differences between group centroids, the population centroids (population mean vectors) of the experimental and comparative groups on the posttest scores will not differ significantly. Mathematically, $\text{Ho2: } \mu_e = \mu_c$

4.1.2 Reliability of the Pretest and Posttest Measures

In order to test the above hypotheses, it was necessary to administer the nine scales or subtests of the attitude questionnaire before (referred to here as the pretest) and after (referred to here as the posttest) the treatment. The responses of the subjects were analysed using the UBC LERTAP computer program. The total test and subtest reliability coefficients

(Table 4.1) show that for both the experimental and comparative groups the tests were internally consistent to a reasonable extent.

The reliability coefficients ranged between .68 and .87 for the nine scales, and reached a value of .95 for the whole test. The correlation between the subtest scores and the total test scores (Cronbach's alpha) ranged between .87 and .93. These results indicate that the questionnaire which was employed in this study was reasonably reliable for the analyses intended.

4.1.3 Statistical Analyses

4.1.3.1 Population Dispersions and Centroids of Scores on the Nine Dependent Variables

4.1.3.1.1 Pre-treatment

In order to determine whether or not there was a treatment effect, it was necessary to find out if the two (experimental and comparative) groups were similar before the treatment. If they were similar, differences in posttest scores could be interpreted with greater clarity. However, if they were different it would be necessary to take the initial differences into account in the posttest analysis, by using multivariate analysis of covariance.

The pretest analysis involved computation of group dispersions and group centroids. Two analyses were carried out on the pretest, (1) a test of equality of group dispersions, which Cooley and Lohnes (1962) call H_1 , and, (2) the test of

Table 4.1

Pretest and Posttest Reliability Coefficients for the
Experimental and Comparative Groups

TEST/SUBTESTS (dependent variables)	EXPERIMENTAL GROUP		COMPARATIVE GROUP	
	PRE TEST	POST TEST	PRE TEST	POST TEST
Societal Norm-Energy	.68	.69	.68	.86
Societal Norm-Plants	.81	.80	.81	.85
Societal Norm-Wildlife	.76	.74	.81	.79
Personal Feeling-Energy	.80	.75	.77	.85
Personal Feeling-Plants	.79	.77	.81	.84
Personal Feeling-Wildlife	.73	.82	.87	.84
Personal Action-Energy	.80	.84	.81	.83
Personal Action-Plants	.79	.79	.86	.87
Personal Action-Wildlife	.77	.74	.80	.80
Hoyt's Coefficient *	.95	.95	.95	.97
Cronbachs alpha **	.90	.89	.87	.93

* An internal consistency measure of the total test.

** A coefficient indicating the correlation between the subtests and the total test.

equality of group centroids, which the same authors refer to as, H2. The H1,H2 computer program by Cooley and Lohnes (1962) was used. The program determines and tests both dispersions and centroids for statistical significance.

The first statistical hypothesis which was tested was:

Ho1: The experimental and comparative population group dispersions of the pretest scores on the nine dependent variables, taken simultaneously, are equal.

$$Ho1: \underbrace{\triangle}_e = \underbrace{\triangle}_c$$

The α -level was set at .10 to reduce somewhat the probability of accepting a no difference conclusion when real differences in the group dispersions existed, that is, to reduce Type II error. The calculated F-ratio for the dispersions, 0.11, was less than the tabled F-ratio of 1.00 ($\alpha=0.10$, $df=(594,101265)$). This led to the conclusion that the experimental and comparative group dispersions of the pretest scores on the nine dependent variables, taken simultaneously, were equal, and consequently, that the hypothesis of homogeneity of dispersions was tenable.

The second hypothesis tested was:

Ho2: The population centroids of the experimental and comparative groups on the pretest scores, taken simultaneously, are equal.

$$Ho2: \mu_e = \mu_c$$

The α -value was again set at .10, to reduce the possibility of a type II error. The calculated F-ratio for the group centroids was 1.39 which was less than the tabulated F-ratio of 1.63 ($\alpha=0.10$, $df=(9,124)$).

These results led to the conclusion that there was no statistical difference between the two groups on all the nine dependent variables, taken simultaneously; thus it was reasonable to assume that the performance of the two groups on all the nine dependent variables, taken simultaneously prior to the treatment, was comparable.

4.1.3.1.2 Post-treatment

Initially, the posttest scores were analysed using the same H1,H2 program to test the two statistical hypotheses in the research question. The first analysis involved testing for equality of group dispersions. The α -level was set at .05, to conform with the level of significance normally used in the social sciences like education where, as was the case in this study, we do not have much control over the subjects (Kerlinger, 1964; Kirk, 1968). This represents the level of chance the writer wanted to take in making a Type I error. In this case the writer wanted to be at least 95% sure that his decision was correct, i.e., 5% chance of making a Type 1 error.

The comparison of the dispersions of the two groups on the nine dependent variables taken simultaneously, resulted in a calculated F-ratio of 0.19.

These results led to the conclusion that, taking all the nine dependent variables simultaneously, there was no difference in the dispersion of scores between the experimental group and the control group. This conclusion was interpreted to mean that the treatments did not result in any significant change in the dispersions of scores on the nine dependent variables, taken simultaneously, after the program.

The comparison of the group centroids resulted in a calculated F-ratio of 11.8. This value was greater than the tabulated F-ratio of 1.96 at $\alpha=.05$, $df=(9,127)$. That is, the difference in the group centroids, was held to be significant at the .05 level of probability. This resulted in rejecting the null hypothesis in favor of the alternate hypothesis that the

population centroids of the experimental and comparative groups differed significantly.

The examination of the mean posttest scores (Table 4.2) showed that the experimental group's posttest scores were more homogeneous and greater than those in the comparative group on all the nine dependent variables. The minimum difference recorded was 4.85 and was observed in their personal feelings towards wildlife.

These results suggest that the treatment received by the experimental group (outdoor education program) was more effective in improving the attitudes of the subjects than the treatment received by the comparative group (regular school program). Consequently, with reference to the first research question, it was concluded that participation in a residential outdoor education program resulted in a significant improvement in the attitudes of the students towards conservation of natural resources.

4.1.3.2 Discriminant Analysis on the Nine Dependent Variables

Having obtained a statistically significant difference in the group centroids of the two groups, discriminant analysis was performed on the posttest scores to seek more information about the nature of the group differences. The computer program DISCRIM, by Cooley and Lohnes (1962) was used, followed by the program RSPACE, by the same authors, for this purpose. The DISCRIM program computes a discriminant function which shows the

Table 4.2

Means and Standard Deviations of the Posttest Scores
for the Experimental and Comparative Groups

Dependent Variables	Experimental		Comparative		Difference
	Mean (Y1)	Stan. Dev.	Mean (Y2)	Stan. Dev.	Between Means
Societal Norm-Energy	38.078	4.122	30.986	7.587	7.092
Societal Norm-Plants	40.141	4.313	33.986	7.218	6.155
Societal Norm-wildlife	40.422	4.246	34.808	6.456	5.614
Personal Feeling-Energy	40.688	3.891	35.110	6.299	5.578
Personal Feeling-Plants	42.266	3.793	37.027	6.464	5.239
Personal Feeling-Wildlife	43.797	4.336	38.945	6.561	4.852
Personal Action-Energy	40.531	4.690	31.548	6.958	8.983
Personal Action-Plants	41.641	4.146	36.466	7.219	5.175
Personal Action-Wildlife	42.500	3.846	37.096	6.713	5.404

relative contribution of each of the dependent variables in differentiating between the two groups, and hence the variables on which the groups differed the most. RSPACE, on the other hand, shows the locations of the group centroids in discriminant space, that is, the location of the centroids on the single dimension spanning discriminant space in the present situation.

The single discriminant function obtained in the analysis has been presented in Table 4.3. Since it was found earlier that the posttest scores for the experimental group were higher on all the nine dependent variables than those of the comparative group, the scaled weights suggest that the effects of the

residential outdoor education program were relatively greater on attitude scores of the subtests dealing with students' personal action in conservation of energy, personal action in conservation of plants; and what they believed that most people would do to save energy (societal norms-energy).

Table 4.3

Scaled Weights of the Dependent
Variables in the Discriminant Function

Dependent Variable	Scaled Weights*
Personal Action-Energy	48.00
Personal Action-Plants	-38.89
Societal Norm-Energy	17.08
Personal Feeling-Wildlife	15.98
Personal Feeling-Plants	13.68
Personal Feeling-Energy	-12.68
Societal Norm-Wildlife	5.80
Societal Norm-Plants	-1.73
Personal Action-Wildlife	0.31

* Cooley and Lohnes (1962, p. 121)

The scaled weights also showed that of the nine variables the three least affected areas were: what the children did in conservation of wildlife (personal action - wildlife), what they believed that people would do to save plants (societal norm - plants), and what they believed that people would do to save wildlife (societal norms - wildlife).

These results seemed reasonable in light of what went on during the program, and what was later identified to be one of the limitations of the study. During the program the students

were exposed to all the three natural resources, but unlike energy and plants, they were not able to interact with wildlife. For example, they were told not to disturb the birds, to approach any animal with extreme care because, if for example, they went too near a bird the mother might abandon the young ones. Also, apart from energy, where they could see the conservation methods being used, there was not much emphasis on explaining or discussing what people would do.

One limitation of the study which was confirmed by some of the parents was that there was not much time after the program for the students to get into situations where they could practice conservation methods related to wildlife. Since the students showed some concern in their feelings for wildlife conservation, and had exhibited these at home, it was expected that if they were exposed to situations which demanded it, they would practice it.

Another observation which was made during the post-camp interviews with the students was a pre-established negative attitude towards some particular wild animals. Two students said that they would not save snakes, while another student said that she would not save cats. They said that they had taken these positions because of their unpleasant experiences with those animals. The student who said that she would not save cats also said that she did not like cats because cats had been killing small birds.

Also, during the period of the program and the study, the students were not exposed to situations where they could see what other people would do to save both plants and wildlife. As

far as energy conservation is concerned, however, they could see it being practiced by the public, they could see it in situations which affected their lives, and they could also see it on television. One can hardly avoid situations which do not call for the conservation of energy these days. Probably the reduced effect on what they think that people would do to save plants was due to the fact that some of them saw signs of human acts which were against what they had learned, like people carving their names on trees and breaking branches off trees. The reader is informed here, that the students had come from a wooded neighborhood and, consequently, could also have seen such acts at home, after the program.

With reference to the research question, therefore, the discriminant analysis showed that the program was most effective in enhancing the students' attitude towards personal action with respect to energy. It was moderately effective in enhancing their attitudes towards all the three aspects of conservation at the level of personal feeling - i.e., personal feeling-wildlife, personal feeling-plants, and personal feeling-energy. The least effective areas were in personal action with respect to wildlife, and societal norms with respect to both plants and wildlife, but these areas of least effect have to be interpreted with caution.

The RSPACE analysis showed that the centroids of the two groups in the reduced space was 28.03 for the experimental group, and 21.51 for the comparative group. These results suggest that the centroids of the two groups are well-separated on the discriminant function. The fact that the two group

centroids were located toward the positive end of the dimension indicated that both groups had favorable attitudes, and the difference between the centroids was an indication of the degree of favorableness which the two groups held.

With reference to the second statistical hypothesis, this shows that the difference in the group centroids which was found in the earlier analyses was not only significant, but also considerably wide apart. Also, it showed that the experimental group had a more favorable attitude than the comparative group. Thus it was concluded that the observed differences between the experimental group and the control group were significant on at least three of the dependent variables.

4.1.4 Qualitative Analyses.

4.1.4.1 Analysis of "No-Attitude" Responses

One limitation of a Likert-type scale is that a "no response" category is usually provided for individuals who are undecided. Such individuals are considered to have a neutral attitude. In this study it was important to distinguish between an actual neutral response (an attitude) and an undecided (i.e., don't know) response, because one effect of the program could have been helping the students to change from "no attitude" (i.e., undecided) to a neutral attitude, that is, in helping the students to acquire a positive attitude towards conservation of natural resources.

An additional response category "Don't know, or Undecided"

was therefore included in the questionnaire to find out if the information gathered on that response would help to locate such an effect.

The frequency of responses which indicated that subjects were undecided or did not know, have been presented in Table 4.4. Even though on the pretest there were comparatively bigger differences in the frequencies for some of the variables (particularly societal norm-plants, personal feeling-energy, and personal feeling-plants), the frequencies on the other variables were quite close. The pattern of the overall differences and the means were more or less balanced, with a slight tendency to have more of such "non-attitude" responses from subjects in the comparative group.

On the posttest, however, there was a clear difference in the pattern of the responses. Fewer subjects in the experimental group than in the comparative group circled "undecided or don't know" responses. This increase in the frequency of the responses in the comparative group was difficult to explain. One speculation was that probably some of the subjects were undecided or did not know some of the attitude questions and decided to guess on the pretest, and were being more honest on the posttest. Another possible speculation might have been that because there was no discussion of the questionnaire items after the administration, students might have discussed the items, and probably some of them were confused, hence undecided on the posttest.

A third speculation, which is probably more likely, might have been that the regular school program might have dealt with

Table 4.4

Frequency of Group Responses Indicating 'Undecided or Don't Know' in Pretest and Posttest

TEST/SUBTESTS (dependent variables)	EXPERIMENTAL GROUP		COMPARATIVE GROUP *	
	PRE TEST	POST TEST	PRE TEST	POST TEST
Societal Norm-Energy	37	7	31	32
Societal Norm-Plants	31	6	21	31
Societal Norm-Wildlife	20	8	23	45
Personal Feeling-Energy	20	7	31	46
Personal Feeling-Plants	18	5	29	43
Personal Feeling-Wildlife	23	2	21	29
Personal Action-Energy	25	2	26	31
Personal Action-Plants	18	1	19	31
Personal Action-Wildlife	21	1	24	44
Mean	23.7	4.3	25.0	36.9

* Adjusted for n=63 (i.e., n for Experimental Group).

some of the items in a more abstract way, and some students were undecided about some of the conservation statements. This third speculation was generated from some of the comments which the counsellors (adult students) made during the residential outdoor program.

One finding from this analysis was that, while on both the pretest and posttest the comparative group indicated many "Undecided or Don't know" responses, in the experimental group the number of such responses on the posttest was significantly less than what was recorded on the pretest.

In both the theoretical construct and the measuring scale which were adopted for assessing the attitudes in this study (Fishbein and Likert, respectively), any of the five "regular"

responses in the attitude instrument (SA,A,N,D,SD) indicates an attitude. For example, a neutral response indicates an attitude. Therefore, since between the pretest and the posttest fewer responses were recorded in the experimental group which indicated a "no attitude" on the posttest, while in the comparative group there was no decrease in the number of such responses, it was concluded that in the experimental group the treatment was effective in helping the students to select attitudinal responses. This can be interpreted to mean that the residential outdoor education program (the treatment for the experimental group) was effective in helping students to develop conservation attitudes.

4.1.4.2 Analysis of Parents' Questionnaire

As an alternate procedure for investigating the first research problem, written comments of the parents about any changes in the attitude or behavior of their children following the program were sought. Sixty-three parents of the students in the experimental group were requested to respond to a special questionnaire designed for this purpose. The questionnaire is presented in Appendix E. The students presented the questionnaire to their parents. Thirty-nine of these were answered and returned, representing a response rate of 61.90%. This response rate was considered to be reasonable for estimating observable changes, if any, in the attitudes of the students.

The parents' comments and responses indicated that many

observable changes were seen in the students after the program. In the area of energy conservation, 16 of the parents indicated that their children had shown changes in their attitude or behavior towards conservation. Some of the changes which the parents had observed included: turning off lights, turning down heat, talking about energy conservation, watching television programs on energy conservation, reading about energy conservation, and being worried about the depletion of energy.

Thirteen out of 39 parents reported that they had not seen any changes in their children since the program. The reason seven of them gave for this response was that their children had already acquired favorable energy conservation attitudes before the program.

Ten parents out of 39 indicated that they did not know, or could not tell if their children had shown any changes in energy conservation. Again, one parent from this group commented that there was not enough time to observe such a change.

These results suggest that the majority of the parents who were in a position to, had observed positive changes in the attitudes of their children towards energy conservation, after the program.

The same pattern of responses which was reported on energy conservation was also reported for the conservation of plants, another important variable which accounted for significant group differences. Fifteen parents indicated that their children had shown changes in their attitudes or behavior towards conservation of plants. The changes which the children were reported to have shown included: watering plants, caring for

plants at home (e.g., removal of undergrowth), talking about conservation of plants, watching television programs on conservation, commenting on pollution, reading, and expressing some interest in the care of plants.

Twelve parents out of 39 reported that their children had not shown any change. Three of these parents commented that the time between the camping experience and the administration of the questionnaire was too short for them to observe any significant changes. One of them also commented that even though no change was noticed, because their child already had a favorable attitude, he/she thought that it had reinforced the old attitude.

Twelve parents out of 39 were not in a position to observe any such change, and no reason was offered by them.

The results of the responses on conservation of plants showed that most of the parents who were in a position to observe changes had noticed positive changes. Addressing the question, the results showed that the attitudes of the students toward conservation of plants had improved.

The observed changes with respect to wildlife conservation was probably the one which most parents noticed. As many as 22 of the 39 parents reported that their children had shown positive changes towards conservation of wildlife. Their comments indicted that the children did things like: showing that they were more aware of animals; donating money to save wildlife; watching television programs related to conservation of wildlife ; talking about wildlife conservation, reading about wild animals, and showing some concern for the need to preserve

wildlife.

Eight out of 39 parents indicated that they did not observe any change in their children. Six of the eight parents elaborated on this lack of a change by attributing it to two reasons--that the children had already acquired this attitude prior to the program but that the positive attitude had not diminished, and that there was not enough time to observe a change. Some of the parents who reported that their children had already acquired favorable attitudes also suggested that the program might have reinforced the old favorable attitudes.

Nine parents indicated that they did not know or could not tell of any changes in their children. One of them again suggested that this was probably due to the fact that the children had not had a chance to show a change.

These results on wildlife showed that even though some parents felt that there was not much time for the students to practice wildlife conservation methods, most parents saw positive attitudinal changes after the program. This was interpreted to mean that the program resulted in enhancing the attitudes of the students towards conservation of wildlife. Although more parents indicated that the students had shown positive attitude changes, a careful observation of the things which the parents had observed shows that the effects indicated more of how the students felt about wildlife than their interaction with wildlife. This finding was not the same in energy or plants. Most of the changes which the parents had noticed in those areas indicated some overt conservation activity involving energy and plants.

This observation tends to support the results of the discriminant analysis, which revealed that for wildlife, the effect of the program was greater on personal feeling towards conserving wildlife, and minimal towards personal action in wildlife conservation.

To summarize, the responses of the parents indicated that positive attitudinal or behavioral changes towards conservation in all three areas of natural resources were observed in the students, as a probable effect of the program. With respect to the research question, this was interpreted to mean that the program was effective in enhancing the attitudes of the students towards conservation of natural resources.

4.2 Specific Problem #2

The second research problem was to identify aspects of the outdoor education program which contributed to or appeared to have contributed towards the enhancement of positive attitudes towards conservation of natural resources.

In order to investigate the problem the writer assumed the role of a non-participant and unobtrusive observer of the program and recorded relevant information from what occurred during the program. The opinions of teachers, counsellors, and students were also systematically obtained.

The outdoor program has been described in a general way in Chapter Three, and specific events are given in Appendix A. Only those details of the program which had a bearing on the development of positive conservation attitudes will be presented in this section. In addition, the observations and opinions of

the students, counsellors, teachers and the writer will be presented.

4.2.1 Students' Attitudes After the Program

Thirty-nine of the 69 students who took part in the program were interviewed after the program. Table 4.5 shows the views expressed by the students in response to the program. The results show a positive effect on the students for all the three conservation topics. If one can assume that these responses indicated their overall attitudes, then one can infer that the effect was greater for plants and wildlife than for energy.

Table 4.5

Student* Responses to the Question 'Do You Think That the Outdoor Program Made You Feel Like Saving'

CONSERVATION TOPIC	Yes**		No***	
	N	%	N	%
Plants	36	92	3	8
Wildlife	38	97	1	3
Energy	29	74	10	26

* n=39

** Indicates a positive response

*** Indicates "no effect" and undecided responses

The reasons given by the students who did not think that the program had a positive effect on them have been presented as Appendix O. Three reasons were given: they did not do anything

about energy conservation; they already knew what they were told; and they experienced a bad (negative) conservation practice on the part of one cabin group which occurred during the program. Since almost everyone felt that the program made them feel like conserving plants and wildlife, it was inferred that the students' activities and the new knowledge introduced during the program probably contributed towards the enhancement of their conservation attitudes.

During the post-program interviews, the students were asked what made them feel like saving plants. Their responses, presented as Appendix P, were classified to find out the common views which they had. Table 4.6 shows the common ideas which the students offered. The results show that 53% of the students mentioned what they were taught or learned generally, 33% attributed it to the field studies, 25% attributed it to a need for conservation which was stimulated by the camp experience, 11% attributed it to the films, and 31% attributed it to other factors like the program as a whole, because they liked plants, because of plants having the right to exist, plants being living things, and the poems they wrote. Almost all the responses which the students gave were related to what was taught at the Outdoor School. Thus, it was concluded that the main reason the students gave for their change in attitude towards plants was what was taught during the program.

The students' responses therefore indicated that the aspects of the outdoor education program which contributed towards the enhancement of positive attitudes towards conservation of plants included what was taught, the way those

Table 4.6

Aspects of the Program which Students* Believed made them Feel
Like Saving Plants

Idea presented	f	%**
1. Teaching & learning in general	19	53
a) Teaching about plants	8	22
b) Students learning about plants in general	5	14
c) Students learning about nature	6	17
2. What students learned specifically about the need for conservation	9	25
3. Field Studies	12	33
4. Films	4	11
5. Others	11	31
a) The whole program	5	14
b) Appreciation of plants	2	6
c) Feeling of the right to exist	2	6
d) Acquiring new ideas about plants	1	3
e) Writing poems	1	3

* n=36

** percentage of students who mentioned
the idea (aspect)

things were taught, the field studies, and the films.

The responses given by the students during the post program interview about what made them feel like saving wildlife have been presented as Appendix Q. The classification of the responses (Table 4.7) shows that the students attributed the change of attitude towards wildlife conservation to different aspects of the program. Thirty-seven perecent of those interviewed indicated that the field study sessions made them feel like conserving wildlife, 32% attributed it to what they were taught or what they learned generally in the program; 24%

attributed it to the need for conservation which was stimulated by the camp experience; 11% said that the films influenced them; and 26% attributed it to other factors like the program as a whole, appreciation of wildlife, feeling of the right for the wildlife to exist, just going to the Outdoor School, and through interacting with the people and animals at the Outdoor School.

Table 4.7

Aspects of the Program which Students* Believed Made them Feel Like Saving Wildlife

Idea (aspect)	F	%**
1. Teaching & learning in general	12	32
a) Teaching about wildlife	4	11
b) Telling students about wildlife	2	5
c) Students learning about wildlife in general	4	11
d) Understanding	2	5
2. What students learned specifically about the need for conservation	9	24
3. Field studies	14	37
4. Films	4	11
5. Others	10	26
a) The whole program	3	8
b) Appreciation of wildlife	3	8
c) Feeling of right to exist	1	3
d) Just being at the Outdoor School	2	5
e) The people and animals at the Outdoor School	1	3

* n=38

** percentage of students who mentioned the idea (aspect)

The responses given by the students about energy conservation (Appendix R) have been classified in Table 4.8. The

attention of the reader is drawn to the fact that most of the students said that although they felt like saving energy, they could not tell how the program influenced them. The responses presented were obtained from 20 students of the 39 who were interviewed after the program. The results show that seven (35%) of those who offered reasons for what made them feel like saving energy indicated that they were taught about energy conservation in general, without any elaboration; another seven (35%) attributed it to the concern for energy conservation with an explanation that it was because of dwindling energy resources; one (5%) said that it was due to the field studies; while five (24%) attributed it to "other" reasons (three students said that it was because of the conservation practices at the outdoor camp, one said that it was the whole program, and one said that it was because she felt good about saving energy). One limitation of the data on energy was the relatively smaller number of subjects ($n=20$) who responded to the question. Ten students had indicated earlier that the program did not have any effect on their feeling towards energy conservation, while nine other students said that they did not know. From the writers evaluation of the results, the views expressed by the 20 subjects represented what the program offered. It was assumed that the 20 responses represented the general view of the students. That assumption was made to permit a comparison of the results of all the three conservation topics.

The views expressed by the students about the three conservation topics revealed that the field studies, what the teachers taught, the reasons for conserving natural resources,

Table 4.8

Aspects of the Program which Students* Believed Made them Feel
Like Saving Energy

Idea suggested	f	%**
1. Teaching & Learning in general	7	35
a) What they were told about energy conservation	6	30
b) What they said they learned about energy conservation	1	5
2. What students learned specifically about the need for conservation during the program	7	35
3. Field studies	1	5
4. Films	0	0
5. Others	5	24
a) conservation practices at camp	3	15
b) through the whole program	1	5
c) feeling good about energy conservation	1	5

* n=20

** Percentage of students who mentioned the idea (aspect)

and the film, were the main aspects of the program which the students attributed to why they felt like saving plants and wildlife. For energy, however, what the students were taught, and reasons for energy conservation and conservation practice appeared to be the main aspects of the program which enhanced their attitudes.

The reasons given by three of the students who did not think that the program affected them, also supported this view. The reason which these students gave for the lack of an effect suggested that they did not do anything about energy conservation. Also, during the program, there were three main sessions which involved instruction (in-class teaching, field

studies, and the films). For energy conservation, those three sessions were only involved with some discussion of, and explanation of energy shortage in the world, and what people can do to conserve it.

The responses which the students gave and which were classified as "other" in all the three conservation topics (Tables 4.6, 4.7, and 4.8) appeared to be their responses to what they learned or their reactions to what they observed during the course of the program. For example, responses such as: "Plants are sort of like humans..."; "The plants outside our cabin made it pretty..."; "The whole program is about saving them..."; "We saw different kinds of bird feeders"; "Because I found out how they really are like"; "Because they don't use as much energy as they do in towns"; "Because we were forced (expected) to turn off our lights or else we would not get very good cabin marks."

There was another indication which suggested that the students were attributing the effect of the program to what they studied. When they were asked which part of the program they liked, their responses (summarized in Appendix S) showed that they liked the field studies best.

Thus, from the students' point of view, the main aspect of the program which contributed towards enhancing their attitudes was what they were taught during the outdoor program. This included the things which they learned, the way it was presented to them, and the activities which they were engaged in. Other aspects of program which enhanced their attitudes were the films which they saw, the conservation practices which were practiced

at the Outdoor School, and their interaction with the Outdoor School environment.

4.2.2 Results of Counsellors' Interviews

Ten counsellors took part in the camp program. They were interviewed before, during, and after the camp program. The pre-camp interview revealed that apart from the weekend preparation at the Outdoor School all the counsellors had had at least a one-week prior experience at the camp. All agreed that the program had a positive effect on their attitudes towards conservation of natural resources. They offered reasons to explain how the program enhanced their attitudes. After the camp program they were again asked how in their view the one-week program influenced the attitudes of the students. Even though they responded, all of them agreed that their earlier comments were still valid. Thus their responses for both periods of the program have been combined and presented below.

(1) Field Studies

Five counsellors mentioned the field studies as an aspect of the program which contributed towards the enhancement of conservation attitudes. They said that there was an emphasis on plants and animals in the field studies. The instructors took the students around and showed them different trees and animals, and also told them new things about natural resources. For example, they told them how they could affect the plants and animals. The five counsellors reported that the field study sessions appeared to arouse student interest in plants and animals, while the associated discussions helped them to realize

how they could conserve resources.

(2) What Students Learned Specifically about Conservation

Five counsellors suggested that the knowledge acquired by the students contributed towards the enhancement of conservation attitudes. According to the counsellors, some of the students probably did not really know anything about the outdoor environment before the camp. During the program the students learned new things about ecology and were presented with facts about dwindling natural resources. They were told how the ecosystem worked and why they should or should not do certain things, and how if everyone contributed a little bit, it could save the environment. For example, according to one counsellor, the students learned that shooting one animal at a certain time of the year could result in killing the animal and its unborn babies. They also got to know that an act which may be considered as trivial could lead to a bigger effect, because of the interrelationships among different parts of an ecosystem. Thus they understood and appreciated the value in conserving natural resources. They also realized that there were many things which they could do to conserve natural resources, and they respected the attempts which are made by other people for the same purpose.

(3) The Outdoor Experience

According to three counsellors, just taking the students out to the outdoor camp was an aspect of the program which enhanced the students' attitudes. The three counsellors suggested that it was a better place to learn about conserving natural resources than studying in the city from books, because

they studied about the environment in the environment. One of them reported that it gave the students the opportunity to experience what they had been studying in school, while another counsellor added that it helped them to acquire good habits, and to share the ideas by talking with friends while at the camp.

According to yet another counsellor, the experience at the camp reinforced what some of the students knew. For example, he said that some of the students had learned about energy conservation at home, from their parents. At the Outdoor School they saw that what their parents had been telling them was practiced by everyone. They saw that everyone turned off the lights and/or indicated that they wanted lights to be turned off to conserve energy. According to him, this made them feel that their parents were not being abnormal by telling them to turn off their lights at home, and they learned to accept it.

(4) The Outdoor School Environment

According to two counsellors, conservation of natural resources is the "big emphasis" at the camp. One counsellor said there was a feeling which one got from the people at the camp. Everyone at the Outdoor School talked about conservation and/or showed good conservation habits. He believed that because the students saw how other people reacted to conservation issues it might have influenced them. He appeared to believe that the constant surveillance by counsellors and teachers was likely to have influenced their attitudes. According to him, if the students were by themselves in the outdoors, things might have been different, but because they were with other people and they knew that they were being watched, they felt it. Another

counsellor suggested that during their free time and while walking around and listening to other people the students got the same feeling to conserve.

(5) Posters in Cabins

One counsellor suggested that the energy conservation posters in the cabins were one aspect of the program which could have influenced the development of favorable attitudes. The writer observed that there were energy conservation posters in all the buildings at the Outdoor School.

(6) Enjoyment of the Outdoor Experience

Apart from the fun they had in the field study sessions, one counsellor suggested that the students played and had fun during the recreational sessions. Another counsellor indicated that the enjoyment helped to enhance their conservation attitudes because they would remember the fun they had in the outdoor camp program.

(7) Interaction Among Students in the Outdoors

One counsellor suggested that during the program students saw things themselves, through their own observations, and when these observations occurred they often told other students. This was not elaborated upon by him. Similar things were reported by the teachers.

(8) Counsellors' Influence

A comment by a counsellor indicated that the counsellors had a unique role in the enhancement of attitudes in the outdoor program. According to her, most elementary school students see high school students as their idols. She indicated that during the camp program they made the students feel wanted, and they

became more involved in the program. She also remarked that because of the way the students see the counsellors, they were more prone to accept what the counsellors told them, which included appropriate conservation behaviors.

According to the counsellors' views, the set-up at the Outdoor School, the posters on energy conservation in the cabins (and probably those in the other buildings), the experiences which the students got by interacting with the environment and the field studies all contributed towards the enhancement of positive conservation attitudes. During the interview, all the counsellors indicated that they enjoyed the sessions. All of them thought that the students enjoyed the sessions, and that was confirmed by the students. Thirty-seven (95%) of the 39 students who were interviewed during the program said that they enjoyed the sessions, and all those who were asked after the program indicated that they did.

Apart from the posters in the cabins, the students' views touched on all the key ideas suggested by the counsellors except that the counsellors offered a clearer explanation. One difference between the two views was that counsellors did not mention anything about the films. This was not unexpected, because almost all the teachers and all the counsellors did not participate in the film sessions.

4.2.3 Results of Teachers' Interview

The teachers involved in the program included the Outdoor School recreation director, three teachers from the Outdoor School, and three teachers from the visiting school. Even though

the recreation director was not a teacher by training, the role she played in the program was that of a teacher. Consequently she was classified as a teacher in this study.

All seven teachers were interviewed after the program, and their views have been presented below. From the teachers' point of view there were six aspects of the program which contributed towards the enhancement of the students' attitudes.

(1) The Preparation Before the Camp Program

All seven teachers suggested that the preparation which took place before the camp program was one aspect of the program which contributed towards the enhancement of the students' attitudes towards conservation of natural resources. These included the preparation of the students, counsellors, parents, and the teachers. They said that the preparation led to an understanding and cooperation of all the people who were involved in the program, and in turn helped to make the camp experience more effective. For example, two teachers said that it made them (teachers) aware of the field studies which were going to be taught during the camp program, they knew the responsibilities of each teacher, and it made them aware of the full details of the overall camp program.

Another teacher said that the preparation helped the students to acquire a more receptive frame of mind for both the social and the academic activities which had been planned.

Even though all the teachers said that the preparation was going to have a positive effect on the students, the three teachers at the Outdoor School felt that there was still room for improvement. They would have liked to play a more active

role in the preparation of the students, and to have had more meeting time with all the visiting teachers prior to the camp program. According to them, if they had had a greater role in the preparation phase of the program they would have been able to discuss the whole program with all the teachers and also would have known the students better before they arrived at the Outdoor School. The teachers thought that such a role would have made them "more comfortable" with the group before they arrived at the camp.

(2) Field Studies

According to all the seven teachers, the field studies made the greatest contribution towards the enhancement of conservation attitudes. There were four field study topics and every teacher said that his/her field studies had a role in enhancing the students' conservation attitudes. For example, one teacher said "I definitely think that today's lessons would have an influence on the childrens' attitudes towards conservation, because they were right in the environment, seeing how it is interdependent, how each part is very important, how it could not function without animals, plants, water and how these natural resources are necessary and have to be conserved. And again we talked about energy too, so they can see how energy fits in." Another teacher said "I would say yes; from the attitudes the kids seem to have when they leave me at the end of the day in the forest." With regard to the stream study the same teacher said "Yes, they see it very clearly. The kids see that water is a very easily affected medium. If its temperature changes or there is some substance in the water that is

poisonous, or there is no oxygen... things are affected right away. So they see that they themselves should not throw things in the water, or throw garbage into the water, and that has an impact on it right away." Similar statements were made by each of the seven teachers.

When the teachers were asked to explain how their field studies enhanced the students' attitudes towards conservation of natural resources, they said that the students acquired new knowledge about natural resources, that they had first-hand experience from interacting with it, that they found each session to be important, interesting, and realized that there were things which they could do or avoid doing to conserve natural resources. Again, all the teachers indicated that in their field study sessions they tried to show the students the interrelationships among the different parts of the ecosystem, the value of each part, and how people can affect it.

A view which appeared to have been shared by all the teachers was probably best expressed in what one teacher said: "With the variety of the field studies we had,.... I think that every student should go away with a little more awareness of the delicateness of our environment and its resources." All the teachers indicated that they were teaching with the same concept of the ecosystem, but they also agreed that their activities were different, that they were giving the students "different pieces of information," and using different types of examples. They also believed that the different field study sessions were reinforcing each other.

One teacher said that even though the titles of the field

study topics suggested that they were related to conservation, he thought that the topics alone did not guarantee the enhancement of conservation attitudes. According to him it was the quality of the experience which the students got in the field studies and in the whole program. He explained that the field studies were of a high quality because the students were exposed to new experiences, new knowledge, that they saw the value of what they were learning, and got a framework from which they could think about the outdoors. According to him a program, or an activity could have been of a low quality if the students were involved in an unpleasant experience such as being sent out on a rainy day, or if they were unsuccessful in accomplishing a task that they had been set, or if the students became frustrated during the field studies. He thought that it was the frequency of the high quality experiences which the students had in the field studies which contributed towards the enhancement of the attitudes.

(3) The Outdoor School Environment

Three of the teachers believed that being in the Outdoor School environment for the five days, alone contributed to enhancing the students' attitudes towards conservation, because that environment was new, and it also supported appropriate conservation practices. Two of the teachers said that at the camp the students saw and worked with teachers and counsellors who practiced good conservation methods. According to the rules of the Outdoor School they were expected to do the same.

One teacher said that each student was seeing himself or herself as a student in a different environment, and was

performing different activities with many other students. According to him, the things which they saw and were expected to do "...draws home some of the lessons which they have been hearing over and over, and it makes sense here." He believed that if they had gone to the camp for the activities and returned home every evening during the week, their attitudes would not have been equally favorable. Because they lived in that new and suitable environment, they acquired more favorable attitudes. In an attempt to defend the above position, he argued that, while they were there, they were being watched by the teachers, counsellors, and their friends, and were "inundated with their (students) behavior." For example, a group of students were reported to have noticed a frog while on a walk and one student attempted to grab it. All of a sudden, three students were reported to have shouted "Don't touch it. You might hurt it."

Another teacher said that she overheard some students telling others not to walk in the stream, and in another case other students were telling their friends not to pick flowers in the forest. Such immediate reactions, particularly from their own friends, were said to have an effect on them, and also helped to reinforce what the teachers had told them. She argued that the behavior of students before the camp program, and what they learned at the camp made more sense because they were in an appropriate environment. They had the opportunity to experience and to practice some of the conservation methods, and in doing that she said that they were more observant.

(4) Films Shown at the Outdoor School

Two teachers mentioned the films which were screened at the Outdoor School as an aspect of the program which they believed to have an effect on the students' attitudes towards conservation. The teachers were the two who supervised and showed the three films.

According to the two teachers, the films dealt with some of the conservation topics which were discussed during the field study sessions. For example, they showed some of the interrelationships among the components of the forest and stream ecosystems, some effects of pollution, and how people can help to conserve natural resources.

One of these teachers also mentioned that the discussions before and after screening each film were also helpful. The discussions before each film helped to arouse the students' interest and to focus their observations, while the discussions after each film helped to explain what they saw.

(5) Attitudes and Behavior of Teachers

Two teachers suggested that the attitudes of the teachers also contributed to enhancing the attitudes of the students. They said that even though the students listened to the teachers keenly as they talked about conservation, they also watched them to find out if they followed through what they said themselves. One said that students usually observed the teachers, and would pay heed to what they were told only if the teachers practiced what they said themselves.

Both teachers suggested that since all the teachers who participated in the program showed a keen interest in

conservation themselves, that attitude might have been picked up by some of the students too.

(6) Post-camp Experiences

All the resident teachers commented that even though the students had been exposed to the camp program, the experiences of the students upon returning to school could affect their attitudes if the acquired positive attitudes were not reinforced. One teacher suggested that the school should be more encouraging and supportive, if the students' conservation attitudes were going to remain for long.

Another teacher noted that because the Outdoor School was isolated from the normal school, and also because the Outdoor School did not have much to do with the students after the program, it was possible that some of the students might think that the conservation ethics were only applicable at the Outdoor School, and might forget them once they left the camp. She therefore suggested that a follow-up with similar ideas in the school after the camp program would help to reinforce, and also to extend the acquired attitudes beyond the Outdoor School. Another teacher suggested that it would be better for one of the outdoor staff members to be involved with the follow-up activities in the school.

4.2.4 Writer's Point of View

In the writer's view, eight aspects of the program appear to have contributed towards the enhancement of the students' attitudes towards conservation of natural resources. These aspects have been presented below.

(1) The Preparation Before the Camp Program

Prior to the camp program there was a preparation phase which separately involved teachers, students, counsellors, and parents.

During the preparation phase the students saw three films on forest ecology; they studied mammals and ecosystems; and they wrote poems on forest appreciation. In addition, they discussed the Outdoor School conservation rules and the living conditions in the Outdoor School.

All three films, "The Incredible Forest," "A Tree is a Living Thing," and "Another Side of the Forest," were related to plant and wildlife conservation. For example, "The Incredible Forest" showed the way humans interact with, and affect the forest. Before each film the teacher introduced its content, telling the students what they were going to see. They also presented the students with 12 or more questions which they were expected to answer in writing after the film. All the questions were open ended, in that they were not answered directly in the film. For example, students were asked to describe what would happen if half the bears in the forest were killed. The answers which the students wrote down included an increase in the population of animals on which the bears fed, an increase in the population of other animals which competed with bears for food, and other problems which would be created by the imbalance in the population of the communities within the forest environment.

The films, about half-an-hour long, held the students' attention. It was observed that some students took down notes during the film. After the film, students' answers to the

questions were discussed. The encouraging response of the teacher to these suggestions led the writer to believe that this exercise could have enhanced students' attitudes towards conservation of wildlife.

The science topics which were taught prior to the camp program were "mammals" and "ecosystem." Each student was asked to write a report on a farm animal. As part of the directions for that assignment they were told to do library research on one of the farm animals living at the Outdoor School. In the report they were expected to write about problems which that farm animal would face, if it was returned to its natural environment.

In language arts, students discussed the things they liked about forests, and these ideas were used to write some poems together. They were to write another poem on some aspect of the forest and to submit it after the camp program.

In addition to the academic preparation, the students were also given preparation for the conditions at the Outdoor School. Each student was given a copy of the students' handbook, supplied by the Outdoor School. This book contained information which was considered to be pertinent to the camp experience. For example, it had information about the site, the outdoor staff, the living conditions, the organization of the Outdoor School, the type of clothing and equipment which was appropriate, duties, table manners, rules and the general program schedule. The teachers allowed time for them to read the book on their own, and later discussed the contents with them. In the writer's opinion, the preparation of the students helped them to acquire

a more receptive frame of mind for the objectives of the program. Nineteen students were interviewed before the camp program, and all of them indicated that they knew what they were going to do, learn, and see at the camp. All of them felt they knew what was expected of them at the Outdoor School, and about half of them indicated that going to the Outdoor School was a privilege which they could lose if they did not comply with the rules of conduct. In the writer's opinion, the preparation of the students helped to ready them for the camp program.

In the opinion of the writer, the preparation of teachers, counsellors, and parents did not directly affect the students' attitudes towards natural resources, since students were not directly involved. This representation was, however, indirectly effective in making the students better prepared for the camp program than they would have been if no preparation had been done.

As part of the preparation, the visiting school teachers were given copies of the teachers' handbook to study. There were meetings at the Outdoor School involving the outdoor staff, meetings at the visiting school involving the visiting teachers, and one meeting between a representative from the Outdoor School and the visiting school.

The meetings at the Outdoor School discussed the preparation of the counsellors, and the arrangements for the camp program. The meetings of the visiting teachers discussed the way the students were going to be prepared, discussed which of the suggested field study topics they considered to be suitable for the camp program, and discussed which of the

suggested recreational activities would be suitable for the students.

The meeting between the representative from the Outdoor School and the representative from the visiting school was mainly involved with administrative details which had to be fulfilled before the Outdoor School would accept the students. For example, the teachers checked to ensure that each prospective student had the consent of a parent in writing, and a written notation of any medical problems any student might have, or any special characteristics or problems of students they should be aware of. In addition, the students were assigned to cabin and study groups. Also at that meeting, the Outdoor School representative asked about the field study topics and recreational activities which the visiting teachers had selected for the camp program. The final decision on that had not been made because a meeting had been planned by the visiting school teachers to discuss them. The two representatives contacted each other by telephone to communicate the final decision later.

In the writer's opinion, the preparation of teachers helped to complete the administrative and organizational arrangements of the camp program. The meetings served many useful functions. They enabled one outdoor staff member to meet the visiting teachers before their arrival at the camp, encouraged teachers to discuss and to select suitable field study topics and recreational activities, and gave teachers a chance to discuss potential problems related to the camp program.

The preparation of parents involved one meeting. During the meeting the visiting teachers briefed the parents about the camp

program, and encouraged parents to react to the information presented. There was, for example, a slide presentation on the Outdoor School. In addition, one teacher reviewed the plan of the camp program and the arrangements which had been made in the school for the departure and arrival of the students to and from the Outdoor School.

After the briefing, parents were encouraged to react to the planned program. Parents said they wanted to know what arrangements had been planned to ensure the safety of the students. The teachers responded by describing the facilities at the Outdoor School, the experience of the adults who were going to be involved in the camp program, and the safety precautions which had been described in the Outdoor School handbooks. Following that answer many parents said that safety was their major concern, and that they were satisfied with the safety precautions which were described.

In the writer's opinion, the preparation of parents served to allay the fears of parents about the safety of their children at the Outdoor School, and it also helped to confirm the support of the parents for the camp program by making the parents feel more positively about the program.

In the writer's opinion, the effect of the preparation of parents on the students' attitudes towards conservation of natural resources was indirect. It informed parents about the program, thereby placing the parents in a better position to relate to questions and/or comments which the students made after the camp program.

The preparation of counsellors involved a meeting followed

by a weekend orientation program at the Outdoor School. The meeting was held in the school district office. All those who had volunteered to assist in the program met and an outdoor staff member explained the role of counsellors in the camp program. At that meeting each prospective counsellor was given a copy of the counsellor's handbook to study before the week-end orientation program.

The Outdoor School picked up all the prospective counsellors from the school district on Friday afternoon for the orientation program, and returned them on Sunday afternoon. The orientation program consisted of lectures, seminars, and practical work. Some of the things discussed involved the organization and daily operation of the Outdoor School, the characteristics of elementary school children, the role of a counsellor, the teaching of recreational skills, and the Outdoor School rules and procedures. After the week, the Outdoor School staff evaluated the counsellors, and selected the best ones for the Outdoor School camp program.

In the writer's opinion, the preparation of counsellors contributed indirectly to enhancing the students' attitudes towards conservation of natural resources because it helped to ready them for the camp program. Since the counsellors had no teaching experience, their preparation contributed to making the camp program more efficient by instructing them how to handle situations involving the younger students. The preparation also gave them the opportunity to see the Outdoor School, to meet the outdoor staff prior to the program, and to practice some of the recreation and field study sessions before interacting with the

students. Besides preparing the counsellors, the preparation phase enabled the Outdoor School to select the most suitable counsellors for the camp program.

(2) Field Studies

There were four field study topics. The students said that they learned something new in each session, including new things about what they could do to conserve natural resources. Even though each field study session included things about energy, plants and wildlife, the activities which the students carried out involved only plants and animals. Energy-related issues were only discussed during the field study sessions, without further activity.

All the students, counsellors and teachers who were interviewed said that they found each field study session to be interesting and important. The counsellors reported that they learned something themselves. A brief discussion of each field study topic, and how it enhanced the development of attitudes follows.

In the farm studies, there was a discussion of farm animals and how those animals were similar to wild animals. For example, it was pointed out that domesticated goats are similar to wild goats, and that the wild rabbits roaming around the farm area were similar to the domesticated ones on the farm. Since the students could not see or touch wild animals in the forest, the writer felt that farm animals were a good substitute. Students could touch them, examine their feet, teeth, eyes, feeding habits, etc. Four students were asked if they enjoyed the farm studies, and all four responded in the affirmative. The students

said they liked petting the animals, helping to feed the animals, and learning about them. They said they were surprised to find out how useful the animals were to humanity and how well adapted they were to their environments. At least one of the students related this experience to wild animals. He commented that if hunters had a better understanding of the animal in its environment, their desire for killing wild animals would be reduced.

The farm session was helpful, too, in enabling the students to use the differences among the farm animals to discuss conservation practices. For example, during the discussion of the different types of food which the farm animals ate, it was mentioned that, like farm animals, wild animals feed on different types of food, and that it was important for people who were interested in conserving them to know this before arranging food for them. They were told, for example, that moose can not eat grass but that some people, in an attempt to save them during heavy snow periods, had flown in grass to help them. Because the moose could not eat the grass that effort was not worthwhile. In the writer's opinion, it gave students new information and a better frame of reference for them to become interested in and/or understand some conservation practices.

In the stream studies, the students learned about the delicateness of the stream ecosystem. They were told that the parts of an ecosystem were interdependent. They discussed how they could affect the stream both positively and negatively. They learned the effect of walking in a stream, throwing rocks into it, washing soap into it, and removing garbage from it.

They also discussed how they could share their knowledge and ideas with other people.

In another session on streams, they learned of the role of streams in the forest. The teacher used an analogy to get to the feelings of the students. For example, on throwing rocks into water, the teacher asked the students how they would feel if someone threw rocks into their house, and they were told to realize that the stream was the home of other organisms. They observed the stream organisms and did water tests, thus learning about the value of the stream, and becoming aware of the delicateness of the stream ecosystem, and how their (students') behavior could affect it.

In the forest ecology sessions, two approaches were used. In one case the teacher began the lesson with a discussion of the value of the forest, and a discussion of the forest ecosystem. Then the group went out into the forest, where the teacher asked the students to sit and quietly experience the forest for ten minutes, and to consider how humans could affect life in the forest. The discussion which ensued led them to accept that humans were very noisy. They realized that the presence of humans in the forest and their noise scattered the birds and other wild animals. They discussed how the construction of a road through a forest could affect the wildlife.

In the other case, the teacher started a discussion by having students draw some of the characteristic features of conifers and deciduous trees. During the discussion, the teacher mentioned the uses of forests, and why it was necessary to

conserve them. Again there was a discussion of how they could conduct their studies with minimum damage to the forest. During that discussion, such things like staying on the trails, using fallen parts of plants as specimens, and not stepping on plants were mentioned. While in the forest, the students saw the interrelationships among the forest communities. For example, birds were nesting in the trees, there were mosses on the tree trunks, students saw insects living in the mosses and woodpeckers feeding on the insects. Students also saw squirrels going up a tree and feeding. They studied the bark of trees, and how such human actions like carving names on trees affected the plants. Towards the end of the session, students were asked to respond to the questions in their worksheet, which asked about how the forest was influenced by humans, water, animals, wind, insects, fire, disease, and ice storms. The writer believed that the forest ecology sessions contributed towards enhancing the students' attitudes, because they learned about what they could do to conserve, and they were made aware of the need for conservation.

In the bird studies, where they had the use of binoculars, students saw many kinds of birds. They saw many bird nests, and noted variations in the site. For example, students did not seem to have previously known that some birds nested in the sand. They were reminded of the importance of plants to birds, and why they were advised not to trample over bushes. While they were touring the property and studying the behavior of birds, they learned that if they touched a bird's eggs the bird would abandon the nest, that there are differences in the types of

songs made by birds (e.g., ordinary songs and distress cries), and that humans affect birds both positively and negatively by such acts as building bird feeders and constructing roads. From the writer's point of view, apart from the appreciation of birds which the students got from the bird studies, they learned about how people could affect bird communities.

All the field study sessions involved activities with plant and wildlife conservation. Energy conservation was only mentioned in the overall need for conservation methods by humanity.

(3) Films Shown at the Outdoor School

Three films were shown during the camp. "A Living River", "The Other World", and "Trees". The films were previewed by the recreation director and selected by her for their interest and fit with the theme of the field studies.

All the films dealt with the ecosystem and conservation. For example, the first film dealt with the migratory behavior and life cycles of salmon, the adaptation of animals to life in rivers, the interrelationships among aquatic animals, the food chain, water pollution and how it affects organisms living in water, the components of a stream ecosystem, and why it is important to conserve plants and animals in and around a stream.

The second film discussed life in a stream, different types of aquatic plants and animals, food chain, and the balance of nature. In addition, the film cited some of the things which people (mainly industrialists) do, like putting some waste products (e. g., copper wastes) into streams and rivers. It was mentioned in the film that because the stream organisms could

not tolerate high copper content in the water they died. The film also mentioned what people can do to reduce pollution, and suggested that if people found others putting oil, for example, into a river they should report it.

The third film was essentially about forest ecology and the uses of trees. For example, it described the life cycle of an oak tree, how the tree is affected by weather, how the community around the tree supports different kinds of life, and the process of photosynthesis. In addition, the film showed that trees provide other organisms (e.g., birds, ferns, mosses, and insects) with homes, that animals and some plants feed on trees, and that most of the organisms living in the forest depend on one another. It showed how animals in general can damage trees. The film also suggested some rational conservation methods to be used to maintain the natural environment.

There was a discussion preceding all three films, and a discussion after the last two. The discussions were similar. The discussion preceding and following one film has been described below. Before the film, the teacher asked students to explain what the term "interrelationship" meant. After five responses, the teacher summarized the ideas which the students mentioned, and told the students that they were going to learn more about interrelationships between living and non-living things in a stream. The teacher also told the students that the film was going to show them about: the life cycle of an animal; interrelationships among living things, the balance of nature; pollution; and predation.

After the film, the teacher asked the students what they

learned. Their answers indicated that they had learned some of the facts and principles which were intended. They said they learned the life cycles of the oak tree and some insects; the ecosystem around a tree; how insects depend on plants; the importance of conserving trees; and why they should not touch the eggs in bird's nests.

It is clear, from the above, that the students considered the conservation of plants and wildlife as a result of viewing the film; and, the positive nature of the discussion led the writer to believe that their attitudes toward conservation could well have been enhanced.

After the film, students were told that the removal of any member of the environment affects other organisms. The students were also told that natural resources (including energy) are being used up in the world, and that, if people did not save their resources, there will not be enough for future generations. The teacher told the students that one of the objectives of the Outdoor School was to help students to understand conservation of natural resources.

The writer believes that the films contributed to enhancing the students' conservation attitudes. The films discussed things about plants and animals, about conservation, and taught them what they can do to conserve. In addition, the interviews after the films showed that all the films were valuable and interesting. All 26 students who were interviewed confirmed that they learned something new from the film, about plants and animals, and conservation methods.

One factor which the writer believed made the films

effective was the discussion before and after the screening. The pre-screening discussion helped students to anticipate what they were going to see and helped them understand the films better. The post-screening discussions also helped the students to understand the films and to relate them to conservation practices. During those discussions the topic of energy conservation was raised, and conservation practices were mentioned.

(4) The Outdoor School Environment

The writer believes that the setting of the Outdoor School contributed to the enhancement of students' attitudes towards conservation of natural resources. The camp provided a safe, happy, and academically rich environment for learning conservation-related issues.

The camp was a safe place, because, apart from the safety of the structures at the site, there was a nurse who lived at the camp, whose duty was to take care of all medical problems that might occur. She worked in consultation with a physician who was retained by the Outdoor School. She had a list of medical problems of the students from their parents, and took over their medications on the arrival of the students at the camp. At the first meeting she briefed all the teachers and counsellors about students who required constant surveillance, and what needed to be done in case of an emergency. She alone gave medications to students. Apart from the students who required constant surveillance, all students were closely supervised by their teachers and counsellors during field studies. During recreation, when they were with the counsellors,

the recreation director personally supervised both the counsellors and students. The property and the camp area had been marked, and when students went outside the marked area for any purpose they carried walkie-talkies so that any problems could be communicated to the camp staff for immediate attention. The camp also had a stock of rain gear and first aid equipment to ensure that students were not exposed to unsafe situations while at the camp. In addition, only animals which were safe to pet were maintained on the farm.

The camp was a rich environment to live in, with a swimming pool which the students could use often during recreation, and facilities for canoeing, archery, water safety, games, exploring, and treasure hunts. Or, during their free time, students could choose to spend their time playing table tennis, football, or fishing. Furthermore, kitchen staff ensured that students were given good food. Students were encouraged to eat what they were given, and they did. Seconds were always available after everyone had been served with a balanced diet, and most students helped themselves to them. Students were also served with a snack every afternoon, after field studies, and again before bedtime.

In the writer's opinion, the Outdoor School was a rich environment for the development of favorable conservation attitudes. There were camp rules which encompassed appropriate conservation practices. Both the teaching and the non-teaching staff members respected the rules themselves. There were many signs in and around the property indicating that the outdoor school was for environmental studies. These had been so

conveniently placed that the writer believed everyone saw at least one each day.

There were over 20 different types of bird feeders which had been conveniently placed around the living area, and all students saw them while they were at the camp, because it was one of the things which counsellors showed the students while they were touring the property soon after arriving at the camp. There were many conservation-related magazines in the lounge, and some students were observed reading them on different occasions. There were energy conservation posters in every building at the camp. There were many bulletin boards in the auditorium, which displayed, apart from the energy-conservation posters, other posters, on pollution, wildlife conservation, the food web, the energy cycle, and poems written by previous students, some of which also dealt with the need to conserve the environment.

The Outdoor School had video tapes and playback facilities in the lounge which teachers were encouraged to use. Two of the visiting teachers were seen using them on two occasions. There was a mobile library facility, and many materials from the Ministry of the Environment on acid rain, pollution, salmon enhancement projects, forest fires, and wildlife conservation.

One of the practices at the Outdoor School involved a daily inspection of cabins by the nurse. The best cabin was awarded a trophy which all the students had helped to make. Although cleanliness appeared to be the main concern of the nurse, any cabin which did not respect the energy conservation rules lost points. During the program one clean cabin left their lights on

and consequently did not win the trophy.

From the writer's point of view, the Outdoor School was not only a safe and enjoyable environment, but also a stimulating one that enhanced the development of favorable conservation attitudes.

(5) The Program Staff

The writer believed that the program staff (teachers and counsellors who took part in the program) contributed to making the program a success. All the counsellors and teachers said that they found the camp program and the field studies to be important and interesting to them, and to the students.

All the counsellors who took part in the program were interested and had volunteered to assist in the program. All ten counsellors had been to similar camps and, apart from the week-end preparation at the camp, eight of them had been to the camp as students. They knew their role in the program, and worked hard. They knew what they were teaching. For example, during the field studies they were heard using ecological terms like ecosystem, food chain and pollution correctly. They were always happily willing to help the teachers and the students when the need arose. The counsellors helped the students even after field studies. For example, some of the counsellors were overheard discussing different occasions in the cabins where students asked them questions about some of the field study sessions, specifically questions on why they were learning about conservation. The counsellors said they explained to the students that the world was going through a phase of environmental degradation and unwise use of natural resources.

According to the counsellors, they had told the students that those problems were being caused by industrialists and other people who did not understand the problems, and that part of the objectives of the program was to help them to understand so that they would help to conserve the environment and its resources, and to pass on the information to other people.

The writer believed that the counsellors were influential because they were very close to the students for most of the week. The students needed the company of the counsellors in order to do such things as fishing, exploring, or petting of farm animals. The students liked the counsellors. During the freetime, students went to the counsellors and they were seen talking with students for most of that time. The writer also observed students writing down the addresses and phone numbers of the counsellors on the last day at camp.

Like the counsellors, all the teachers who took part in the study said they enjoyed it. One of the teachers from the visiting school who was unable to participate in the program was replaced by another teacher who was interested. The backgrounds of the six teachers showed that each of them had a university degree and had taught for at least three years. Their teaching experience at the grade six level ranged between one and six years. Apart from the outdoor teachers who lived at the camp, all the other teachers had visited the camp prior to the camp program. All the teachers had had some experience teaching conservation-related topics, and all of them said that they believed it was very important for students to acquire favorable attitudes towards conservation of energy, plants, and wildlife.

Their behavior at the camp showed that they were very keen on conservation and interested in the students. For example, they helped the students to design conservation posters as follow-up activities on two evenings.

The cooperation of all the teachers was excellent. They discussed their field study topics and were open to alternate ideas from anyone. The teachers were also enthusiastic about their work. As an example, one teacher, soon after arriving at the camp, asked the resident teachers where it would be possible to see the greatest variety of birds. After discussing the details of what she wanted she toured the property with another teacher and selected the best sites for her bird study sessions. A view expressed by the recreation director, and which the writer shared, was that the teachers were so enthusiastic about their work that the students had to be interested in what they were being taught.

The teachers could also supervise or accompany the students on some of the free-time activities like fishing and petting the farm animals. That role enabled the teachers and the counsellors to watch what the students did, and to react to their attitudes and behaviors. During those interactions the adults, consciously or unconsciously showed the students their own positive attitudes. For example, when one teacher was going out with two students who wanted to spend their freetime fishing, he asked the second student to follow the first so that they would not trample over the bushes. He too followed the students in a file.

Thus, the program staff contributed to enhancement of the

students' attitudes towards conservation of natural resources by serving as good models.

(6) Variations in the Teaching Strategies Used

Even though all the teachers used an ecological approach to discuss their individual sessions, they used slightly different techniques. One teacher used a unit which she had developed to teach a forest ecology session. She believed it was important that the students study the forest plants and other organisms, and enjoy doing that; before discussing the conservation aspect, and that was the approach she used.

Another teacher began by stressing the importance of conservation; and explained, for example, how energy conservation could help people to save money. According to him, that approach was more effective because if students understood why conservation was necessary, and knew that practicing conservation would help them individually and/or collectively, they were more likely to practice it. The writer shared that view with the teacher, but wondered if students considered saving money as being the best motivation.

A third teacher began by asking students to identify some animals which they would like to save, and others which they would not like to save. He then asked students to offer reasons for their choices. He acknowledged his support for saving the animals which they wanted to save, and addressed the students' negative ideas about the other animals (e.g., wild cats and snakes). He explained how those animals were valuable in the forest to control populations of other animals, and the importance of conserving them. After that introduction he

proceeded to discuss the role of living and non-living things in an ecosystem and the need for conservation, before elaborating on the activities which had been planned for the session. In the writer's opinion, this teaching approach was effective because it reinforced the students desire to save some animals and gave them new information to help them re-evaluate their attitudes towards the animals which they did not like to conserve.

The fourth teacher discussed the effect of what the students did during the field studies. (Some of them were found walking in the stream during the bird studies.) The teacher gathered all the students and asked them to look at the water, and to decide if walking in a stream was a good or bad practice. After all the students had agreed that it was a bad practice, she asked them to explain why they considered it to be bad, which they did. She asked them to suggest other acts which they considered to be bad, (i.e., anti-conservation) and they listed many things like throwing rocks into a stream, walking along the edges of a stream, and throwing garbage into a stream. Even though the teacher knew which students were involved in that act, she did not mention any names in the discussion. One of them was seen apologizing to the teacher later, and two other students were reported to have apologized too. In the writer's opinion the content of the discussion helped the students to realize the effect of what they did, and the positive manner in which the discussion was held probably made the students who were involved in the act to feel guilty. At least the students who apologized became conscious about what they did. Although the latter comment worked with the students, the writer believes

that the same method may not achieve similar effects with a different group of students.

The fifth teacher discussed the components of a stream ecosystem and the interrelationship among the components. Students were then divided into two groups to do some water chemical tests, after which the teacher involved them in an activity which showed them how complex the interrelationships among the components of an ecosystem could be. They also discussed how the removal of any one component could affect the whole ecosystem. The writer observed that the students enjoyed doing the water tests. They also learned about the interrelationships which exist in the stream ecosystem and why it was important to conserve all the components of an ecosystem. The writer believes that the session was different from all the other sessions because it helped the students to see pictorially (students used strings to connect interrelationships in the ecosystem) the complexity of the interrelationships in an ecosystem, and because they were involved in developing the pattern of the interrelationships.

The sixth teacher's teaching method showed that enjoyment and an understanding of what was being presented were important to him. For example, during the farm session he encouraged the students to pet the animals, by showing the students how to pet them, and by allowing time for all students to have the opportunity to pet the animals. Also, he devoted considerable amount of time to the explanation of why it is important to conserve, and how certain human acts affect plants and animals. During the explanation he used different analogies. For example,

he used human homes as an analogue of a bird's home. He asked students to imagine how disturbing it would be if someone threw a rock into their home, and asked the students to relate the act to the feelings of birds. He also asked students how they would feel if someone were to put oil into their drinking water, and asked students to relate that to the feelings of fish when people put discarded engine oil into streams.

The teacher allowed the students to pet the animals (an act which all of them enjoyed) and to develop a liking for the animals, before discussing their conservation. The petting appeared to have helped the students to associate a positive relationship with animals, and therefore created a favorable condition for them to accept to conserve animals. The use of analogies also appeared to the writer to have helped the students to associate their feelings to the animals. Even though in the writer's opinion the use of analogies was successful for that session, the writer did not think that the method should be used extensively, because the analogies were not always positive with conservation-related issues.

Apart from the differences in the way conservation was introduced to the students, teachers also had different ways of sustaining the interest of the students. For example, two teachers told students what they were going to do and what was expected of them at the end of their sessions. During those sessions students were very attentive; they wrote down notes, and appeared to be competing among themselves for grades. Thus, with those two teachers the use of assignments was effective in sustaining the attention of the students during the field

studies.

The other four teachers maintained the attention of the students by giving them the freedom to explore the environment. For example, during the stream studies, one teacher demonstrated how to use nets to catch organisms living in the stream, and asked students to observe differences in the plants and animals. Students were excited about the differences among the organisms (mainly animals) and often shouted in excitement about what they had found. Although they took their books with them when they started the activity, they all returned their books to the bank individually, within the first few minutes, and returned to continue with the activity. During the activity, the teacher visited the students to identify their living organisms. He told the students to change the locations so that they could sample different organisms.

In the writer's opinion, both methods were effective, but while in the former method students listened and wrote down many things, in the latter they explored the stream on their own and realized how and where they could find more stream organisms. Each approach had its advantages and disadvantages.

The writer believes that the teaching strategies which were used during the program were both effective and varied enough to capture the interest and attention of all students. Consequently the writer believed that the variations in the teaching strategies used contributed to the enhancement of the students attitudes towards conservation of natural resources.

(7) Individual Attention

At school, there were 23 students in each class giving a student-teacher ratio of 1:23. During the field studies the 69 students who took part in the camp program (one student had left the province) were divided into five groups, and the maximum number of students per group was 14. In addition, two counsellors helped each teacher during the field study session, thus making more help available to the students. The ratio of students to those who were involved with instruction (teachers and counsellors) during the field studies was 16:69.

Because the field study groups were smaller than a normal class, and because of the assistance of counsellors, students had more individual help. For example, the writer observed that in school, on many occasions, students needed help but had to wait because the teacher was helping others. Often some students abandoned the request for help because assistance did not arrive when they needed it. During the field studies, however, help was readily available.

For example, during the session on forest ecology, students were asked to use a key to identify some plants, and most of them asked for help in identifying some of the external structures on the plants. The teacher and the two counsellors helped the students, and the writer observed an expression of satisfaction on the faces of students following the help. Also, while the students were drawing the specimens, most of the students wanted the teacher to see what they had done and for the teacher to respond to the quality of their work. Because the number of students was small the teacher was able to help all

the students. In addition the counsellors provided help.

The writer believes that the students gained more than they otherwise would have from the field studies, because of the small size of the student groups and because of the additional help which was available from the two counsellors. The help of the counsellors was worthwhile because they had studied the field study activities themselves, and they had more knowledge about the sessions than the students. In the writer's opinion, if the counsellors had no prior knowledge about the field sessions they would have probably inhibited the success of the field studies, because it was likely that some of their thoughts would have conflicted with that of the teacher.

(8) Post Camp-Program Activities

After the week at the Outdoor School the teachers engaged the students in some follow-up activities. They watched two films on conservation, discussed what they did and learned at the Outdoor School, wrote letters to the Outdoor School staff, and completed a chapter on animals in the science classes.

In the writer's view, the follow-up activities helped the students to think through what they learned at the Outdoor School. Also, because the follow-up was done in the school, the writer believes that students transferred what they had learned from the Outdoor School environment to their school and to their homes. For example, students used the knowledge they gained at the Outdoor School to write a report on a farm animal, and also to write a poem. Both reports were submitted after the camp program.

The follow-up also helped the students to express their

appreciation of the camp program by writing letters to thank the Outdoor School staff. Students showed their letters to other students and they talked about what they had done since the camp program. For example, one student mentioned that she took her parents to a stream and showed them some of the things they learned at the Outdoor School, and explained how streams were affected by pollution and other human acts (throwing rocks into a stream, walking in streams, putting soap into streams).

In the writer's opinion, the follow-up activities enhanced the students' attitudes towards conservation of natural resources by reinforcing the things they learned about conservation at the Outdoor School. The follow-up also helped the students to extend what they learned beyond the Outdoor School environment.

4.2.5 Triangulation of Views

Sevigny's (1978) view of triangulation, involving a comparison of the opinion of different people on the same program, was used for this study. The alternate views were expressed by the students, counsellors, teachers and the writer. These alternate views have been presented as Table 4.9. The results show that all shared the common view that the field studies, the outdoor school environment, and the program staff contributed to enhancing the students' attitudes towards conservation of natural resources. The students, teachers and the writer believed that the films shown at the Outdoor School also contributed to enhancing the students' attitudes.

Counsellors did not cite the films, but that was

Table 4.9

Aspects of the Outdoor Education Program Which Students,
Counsellors, Teachers and the Writer Believed to have
Contributed to Enhancing Students' Attitudes Towards
Conservation of Natural Resources

Aspect of the Program	Stud.	Couns.	Teach.	Writ.
1. Preparation phase	N	N	Y	Y
2. Field Study Sessions	Y	Y	Y	Y
3. Outdoor School Environment	Y	Y	Y	Y
4. Program Staff	Y	Y	Y	Y
5. Variations in Teaching Strategies	Y	O	O	Y
6. Individual Attention	N	N	N	Y
7. Films	Y	O	Y(O)	Y
8. Post-camp Activities	N	O	Y(O)	Y

Stud. = Students

Couns. = Counsellors

Teach. = Teachers

Writ. = Writer

N = Did not cite aspect

O = Not in a position to judge aspect

Y = Cited aspect

understandable, since they did not see any of the films. The film sessions were the free times for the counsellors and most teachers. The teachers who cited the films as contributing toward enhancement of students' conservation attitudes were the two teachers who supervised the film sessions.

Students and the writer shared the view that variations in the teaching strategies used during the outdoor education program contributed toward the enhancement of students' attitudes toward conservation of natural resources. Counsellors

and teachers did not suggest that the variations in teaching strategies contributed to enhancing the students' conservation attitudes. This was understandable for teachers because they did not see the teaching strategies which the other teachers used. Counsellors were teamed with teachers for the field study sessions. Six counsellors were teamed with each of three teachers; consequently, these six counsellors only experienced the teaching techniques of their team teacher and had no opportunity to observe any of the others. Each of the other four counsellors worked with two teachers, but did not mention the effect of the variations in teaching strategies as being a contributing factor. The writer believed that the four counsellors did not cite the differences in teaching strategies for two reasons. First, they saw only two teachers, and differences in the teaching strategies were probably not obvious to them. Secondly, apart from the teachers which the counsellors were assigned to for the field studies, all four counsellors worked with a common teacher and apparently considered him to be different from the others. This was indicated during the interview with counsellors after the program. Two of the four counsellors referred to that teacher in question as a "specialist," whereas in fact he was one of the teachers at the Outdoor School. The confusion may have arisen because that teacher lived outside the camp area while all the other teachers who were involved in the program lived on the camp property.

Apart from the five factors generally agreed upon as contributing towards the enhancement of the students' attitudes towards conservation of natural resources, three other factors

did not receive consensus approval, even by those who were in a position to notice their effects.

The teachers and the writer agreed that the preparation aspect of the program helped to enhance the students' conservation attitudes, at least indirectly, but no student or counsellor made mention of that aspect, even though both the students and the counsellors went through preparation procedures themselves. The identification of the importance of the preparation phase in the teachers' handbook, the extent of work which teachers put into it, and the background of both the teachers and the writer probably enabled them to relate the preparation phase to the enhancement of students' attitudes.

Similarly, only the teachers and the writer mentioned the post-camp activities as contributing towards the enhancement of the students' attitudes towards conservation of natural resources. The reasons which were given for citing the preparation phase by teachers and the writer were also applicable for the post-camp program. The absence of the support from counsellors on the post-camp activities was understandable because they were not involved, and they did not know what went on after the camp program.

It was the opinion of the writer that since the camp program was the climax of the whole outdoor education program, both the students and the counsellors probably focused their responses on only the camp program. The non-citation of the preparation phase and the post-camp activities was probably because they had not thought about it then.

The last factor, mentioned by only the writer, was the

individual attention by staff members during the program. The writer believed that he noticed that factor because during the pilot study the students, the counsellors and the teachers all suggested that the individual help led to enhanced attitudes in the students. They also said that help was available when it was needed. That finding, and the discussions which followed, influenced the writer to observe that factor during the present study. The others probably did not either observe the difference in the extent of individual help which was available during the field study sessions, or did not consider it to be a significant aspect in enhancing the students' attitudes towards conservation of natural resources.

From the views expressed by the students, counsellors, teachers and the writer: the field studies, the Outdoor School environment, the program staff, the films which were shown at the Outdoor School, and the variations in the teaching approaches which were used during the field study sessions were aspects of the program which all those who were in a position to observe them mentioned as contributing to enhancement of students' conservation attitudes. Two aspects, the preparations before the camp program, and the post camp activities, were mentioned by only the writer and the teachers who were in a position to judge the aspects. One aspect (the individual attention which students received) was cited by only the writer as contributing to the enhancement of students' conservation attitudes.

4.2.6 Discussion of Case Study Results

The results of the case study show that eight aspects of the program were judged to have contributed to enhancing the students' attitudes towards conservation of natural resources. The eight aspects were the preparation before the camp program, the field study sessions, the Outdoor School environment, the program staff, the variations in teaching strategies, individual attention, the films, and the post-camp activities.

(1) The Preparation Phase

The important role of preparing for an outdoor education program has been identified by the North Vancouver Outdoor School (Robertson and Shields, 1980a) and other outdoor educators like Cordier (1966) and Stapp (1964). The main components of the preparation phase attributing to enhancement of students' attitudes were the films, the science lessons, the language arts lessons, and the discussion of the Outdoor School rules.

Three things were related to attitude enhancement in the preparation--students learned about conservation, they discussed interesting things about the forest, and the school lessons were integrated with the Outdoor School. Although acquisition of knowledge is not sufficient precondition for attitude development, it has been found to have a positive effect on attitudes (Castro and Jordan, 1977; Ajzen and Fishbein, 1980). The positive effect of knowledge on corresponding attitudes has also been suggested in outdoor education by Brown, 1971; Trichenor et al., 1972; Stapp et al., 1969; Roth, 1973; and Cohen, 1973.

According to Fishbein's theory on attitude development, the association of pleasant experiences to what is learned enables one to acquire an attitude toward the learned material. Thus, since students discussed things which were interesting to them, the conditions necessary for development or enhancement of attitudes had been satisfied.

The need to integrate the regular school lessons with the Outdoor School camp program has been identified in the teachers' manual (Robertson and Shields, 1980a), and in outdoor education programs in general (Stapp, 1964) as important for the success of outdoor programs. It appeared that the integration made students anticipate things which they were going to learn during the camp program, to be better prepared for the content of the instruction through the library research, and to take the field studies seriously since they had to write a report on their return.

The interview before the camp program indicated that students considered the program to be a privilege which they could lose if they did not comply with the rules of conduct. The literature on attitudes shows that although forced compliance can result in positive behavior, it can also lead to unfavorable attitudes toward the event (Perkes, 1973). During the preparation, students had an opportunity to discuss their feelings about the rules. In addition, students were free to not participate in the camp program, but non-participation was not observed. The comments which students made about compliance, therefore, were considered indications that students were aware of the conservation rules even before they went to the Outdoor

School.

Although the preparation of teachers, parents and counsellors did not involve students, students benefited. The meetings among teachers helped them to select suitable field study topics, provided them an opportunity to discuss the program, and to complete arrangements which were needed before students could visit the Outdoor School.

The preparation of counsellors helped to ready them for the camp program. It gave them an opportunity to meet with the Outdoor School staff, to learn about the role of counsellors in the program, and to practice the field studies and recreational activities. The preparation of counsellors was important, because the counsellors had no teaching experience or training. The preparation of parents, which involved one meeting, served to confirm the support of the parents for the camp program.

The above descriptions show that the preparation prior to the camp program was extensive, and involved different individuals. Even though only the preparation of students was related directly to the enhancement of the students' conservation attitudes, the preparation of teachers, counsellors and parents was considered to be helpful because it contributed to the success of the program.

(2) Field Studies

There were four field study topics--forest ecology, farm studies, stream ecology, and bird studies. Each included some aspects of conservation of energy, plants and animals. Teachers, counsellors, students and the writer believed that each of the field study sessions contributed to the enhancement of students'

conservation attitudes. The factors in the field studies which were considered to have enhanced the development of favorable conservation attitudes included what the students learned about natural resources, what they saw about conservation, their interest in what they learned, and what they learned they could do to conserve natural resources. The things the students said they learned which had a bearing on conservation included the similarity between domesticated animals and wild animals, the adaptation of animals to their environments, the behavior of birds, methods of determining the quality of life in a stream, the structure and function of different ecosystems, the rate at which natural resources are being used up and the effects of these on the future. It was suggested earlier that the new knowledge contributed to enhancing the students' conservation attitudes. Even though there is controversy about the relationship between knowledge and attitude development, the literature supports the view that knowledge is necessary for the development of attitudes (Castro and Jordan 1977; Ajzen and Fishbein 1980; Southern 1971).

During the field study sessions, students had a variety of experiences related to conservation. They found that even though there are similarities among animals, that each animal is different in many ways. For example, they found that all birds in the forest are not the same and that different birds live in different parts of the forest, nest differently, feed differently, and behave differently. They observed that many stream organisms live under rocks, and that many human acts (e.g., shouting in a forest, throwing a rock into a stream,

walking in a stream, walking along the bank of a river) affect the plants and animals in a stream. All these are experiences which directly relate to conservation attitudes and behaviors. The effect of direct experience on attitude development has been documented (Regan and Fazio, 1977; Songer-Nocks, 1976). These authors even suggest that direct experience is a good predictor of behaviors.

Because the experiences which students were exposed to were many and varied, it was believed that the field studies gave students a rich experiential framework which they could relate to on matters concerned with conservation. For example, they saw the behavior of birds as the students approached the birds' nests, and could relate it to how wild animals were affected by humans. Direct observation of the consequences of poor conservation practices and discussion of what is observed has been suggested to be helpful for enhancing attitudes and behaviors by Howenstine (1962). According to Gorman (1974), direct experience helps to develop and/or enhance attitudes in general, if a pleasant experience is associated with the experience.

Fishbein and his associates (Fishbein, 1967; Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980) have argued that if learning about an event, act, (i.e., an attitude object) is associated with pleasant feelings, an attitude is developed or modified with respect to the attitude object. Other social psychologists like Alaimo and Doran (1978); Cialdini, Petty and Cacioppo (1981) have also suggested that if the individual finds what he/she is learning to be valuable, he/she develops a

positive attitude towards the content of what is being learned. The students, and also teachers, counsellors, and the writer found each field study session to be interesting, and valuable. Over half of the students who were interviewed after the field study sessions said they liked "everything," and when they were asked about what they did not like, most of the students, teachers and counsellors not only said "I liked everything," but also expressed surprise at being asked the question, because they thought their interest in the field study sessions was obvious.

During the field study sessions, students also learned things which they can do to save energy, plants and wildlife. Apart from the obvious implications of their experiences during field studies, students learned about other conservation methods in energy conservation, forest conservation, fishing regulations and the ways through which they can share their acquired ideas with other people. Probably the contents of the letter written by the student about taking her parents to the stream and showing them what she learned at the Outdoor School was an outcome of that discussion.

Unfortunately, most of the conservation methods which the students learned involved many negations. For example, they learned that in order to be good conservationists they should not touch a bird's nest, not walk off trails, not walk in streams, not walk along a river bank, not break branches off plants, not leave lights on when not in use, not throw rocks into streams, etc. The things which they were told not to do far outnumbered the things they were told to do. It appears to the

writer that the many "don'ts" are in consonance with conservation methods (there are many things not to be done, and also many rules and laws).

The writer observed that the "don'ts" were always arrived at after discussing and/or observing the consequences of the act. The writer found that approach to be good, because it helped the students to understand the reasons for the suggestion, and also because the students became involved in arriving at those decisions.

(3) Films Shown at the Outdoor School

The three films shown were all on conservation. It was suggested that the films contributed to the enhancement of students' conservation attitudes because the films provided relevant information for the development of the appropriate attitudes. All 26 students interviewed confirmed that they learned something new from the films, and that they found all films to be both valuable and interesting.

One factor which the writer attributed to the effectiveness of the films was the discussions before and after showing each film. The pre-screening discussions helped students to anticipate what they were going to see and it helped them to understand the films better. The post-screening discussions also helped the students to understand the films and to relate the contents of the films to conservation practices. All of the films were basically on conservation of plants and wildlife, and it was during the discussions that energy conservation was addressed.

Outdoor educators and social psychologists have found that

discussions are very effective teaching methods for influencing attitudes (Crano, 1977; Webb, 1979; Ronis et al., 1977; Cook and Flay, 1981; Cialdini, Petty and Cacioppo, 1981; and Harrison, 1977). In this study the pre-screening discussions helped students to anticipate what they were going to see and therefore helped the students to understand the films better. The post-screening discussions also helped students to understand the films and to relate what they saw to conservation practices. In this study, the discussions were particularly important because all the films which students saw were about plants and wildlife. It was during the discussions that the topic of energy conservation was raised, and energy conservation practices mentioned.

(4) The Outdoor School Environment

The environment of the Outdoor School was one of the aspects which all four groups considered to have contributed to the enhancement of students' conservation attitudes. It was a safe, happy and academically rich environment for learning conservation-related issues.

The students were able to feel relaxed and thus negative associations with what they learned were reduced. The excitement of the students in the environment helped students to develop positive associations with what they learned. The safe and rich environment contributed to enhancing students' conservation attitudes because it made them more relaxed and contented while they learned about conservation. There were camp rules which included appropriate conservation behaviors which students were aware of before they even arrived at the Outdoor School and

which they respected. Other favorable aspects of the environment which contributed to enhancement of students' attitudes were the different kinds of bird feeders around the grounds, the conservation magazines in the lounge, the posters on conservation, the displays of poems on conservation written by former students at the Outdoor School, and visual materials on things like acid rain, pollution, wildlife and forest fires. Research in social psychology supports the view that direct exposure to an attitude object can result in positive attitudes, if the experience is pleasant or favorable (Katz, 1960).

In addition, the practices at the Outdoor School involved appropriate energy conservation behaviors in cabins, and students respected the conservation ethics by turning off lights in the cabins. It has been reported in the literature (Edgar, 1972; Hershey et al., 1971) that appropriate attitudes can be developed by practicing conservation. Although there had been a discussion of the Outdoor School rules prior to the camp program; and students knew that they were trying to conserve energy; and although they had agreed to turn off lights, and did, students were also competing among themselves for the cabin award, and knew that turning off the light would help them win. Thus, interest in winning the cabin award spurred them to turn off the lights.

(5) The Program Staff

The program staff (i.e., teachers and counsellors) influenced the students' conservation attitudes through their own attitudes and behavior. Both teachers and counsellors respected the Outdoor School rules, and since the students were

often in the company of the adults, they saw what the adults did and said. In addition, the adults also responded to the conservation attitudes and behaviors of students through their reactions and comments; for example, in the enthusiastic response of the teachers and counsellors to the students' participation in the camp program. When a teacher accompanied some students on a fishing trip, he encouraged them to walk in a file so they would not trample over the forest bushes. Again, when students decided to develop their own conservation posters two teachers encouraged them. Counsellors used conservation terms correctly during their discussion with students and on different occasions they responded to students' questions.

The above examples show that consciously or unconsciously the teachers revealed their own positive attitudes, and acted as models for the students. In addition, students often wanted to be in the company of the counsellors and the teachers, particularly during the free times, and according to Bandura (1971) students tend to copy models. Therefore, the suggestion is that they might have copied the attitudes and/or behavior of the teachers and counsellors. This mode of learning was different from the one suggested by Fishbein. The approach used by Bandura comes from the Social Learning Theory. According to the Social Learning Theory, the model behaves in a certain way or makes value-oriented statements which are imitated by the learner. If the learner is rewarded by approval, a smile or tangible reward, the attitude will tend to become a relatively permanent part of the outlook and behavior (Bandura, 1971). Similar comments have been made by Gorman (1974).

During the camp program new people were involved (counsellors and the teachers from the Outdoor School). Jacob (1960) and Lehmann (1963) have reported that they have found that students who are seeking recognition from the adults are apt to change their values and attitudes. Therefore, those who had negative attitudes and behaviors were influenced to change, while those who had positive attitudes were influenced to maintain them. One counsellor reported that most elementary school students saw high school students as their idols, and because of the way students saw the counsellors, the students were more prone to accept what the counsellors told them, including appropriate conservation behaviors. In outdoor education programs, Howenstine (1962) has attributed the inability of some programs to achieve their objectives because staff members do not practice the rules themselves. Rosenshine (1971) and Gage (1976) have also suggested that the behavior of staff members affects the behavior of students during outdoor education programs.

(6) Variations in the Teaching Strategies Used

All six teachers who were involved in the study used an ecological approach which has been reported to be effective for teaching about conservation (Mitchell and Lunneborg, 1973). This ecological approach involves a wholistic view of an ecosystem involving living and non-living things, and the interrelationships among the components of the ecosystem. For attitude development, it helps students to see the role of each of the components in an ecosystem, and why it is necessary to conserve them.

Even though all teachers used the ecological approach, the way each teacher presented conservation to students was different. One of the teachers used the teaching approach suggested in an outdoor teaching unit of which she was a co-author. Another teacher used an approach suggested by Rhye (1973). All other teachers said they used teaching approaches which they had found to be good from their past teaching experiences.

The writer and all the students who were interviewed after the field study sessions said they found each teaching strategy to be interesting and effective. It was therefore suggested that the teaching strategies were varied enough to capture the interest of students in the conservation topics. According to Fishbein's theory on attitude development, interest enhances the development of attitudes.

The field study topics which the teachers taught were different, and these differences may have contributed to the variations in teaching strategies. In any event a study by Yaakobi (1981), involving a larger sample of teachers, also found that teachers differed in their manner of presenting conservation concepts. Howenstine (1962) has reported that he considers variations in teaching strategies to be good in outdoor education but only if the teacher has thought through the strategy and has found it to be appropriate. Munzer and Brandwein (1960) suggest that, in the teaching of conservation topics, variations in teaching methods should be expected because of differences in the personal experiences of teachers, the differences in the amount of knowledge teachers have about

conservation topics, and the type of teaching strategies which teachers are used to.

(7) Individual Attention

The ratio of students to adult helpers (teachers and counsellors) during the program was smaller during the field studies than that in regular classroom conditions. This reduced ratio was observed to facilitate student learning by making more help readily available to them during the program. However, only the writer related this aspect of the program to attitude development.

The fact that students, counsellors and teachers who took part in the program did not cite individual attention may not be sufficient reason for one to reject its role, because they were not asked about this factor directly. A more direct question would have enabled one to assess their views. However, their counterparts during the pilot study did cite this aspect of the program as contributing to attitude enhancement, and the student-staff ratios were similar to those in the present study. In recent years, teachers have also argued that class size affects student achievement. The effect of class size on student learning is still a controversial issue in education, but most studies done in North America have shown that smaller class sizes result in better achievement (Glass and Smith, 1979).

According to Fishbein's theory on attitude development, if a negative or positive experience is associated with something which is learned, a corresponding attitude is developed. During the camp program, the reduced student-teacher ratio made more help readily available to students, and therefore, made the

learning experience more positive. For example, it was observed that in school on many occasions students needed help, but had to wait because the teacher was helping others. Often some students abandoned the request for help because assistance did not arrive when they needed it. During the field studies however, help was readily available. Thus the improved student-teacher ratio helped to improve the conditions for student learning by removing the frustrations associated with learning due to help not being available when needed.

(8) Post-Camp Program Activities

After the camp program, the visiting teachers involved the students in follow-up activities. These included watching two films on conservation, discussing what students had learned in the Outdoor School, writing letters to the outdoor teachers, discussing science and language arts assignments, and completing a science lesson on animals. The follow-up was helpful to students because it made them think through what they had done during the camp program, and also helped the students to relate regular school work to the Outdoor School work, through the assignments which they submitted.

At the end of the camp program the Outdoor School teachers expressed their concern about the importance of follow-up activities. They were concerned that because of the relationship between the Outdoor School and the city schools, an effective follow-up was the best way of helping students to transfer their acquired attitudes beyond the Outdoor School. Similar views have been expressed by Robertson and Shields in the teachers' handbook (Robertson and Shields, 1980a), and also by George

(1966) in outdoor education.

The follow-up activities in the program involved learning things about conservation from the films, and many discussions. Acquisition of relevant knowledge has been found to be a necessary precondition for attitude development by Castro and Jordan (1977) and Ajzen and Fishbein (1980). Research in social psychology also supports the view that in attitude development, discussions help individuals to think through what they have learned already, and repetition also helps to reinforce old attitudes (Bandura, 1971). The follow-up activities lasted for a week and during that period of time there were different discussions, and so there was continual reinforcement of conservation attitudes. According to Bandura (1971), continued reinforcement also helps to strengthen already acquired attitudes.

4.3 Summary of Results

In this two-fold study, Part 1 (the attitude assessment study) dealt with finding out if the program had an effect on the students and the nature of the effect, while Part 2 (the case study) dealt with the aspects which contributed to or appeared to have contributed to the change in attitude.

4.3.1 Summary of Attitude Assessment Study

The results of the attitude assessment study indicated that the outdoor education program was effective in enhancing the students' attitudes towards conservation of the three areas of natural resources--energy, plants, and wildlife--taken together.

An interpretation of the overall change in attitude, using Fishbein's theory, suggested that the students responded positively to the things about conservation of natural resources which they learned during the outdoor education program. Although this inference is based on the theory which was adopted for the study, the description of the treatment shows that this was a reasonable interpretation of the results.

The results further showed that the greatest impact of the program on the nine dependent variables was in personal action with respect to conservation of energy and plants. The least impact of the program on the nine dependent variables was in personal action in wildlife conservation, and societal norm in energy conservation. According to Castro and Jordan's theory (discussed in Chapter II of this thesis), this meant that the observed change in the students' attitudes towards conservation of natural resources was more likely to affect the positive behavior of the students in energy and plant conservation, than the positive behavior in wildlife conservation. The responses of some of the parents suggested that if the students were exposed to situations which demanded positive behavior in wildlife conservation, they would practice the expected good conservation methods.

4.3.2 Summary of Case Study Results

The results of the case study show that the positive change in the students' conservation attitudes was attributed to eight aspects of the program--the preparations prior to the camp program, the field study sessions, the films shown at the

Outdoor School, the Outdoor School environment, the program staff, the variations in the teaching strategies which were used, the individual attention which students received, and the post-camp activities. The way each aspect was related to conservation attitudes has been discussed in section 4.2 of this chapter. The case study revealed that many of the aspects which have have been repoted by outdoor educators and social psychologists as enhancing the development of favorable attitudes (Chapter II) also operated in the North Vancouver residential outdoor education program.

The case study results also show that of the three conservation topics which were investigated in this study there was more emphasis on plants and wildlife conservation than on energy conservation. This was reflected in the films and in the field studies, where more time was devoted to plant and wildlife conservation than in energy conservation. The student interviews after the program (section 4.2) also showed that they saw the program in the same way.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This concluding chapter of the study begins with a restatement of the problems which were investigated and contains the conclusions of the study. It also specifies the limitations of the conclusions, and discusses the seriousness of these limitations. The chapter ends with some recommended follow-up research, and some suggestions for application of the findings to practice.

5.1 Research Problems and Corresponding Conclusions

This study investigated the change in attitude towards conservation of natural resources presumed to take place among students in a residential outdoor education program. The study addressed itself to two specific questions.

Specific Problem #1

What effect does participation in a residential outdoor education program have on the attitude of students toward conservation of natural resources?

Conclusion #1

With regard to the specific question, it was concluded that:

Residential outdoor education programs can and do enhance students' attitudes toward conservation of natural

resources.

This conclusion is based on the results of the attitude assessment study from Chapter IV (section 4.1.3) which involved the adoption of Fishbein's theory on attitude development. The interpretation of the findings, using Castro and Jordan's theory, showed that in the area of energy and plant conservation, the responses of the students reflected a positive change in attitudes at the personal action level. In the area of wildlife conservation, however, the evidence showed that their behavior did not reflect a positive change in their attitudes. The weak relationship between the overall change in attitude and the behavior of the students with respect to wildlife conservation, where there was little change, has to be interpreted with caution, because evidence showed that students had not been exposed to situations where they could practice wildlife conservation. A discussion of the results has been provided in Chapter IV (sections 4.1.3.2 and 4.1.4)

Specific Problem #2

What aspects of an outdoor education program contribute to or appear to contribute to enhancement of students' attitudes towards conservation of natural resources?

Conclusion #2

With regard to this specific question, it was concluded that:

The following eight aspects of the program contributed or appeared to have contributed to the enhancement of the students' attitudes towards conservation of natural

resources:

- (1) the pre-camp preparations;
- (2) the field study activities;
- (3) the Outdoor School environment;
- (4) the attitudes and behavior of the teachers and counsellors;
- (5) the films seen at the Outdoor School;
- (6) the variations in teaching strategies used;
- (7) the individual help which students received;
- (8) the post-camp follow-up activities.

These eight aspects were ranked in three groups based on consensus. Group one, which had consensus approval of all those who were in a position to judge the aspect, included the field study sessions which students were engaged in, the supportive Outdoor School environment, the enthusiasm and behavior of the teachers and the counsellors, the content and manner of presenting the films at the Outdoor School, and the teaching strategies which were used. Group two, which had approval of the writer and those teachers who were in a position to judge the effect of the aspect, included the preparations which took place before the camp program, and the post-camp activities. The aspect in group three, which was identified by only the writer, was the increased amount of individual attention which students had during the camp program. An analysis of these eight factors has been provided in Chapter IV.

5.2 Limitations of the Findings

The findings which have been presented above have been arrived at after careful analysis of the data gathered during the program. The findings have, however, some limitations.

- (1) The subjects were not randomly selected for the study. This problem of non-random sampling greatly restricts the generalization of the findings of this study.
- (2) The writer was with the subjects throughout the period of the study. The mere presence of the writer may have directly or indirectly interfered with the data which was collected.
- (3) All the teachers who took part in the program had had previous outdoor education teaching experiences and were very enthusiastic about the program. Thus the effects may not apply to similar programs which use a less enthusiastic group of teachers.
- (4) Most of the students who took part in the program were from upper-middle-class homes. Thus the effects of the program on students from other socio-economic levels may not be similar.
- (5) The time interval between the camp program and the posttest was short (one week), thus withholding an opportunity for students to be exposed to situations where they could practice some of the conservation methods.
- (6) No attempt was made to prove the assertion that the aspects of the program actually resulted in enhancing the students' conservation attitudes.

These limitations restrict the findings of this study; however, they are not seriously restrictive. Firstly, even though the subjects were not selected randomly, the study has provided evidence to support the experimental and speculative claims of many outdoor educators, the hypothesized attitude change being found to occur. That is, this study has established indirect evidence for generalization of the findings about attitude change in outdoor education programs. Secondly, during the study, additional attitude measurement data were collected on both the experimental and comparative groups after the comparative group had taken part in the residential outdoor program. These additional data, while not part of the main study, are analysed in Appendix U. The results of that analysis showed that the outdoor education program produced similar attitude enhancement in the comparative group. Thus, the additional data provides some evidence supporting a possible generalization regarding positive changes in attitude following the residential outdoor program.

The presence of the writer was envisaged to be one limitation of this study even before the study. Steps were therefore taken to minimize possible effects, for example, the writer adopted a non-obtrusive role in the program, and suspended the interviewing of teachers in the experimental group until after the camp program. Furthermore, it was found that students in the comparative group, who were involved in the residential outdoor education program after the main study, and with whom, therefore, the writer did not interact, showed similar changes in their attitudes. This evidence suggests that

the results which were obtained may not be attributed to the presence of the writer.

Although all the teachers who were involved in the program had had previous outdoor education teaching experiences, and were enthusiastic about the program, this limitation does not seriously affect an extension of the findings to other residential outdoor education programs, since one thing about residential outdoor schools is that they are usually staffed with teachers who have considerable experience and interest in teaching outdoor topics. Secondly, their involvement in the preparation of classroom teachers for the camp program helps to arouse the interest of teachers who are new to such programs. In addition, most teachers who take part in outdoor education programs are interested; and lastly, most teacher training institutions offer outdoor education courses and in-service workshops to help teachers cope with the demands of this valuable type of education.

The fact that most of the students were from upper-middle-class homes suggests that the reader should be cautious in generalizing the findings of this study.

The time interval between the camp program and the posttest was found to be short in this study, so that some students had not had an opportunity to be exposed to situations where they could practice some conservation methods, particularly in the area of wildlife conservation. The responses of the parents indicated that it is possible that the effects of the program would have been even greater if the posttest had been administered after students had been given the opportunity to

practice conservation methods in all three areas of natural resources which were investigated in this study. Therefore, the short time interval between the camp program and the posttest was a limitation of the study and not a limitation of the overall findings in attitude change.

In this study, no attempt was made to prove that the aspects of the program resulted in the enhancement of the students' conservation attitudes. But the aspects were arrived at only after an analysis of the independent views of the students, counsellors, teachers, and the writer. And, these views were gathered during and soon after the program, so that subjects were in a position to remember and to relate to what occurred during the program.

In summary then, although there were limitations to the findings of this study, there is evidence to suggest that the limitations were not serious.

5.4 Recommendations for Further Research

In view of the findings of this study a number of suggestions for further research are offered.

- (1) It is suggested that because of the problems of sampling which were encountered in this study, that the study be replicated so that the effect of such factors as the socio-economic background of students, and the enthusiasm of teachers and counsellors, on attitude enhancement be investigated in further research.

- (2) It is suggested that because of the problem in the

timing of the posttest, that longitudinal studies be pursued to find out if the relationship between attitudes and behavior with respect to wildlife conservation would change after an extended period of time, e.g., at the end of the summer holidays, and after one year.

- (3) It is suggested that further research be employed to find out the relative importance of each aspect of the program in enhancing the students' conservation attitudes.
- (4) It is suggested that similar studies be conducted in other outdoor education programs to document the general claim by outdoor educators that such programs do enhance students' conservation attitudes and their assumption about how conservation attitudes lead to corresponding changes in students' behavior.
- (5) It is also suggested that other research and theoretical perspectives for assessing attitudes and behavior be employed in evaluating outdoor education programs to find out how those different perspectives might endorse the claims made in the study.

5.4 Suggestions for the application of findings to practice.

The findings of the case study provide information for preparing teachers who are aspiring to be involved in outdoor education programs, and for practicing outdoor educators who intend to improve on their programs. The results suggest that

many aspects of an outdoor education program contribute to enhancing students' conservation attitudes, and that these aspects should be considered in outdoor education programs.

The results showed that in developing an outdoor education program which would be effective in enhancing students' conservation attitudes, it is necessary to consider the following:

- 1) An adequate preparation of students and all who are directly or indirectly related to the program, before the camp program.
- 2) The quality of the field studies which are selected for the camp program.
- 3) The use of an outdoor camp which encourages good conservation attitudes and behaviors.
- 4) The use of teachers and counsellors who have positive conservation attitudes and practice them.
- 5) The use of appropriate films and discussions both before and after showing each film.
- 6) The use of effective teaching strategies during the program.
- 7) The availability of prompt help to students during the program.
- 8) Engaging students in effective follow-up activities after the camp program.

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APPENDIX A

THE ACTUAL TREATMENT USED IN THE STUDY

In order to define the treatment more clearly, the investigator accompanied the experimental group as a non-participant and unobtrusive observer, and recorded relevant information during the program.

In this study the entire program constituted the treatment. It was made up of a 12 day preparation phase, a week-long camp program at the Outdoor School, and a one week follow-up after the camp program.

The preparation phase and the follow-up phase took place in the regular school, while the camp program was held at a residential outdoor camp. The camp was located outside the city of Vancouver and operated year round for the district schools. Cabin accommodation, meals and recreational facilities were provided at the camp. The camp also arranged for bus transportation to and from the Outdoor School for all those who participated in the program.

Preparation Phase

During the preparation period, students saw three films on forest ecology ("The Incredible Forest," "A Tree is a Living Thing," and "Another Side of the Forest") and were involved in discussions before and after each film. In science, students studied about mammals and ecosystems, and they were asked to do library research on one of the farm animals living at the Outdoor School. In language arts, students discussed things they liked about forests, and the ideas were used to write poems together.

Students were also prepared for the conditions at the Outdoor School. They read and discussed the contents of the students' handbook which was supplied by the Outdoor School. In addition, there were meetings among teachers, a training program for counsellors, and a parents' meeting.

Camp Program

Field Studies

The students were divided into five groups. Four of these rotated from teacher to teacher, while one group stayed with two teachers throughout the week.

The more formal structure of the program consisted of four field study topics and three films. Each topic occupied two sessions. The field study topics were forest ecology, stream studies, bird studies, and farm studies.

Forest Ecology

During the first session, students examined and discussed the external characteristics of forest plants, and used biological keys to identify conifers and deciduous trees. There was a discussion of the uses of forest plants and forest ecosystems, and the need for their conservation. Students drew some of the external features of the forest plants, and were shown some interrelationships among components of the forest ecosystem.

During the second session, they discussed two kinds of ferns (bracken fern and sword fern) and drew some of the morphological features. They also discussed the forest ecosystem, and the role of the biotic and abiotic components in the forest ecosystem. Students examined the bark of forest trees. They discussed the functions of the bark and how carving names in the bark affects the tree.

In addition, students answered questions on how forests were affected by human and natural factors. The students' answers were later discussed. In addition, there was a discussion of how students could share their knowledge with their friends and family.

Farm Studies

The farm studies were conducted on the farm. During the first session, students discussed the principles underlying the establishment of a farm, and the appropriate way to approach farm animals without scaring them. They saw some farm animals, namely sheep, goats, cattle and pigs. They learned about their eyes, teeth, feet, feeding habits, and behaviors, and how they have adapted to their living conditions.

During the discussion, the parallel between domesticated animals and wild animals was drawn. The need to conserve farm land was also discussed. Students helped to clean the pig sty and feed the animals. All students had the opportunity to touch each of the different types of animals on the farm.

The second session was mostly about two farm animals (rabbits and chickens). There was a discussion of food products obtained from those two animals. Students saw wild rabbits in the farm area and the teacher told the students that the wild animals were similar to the domesticated ones.

The teacher described and demonstrated the proper way to pick-up rabbits and chickens, and all students had the opportunity to handle each of those animals.

Students observed the behavior and feeding habits of chickens and rabbits. They also saw the food of the animals and how chickens controlled fleas. There was a farm chore which involved cleaning up the chicken coop. After the chores, students were asked to carry out independent studies. The

independent study involved writing a poem or story on how one of the farm animals would survive if it were returned to its natural environment.

Stream Studies

There was a discussion of the stream ecosystem, its delicateness, and how easily the ecosystem could be changed by putting waste materials into a stream. Students examined the stream, conducted some water tests (pH, temperature, oxygen content), and used the data provided by the teacher to estimate how "healthy" the stream was. The results were discussed, and the teacher explained how the analyses could be used to determine the extent of pollution, and the need to conserve rivers. In addition, students were engaged in an activity which showed them the complex nature of the interrelationships among the components of an ecosystem. The first session concluded with a discussion of the importance of each component of an ecosystem, and the need to conserve them all. They also discussed how they could help to conserve the stream. The discussion was extended to other natural resources, including forest plants, forest animals, and energy.

During the second session, there was a discussion of the difference between a stream and a river. During the introductory discussions, they also discussed hydro-electric energy, and why it had become important to conserve energy. They also discussed how some human activities led to stream pollution. The teacher distributed a handout on organisms which had been found in the streams at the Outdoor School. She distributed nets, and explained how the nets were used to catch stream organisms. The students used the nets to catch some of the stream organisms, and they examined their organisms with the aid of microscopes. At the end of the session, the students volunteered to return the specimens to their natural environment.

Bird Studies

During the first bird study session there was a discussion of birds which had been found at the Outdoor School in the past. The students learned about the structure and functions of the different parts of birds, and how variations in the parts of a bird were helpful for bird identification. Students were given binoculars and taken outdoors, and they saw many birds and bird nests. They saw many variations, for example, in the appearance and behavior of birds, in the sites chosen for nesting, and in what they fed on. They discussed the importance of plants to birds, and how human activities affect living organisms in general, with emphasis on birds. They also discussed how they could help to conserve birds and other natural resources. In addition, students estimated the number of birds in different parts of the forest, and discussed why there were differences in the populations of birds at the different areas.

During the second session there was a discussion of the need for conservation of natural resources, and what students

can do to help. The teacher also reviewed how certain human acts affect birds. Students saw more birds, and they saw how the birds reacted to human intrusion on the areas where their nests were. Students described the size, shape, color, sounds, behavior, and location of the different birds and estimated the number of birds in each area. They also saw and discussed the interrelationships between some birds and cattle, and the importance of good hiking behaviors in order to conserve plants and animals.

Films

Students saw three films during the camp program. There were discussions before each film, and after the last two. The first ("A Living River") was mainly about stream organisms, how they were adapted to life in the water, and the interrelationships among the aquatic animals. The film also showed how streams were related to life on land, and how streams were being polluted.

The second film ("Trees") was about forest trees and their uses. It described the life cycle of the oak tree and how it supported different kinds of life. It showed how animals can affect trees, and suggested that rational conservation methods be used to maintain the natural environment.

The third film ("The Other World") showed a food chain and a food web, and the interdependence between living and non-living things. The film described how the balance of nature operated in a stream. It also discussed how some human activities and behavior result in polluting streams and suggested to the audience that they should report anyone found to be polluting streams and rivers.

Chores

There were six types of chores which all students participated in at different times. All the chores were supervised by counsellors. The nature of the different chores has been described below.

Farm Chores

This duty took place each morning and evening. It involved daily routine farm work, like collecting the farm produce, feeding the animals, and cleaning the dwelling area of the animals.

Fetch and Carry

This duty involved setting up the tables before meals. Because the fetch-and-carry students were also responsible for collecting food from the kitchen for everyone during a meal, each table had at least one fetch-and-carry student. He/she occupied a special seat so that it was convenient to leave the table without disturbing others.

Weather Duty

Each morning and evening one cabin group was expected to report at the weather station, to read the weather instruments, and to make a forecast of the weather. By doing this duty they learned about the weather instruments. They made a verbal report at breakfast and at dinner in the dining hall.

Host and Hostess

It was the duty of the host to invite a different staff member or visiting adult to be his guest at each meal. The host headed the table, served the main dish, and when more food was needed at the table, requested the fetch-and-carry person to get it. As host, he guided the conversation and set a good example by using proper table manners. He was also expected to thank his guest after the meal.

Like the host, the hostess invited a staff member or visitor to be a guest at meals. She sat at the opposite end of the table from the host. When the entire table had been served, the hostess took the first bite and then everyone might begin eating. Like the host, the hostess also directed the conversation and set a good example by using proper table manners. She was also expected to thank her guest after the meal.

In addition, the host and hostess remained in the dining hall after the meal and cleaned up the dining room.

Roustabout

The duty of the roustabout consisted primarily of collecting garbage and cleaning the camp grounds. There were also special duties, assigned by the roustabout counsellor, when the need arose.

Vegetables

Each morning after breakfast, the cabin group responsible for vegetables met with the counsellor in charge of the chore. This group was responsible for the preparation of vegetables required for the day's meals.

Follow-up activities

For the follow-up activities students saw and discussed two conservation films. ("Daylight in the Swamp" and "Whatever a Man Soweth"). In addition there was a discussion of what students learned in the Outdoor School, and writing of letters to the outdoor teachers. Students also submitted assignments in science and language arts, and these were discussed.

To summarize the treatment, all students saw all of the films. They also took part in all of the field study topics but

the order of the field study topics differed for the different groups. All students took part in the recreation activities, but students were free to choose only one recreation activity on each day. Students were also encouraged to select a different recreation activity each day. Similarly, all students took part in the chores, but not all students participated in all six chores. Most students were involved in five of the six chores during the program.

APPENDIX B
ATTITUDE TOWARDS CONSERVATION

PURPOSE

We are trying to find out how favourable or unfavourable you are towards saving energy, plants and wildlife. Please fill in background information on this page. Then for each statement on the following pages show how strongly you agree or disagree by circling one of the responses on the scale to the right of the items. Your teacher will explain the symbols to you, and will tell you when to begin. If you are undecided or do not know, circle the letter U which is to the extreme right of the responses. Read each item carefully and circle only one symbol for every statement.

YOUR FREEDOM

Although your school has agreed to take part in this study, you are free to withdraw at any time or refuse to answer any questions without prejudice. If you complete the questionnaire it will be assumed that you have agreed to take part in this study. Any information received from you will remain confidential.

INFORMATION ABOUT YOU

1. DIVISION
 2. Name:
(Surname or last name) (First name)
 3. Sex - check one

☐ Female
 ☐ Male
 4. Have you ever gone on a camping trip?
 If so, for how long?

☐ Yes
 ☐ No

☐ One day
 ☐ Two days
 ☐ Three days
 ☐ More than three days
- Wait for instructions from your teacher before you start answering the next set of questions.

PLEASE ANSWER ALL QUESTIONS through to the end on page 10. Notice that the first set of questions are asking about what you believe people in general do or would do (pages 2-4) about conservation, and the second set of questions (pages 5-7) asks how you feel about some of the same things yourself. The last set of questions (pages 8-10) asks what you yourself do about these things.

The following set of questions are planned to tell us what students your age think about the public. Read the questions carefully and respond to them the way students your age think about the public.

ENERGY

STUDENTS MY AGE BELIEVE THAT MOST PEOPLE ...

- 1) would turn off their television sets when no one is watchingSA A N D SD U
- 2) would not turn their thermostats down at nightSA A N D SD U
- 3) would take the bus instead of their carsSA A N D SD U
- 4) would hang their small washing up to dry instead of using a dryerSA A N D SD U
- 5) would not watch T.V. programs on how to save energySA A N D SD U
- 6) would read books on how to save energy ...SA A N D SD U
- 7) would turn off their lights at home when not in useSA A N D SD U
- 8) would not save energy in spite of what some people saySA A N D SD U
- 9) would not check the amount of energy which different machines use before buying oneSA A N D SD U
- 10) would check their tire pressure frequently to improve gas mileageSA A N D SD U

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree
 U = Undecided

PLANTS

STUDENTS MY AGE BELIEVE THAT MOST
PEOPLE

- 1) would grow trees to help make the
environment beautifulSA A N D SD U
- 2) would protect trees for future
generationsSA A N D SD U
- 3) would support the schools if the
schools were to teach how trees can be
protectedSA A N D SD U
- 4) would break branches from trees to use
as walking sticksSA A N D SD U
- 5) would dig up forest plants to bring
homeSA A N D SD U
- 6) would pull up plants in the forestSA A N D SD U
- 7) would report people who are careless
about fires in the forestSA A N D SD U
- 8) would be interested in learning how to
protect forest plantsSA A N D SD U
- 9) would carve their names or initials on
treesSA A N D SD U
- 10) would not be interested in learning
about laws to protect forest plantsSA A N D SD U

SA = Strongly Agree
A = Agree
N = Neutral
D = Disagree
SD = Strongly Disagree
U = Undecided or Don't know

WILDLIFE

STUDENTS MY AGE BELIEVE THAT MOST
PEOPLE

- 1) would support the idea of protecting
wild animals for future generationsSA A N D SD U
- 2) would support the schools if the
schools were to teach how wild animals
can be savedSA A N D SD U
- 3) would support laws which prevent
shooting wild animalsSA A N D SD U
- 4) would not drive their vehicles more
carefully when there are wild animals
on the highwaySA A N D SD U
- 5) would contribute money to buy hay for
wild animals during bad weather (e.g.,
when there is too much snow)SA A N D SD U
- 6) would not help to provide homes (e.g.,
bird houses) for wild animalsSA A N D SD U
- 7) would bring wild animals home to keep
as petsSA A N D SD U
- 8) would remove garbage from rivers or
streams so that fish would not be
harmedSA A N D SD U
- 9) would report anyone breaking laws
which are meant to protect wild
animalsSA A N D SD U
- 10) would pick up any fish eggs they find
along a river and return the eggs into
the riverSA A N D SD U

SA = Strongly Agree

A = Agree

N = Neutral

D = Disagree

SD = Strongly Disagree

U = Undecided or Don't know

The following set of questions are to find out how YOU feel about saving energy. Circle the response which describes how you feel about each of the following statements.

ENERGY

- 1) I would like to check the television and turn it off if no one is watching itSA A N D SD U
- 2) I would like to check the thermostat to be sure it was turned down at night ...SA A N D SD U
- 3) I would like to take the bus in order to save energySA A N D SD U
- 4) I would want my parents to hang small loads of washing up to dry instead of using a dryer, in order to save energy ...SA A N D SD U
- 5) I would rather watch a T.V. program on how to save energy than watch other T.V. programsSA A N D SD U
- 6) I would not like to go to a library to get some books on how to save energySA A N D SD U
- 7) I would like to turn off lights at home if they are not in useSA A N D SD U
- 8) I would make an effort to save energy in every possible waySA A N D SD U
- 9) I would not spend time finding out the amount of energy needed for different toys, before asking my parents to buy me oneSA A N D SD U
- 10) I would not like my parents to have tire pressure checked regularlySA A N D SD U

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree
 U = Undecided

The following set of questions are to find out how YOU feel about saving plants. Circle the response which describes how you feel about each of the following statements.

PLANTS

- 1) I would not like to join a group which is trying to plant more treesSA A N D SD U
- 2) While hiking I would be careful to stay on the trail, in order to avoid stepping on plantsSA A N D SD U
- 3) I would not agree with schools teaching how trees can be savedSA A N D SD U
- 4) I would like to break branches from trees to use as walking sticksSA A N D SD U
- 5) I would like to dig up some plants in the forest and bring them homeSA A N D SD U
- 6) I would not like pulling up plants in a forestSA A N D SD U
- 7) I would be happy if I could prevent forest firesSA A N D SD U
- 8) I would be glad to report people who throw cigarettes out of their cars to the RCMPSA A N D SD U
- 9) I would like my parents to use artificial Christmas treesSA A N D SD U
- 10) I would not like to learn about laws which are meant to protect forest plantsSA A N D SD U

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree
 U = Undecided or Don't know

The following set of questions are to find out how YOU feel about saving wild animals. Circle the response which describes how you feel about each of the following statements.

WILDLIFE

- 1) I would not volunteer to distribute handouts about protecting wild animals for future generations.SA A N D SD U
- 2) I would like to join those students who want the schools to teach how wild animals can be protectedSA A N D SD U
- 3) I would tell my friends to throw stones at birdsSA A N D SD U
- 4) I would ask my friends to help wild animals during bad weather (e.g., when there is too much snow)SA A N D SD U
- 5) I would like to buy and hang up bird houses to provide a home for birdsSA A N D SD U
- 6) If I went into a forest and found a small wild animal, I would tell my friends to bring it home and keep it as a petSA A N D SD U
- 7) I would remove garbage from a stream so that the pollution won't kill the fishSA A N D SD U
- 8) I would not like to report people to the R.C.M.P. for breaking laws which are meant to protect wild animalsSA A N D SD U
- 9) I would be glad to pick up frog eggs from a river bank and to put them back into the water to protect the tadpoles ...SA A N D SD U
- 10) I would bring any birds eggs I find in the forest home to play withSA A N D SD U

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree
 U = Undecided or Don't know

The following set of questions are to find out what you actually DO about saving energy. Circle the response which best describes your behavior with respect to each of the statements.

ENERGY

- 1) I don't often turn off the television set when no one is watching itSA A N D SD U
- 2) I often check the thermostat reading in the morning to find out if it was turned down at nightSA A N D SD U
- 3) I take the bus in order to save energy ...SA A N D SD U
- 4) I believe in hanging up washed clothes to dry instead of using a dryerSA A N D SD U
- 5) I don't watch T.V. programs which teach how to save energySA A N D SD U
- 6) I don't read books which deal with how to save energySA A N D SD U
- 7) I don't turn off the lights at home, when they are not neededSA A N D SD U
- 8) I have not been saving energySA A N D SD U
- 9) I have been checking the amount of energy used by my toysSA A N D SD U
- 10) I remind my parents to have their tire pressure checked from time to timeSA A N D SD U

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree
 U = Undecided or Don't know

The following set of questions are to find out what you actually DO about saving plants. Circle the response which best describes your behavior with respect to each of the statements.

PLANTS

- 1) I have not cared for, or watered a plant latelySA A N D SD U
- 2) I always stay on the trail while hiking to avoid stepping on plantsSA A N D SD U
- 3) I have not shown an interest about how trees can be protectedSA A N D SD U
- 4) I break branches from trees to use as walking sticksSA A N D SD U
- 5) I have been in a forest lately, and dug up a plant to bring homeSA A N D SD U
- 6) I pull up plants in the forestSA A N D SD U
- 7) I keep an eye on people who might cause forest fires, so that I can report them if there is a fireSA A N D SD U
- 8) I read about how forest plants can be savedSA A N D SD U
- 9) I have carved my name or initials on a tree latelySA A N D SD U
- 10) I have studied something about the laws which are meant to protect forest plantsSA A N D SD U

SA = Strongly Agree

A = Agree

N = Neutral

D = Disagree

SD = Strongly Disagree

U = Undecided or Don't know

The following set of questions are to find out what you actually DO about saving wildlife. Circle the response which best describes your behavior with respect to each of the statements.

WILDLIFE

- 1) I have not shown an interest in programs about saving wild animals latelySA A N D SD U
- 2) I have shown an interest in wanting to learn about how wild animals can be savedSA A N D SD U
- 3) I have thrown stones at wild animals (e.g., birds) latelySA A N D SD U
- 4) I watch out and stop while walking or riding my bicycle to avoid killing small animalsSA A N D SD U
- 5) I have put food out for wild animals (e.g., birds) recentlySA A N D SD U
- 6) I have bought and hung up, or cleaned a bird feeder or bird house latelySA A N D SD U
- 7) I watch out for animals which I can bring home as pets, when I go into a forestSA A N D SD U
- 8) I have removed garbage from a river or stream latelySA A N D SD U
- 9) I don't watch for people who are likely to break laws which protect wild animals, so that I can report themSA A N D SD U
- 10) I found some birds or frog eggs and brought them home to play withSA A N D SD U

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree
 U = Undecided or Don't know

Please go back and make sure that you have responded to all items and circle only one response for each item. When you have finished with it return the questionnaire to your teacher.
 Thank you for taking part in this study.

APPENDIX CTRIAL SHEET

Read the items carefully and indicate how strongly you agree or disagree with each of the following items by circling one of the responses on the scale to the right of each item. The symbols have the following meanings:

SA = Strongly Agree
 A = Agree
 N = Neutral
 D = Disagree
 SD = Strongly Disagree
 U = Undecided or Don't know

1. Students my age believe that most people would not watch cartoons on T.V.SA A N D SD U
2. Students my age believe that most people would like to see shops open on Sundays ...SA A N D SD U
3. I would like to watch cartoons on T.V.SA A N D SD U
4. I would not like to see shops open on SundaysSA A N D SD U
5. I don't watch cartoons on T.V.SA A N D SD U
6. I shop on SundaysSA A N D SD U

APPENDIX D

INSTRUCTIONS TO THE TEACHER FOR ADMINISTERING THE QUESTIONNAIRE

INTRODUCTION

1. Distribute the questionnaires.
2. Read out the TITLE and PURPOSE.
3. Ask students to fill in INFORMATION ABOUT YOU. Make sure that the name is printed.

TRIAL

4. Hand out TRIAL SHEET.
5. Read out the material in the box to the students. Answer any questions.
6. Tell the students to go ahead and do the 6 items on the TRIAL SHEET.
7. After completion by every student, conduct a brisk brief review (e.g., When do you circle "SA"? "SD"? "N"? "U"?) Answer any questions.

MAIN QUESTIONNAIRE

8. Tell them to put the TRIAL SHEET aside and return to the main QUESTIONNAIRE.
9. Tell them to read the instructions in the last box of the questionnaire (Page 1).
10. Tell them to turn to page 2 of the questionnaire and begin.
11. When the first student(s) finish, remind the whole class of the last set of instructions in the lower box (Page 10).
12. Let them hand in their questionnaires to you.

ONCE STUDENTS BEGIN RESPONDING TO THE MAIN QUESTIONNAIRE, PLEASE DO NOT HELP THEM IN ANY WAY. TELL THEM TO CIRCLE "U" IF THEY DO NOT UNDERSTAND ANY ITEM. IT IS ALSO IMPORTANT THAT THEY RESPOND TO THE MAIN QUESTIONNAIRE INDIVIDUALLY.

APPENDIX E
PARENTS' QUESTIONNAIRE

June 11, 1981

To the Parents of Grade Six Students

Dear Parent/Guardian,

This year the school is taking part in a study to find out what effect the outdoor school program has on the attitudes and behaviors of students toward conservation of energy, plants, and animals. The purpose of this study is to find out if, and to what extent, our students practice some of the conservation methods which they learned at the outdoor school in each of these 3 areas (energy, plants and animals).

As you know, our grade six students took part in the outdoor school program two weeks ago. Before, during, and after the program they were taught about conservation of energy, plants, and animals. While they were at the outdoor school they were expected to practice good conservation methods. We are interested in following this up to find out if the students continue to show concern for the need to conserve, and/or practice some conservation methods after their return from the outdoor school.

To enable us to do this we have enclosed this short questionnaire, and we would be grateful if you would respond to it and return it through your child. Because of the nature of this study we would appreciate your own comments in the spaces provided, in addition to the answers to the questions.

Your response is important to us in this study, but your participation is totally voluntary; you are free to refuse to answer any question(s) without prejudice. Your response will be treated as confidential, and will be used for research purposes only. Neither you nor your child will be identified on your responses; we are only interested in the effect of the program on our grade six students as a whole.

Thank you for your consideration of this request.

Yours truly,

QUESTIONNAIRE TO PARENTS/GUARDIANS OF GRADE SIX STUDENTS

A. We are trying to find out if what the grade six students were taught in the outdoor education program has had any effect on their attitudes and/or behaviors toward conservation of ENERGY, PLANTS, and ANIMALS. Please read the three questions below; for each question check one of the boxes which best represents any change(s) which you may have observed in your child since his/her return from the outdoor school.

1. Has your child shown any change(s) in attitude or behavior (positive or negative) towards conservation of ENERGY?

Yes No Don't know/can't tell

2. Has your child shown any change(s) in attitude or behavior (positive or negative) towards conservation of PLANTS?

Yes No Don't know/can't tell

3. Has your child shown any change(s) in attitude or behavior (positive or negative) towards conservation of ANIMALS (WILDLIFE)?

Yes No Don't know/can't tell

B. Please use the appropriate spaces below to provide any comments on any change(s) which you may have observed. A few ideas have been presented to help you in writing your comments.

1. Comments on change(s) in attitude or behavior toward conservation of ENERGY. For example, a positive change may involve doing, and a negative change may involve not doing things like:

 talking about conservation of energy,
 reading about conservation of energy,
 turning off lights when not needed,
 watching T.V. programs about energy,
 turning off the T.V. set when no one is watching.

COMMENTS:

2. Comments on change(s) in attitude or behavior toward conservation of PLANTS. For example, a positive change may involve doing, and a negative change may involve not doing things like:

talking about the need to conserve plants,
reading about conservation of plants,
watching T.V. programs about conservation of plants,
watering plants,
caring for plants.

COMMENTS:

3. Comments on change(s) in attitude or behavior toward conservation of ANIMALS (WILDLIFE). For example, a positive change may involve doing, and a negative change may involve not doing things like:

talking about conserving animals,
reading about animals,
watching T.V. programs about conservation of animals,
feeding birds,
showing some concern for the need to conserve animals.

COMMENTS:

APPENDIX FSTUDENT INTERVIEW QUESTIONS (BEFORE THE CAMP PROGRAM)

Name of student

Gender

- (a) What kinds of things do you hope to learn at the camp?
- (b) What kinds of things do you hope to see at the camp?
- (c) What things have you been specifically told to do at the camp?
- (d) Why are you expected to do these (only those related with conservation - e.g., take garbage to the appropriate place)?
- (e) What things have you been told specifically not to do at the camp?
- (f) Why are you not expected to do these things (i.e., those related to conservation only. - e.g., collect plants, etc.)?
- (g) What do you hope to learn about, say, energy, plants, animals, etc.?

APPENDIX GCOUNSELLORS INTERVIEW QUESTIONS (BEFORE THE CAMP PROGRAM)

1. To what extent do you think it is important to help students to develop favorable attitudes towards conservation of energy, plants, and wildlife?
2. Have you ever been a student at the camp yourself?
Yes.....
No.....
3. If so, do you think that it helped you to develop more favorable attitudes towards conservation of energy, plants, and wildlife?
4. Describe the way you think the program influenced your behavior towards these: energy, plants and animals (both favorable and unfavorable, if possible).
5. Do you think that the grade six students coming to the camp will develop more favorable attitudes towards conservation of energy, plants and wildlife after the program?
6. What do you think is in the program which would influence the attitudes of the students toward conservation of energy, plants and wildlife?

APPENDIX H

OBSERVATION INSTRUMENT (FOR ACTIVITIES/SESSIONS)

1. Content (knowledge).
 - (a) The instructional content included - Circle

Energy	Yes/No
Plants	Yes/No
Animals	Yes/No
 - (b) Describe, in detail, what the content was. (Provide any sources of reference, e.g., books, etc. if possible.)
2. How was the subject matter presented? - e.g., What type of teaching method was used? Were there any discussions?
3. What activities were students involved in? - Describe.
 How many students were on task?
 How many students were not on task?
 (Note: over what time frame?)
4. What did students actually do? - Describe.
 How many students were actually involved (%)?
5. How much time did students spend doing activities?
6. Did students show any initiative? - e.g., what types of questions did students ask?
7. Did students suggest ways of conserving? If so, how were these received by the teacher and by the rest of the group? Was it reinforced?
8. How many students were working in a group?
9. What were the roles of the counsellors?
10. How enthusiastic were the students in the activity? - e.g., happy (from facial expressions willingness to participate, etc.).
11. How enthusiastic were the students in the lesson? (i.e., the lesson as a whole).
12. What sorts of things did students say?
13. Did students enjoy the activity? - Evidence (e.g., smiles, chuckles, reading or talking about the activity after lesson).
14. Did students enjoy the lesson as a whole? - Give evidence.
15. Did the lesson/session specifically deal with conservation? If so, describe the kinds of conservation which were included, and how these were handled - telling, discussion, problem solving, etc.

16. Did students exhibit any conservation behavior? e.g., turning off lights after the lesson.
17. Which students may be helpful for interviewing? List their names, and order them from the point of view of those who are more likely to be helpful.
18. Was the importance for conservation discussed? If so, how was it received by students?
19. Any other observations?

APPENDIX I
QUESTIONS FOR STUDENT INTERVIEWING (AFTER AN ACTIVITY)

1. What did you learn that was new in the lesson?
2. Did you learn anything about
Plants?
Energy?
Wildlife?
3. Do you think that it is important to learn about them?
4. On the whole, did you like the session?
activities?
5. Which parts of the session did you like?
Why?
6. Which part of the session did you NOT like?
Why?
7. Do you think that this session will change the way you feel
about saving energy? Plants? Wildlife?
8. Did having students from other classes with you in the
session make any difference?
9. What did you learn about things you can do to save
(a) energy?
(b) plants?
(c) wildlife?

APPENDIX JQUESTIONS FOR COUNSELLORS (AFTER ACTIVITY)

1. How helpful do you think the activity was in changing the attitudes of students towards conservation of
 - a) Energy?
 - b) Plants?
 - c) Wildlife?
2. Do you consider the lesson/activity to be important?
3. How interesting was the lesson to you? and to the students?
4. In what way do you think that the lesson will influence their attitudes? - Towards plants, energy, and wildlife?
5. In what way do you think that it may inhibit the development of favorable attitudes?
6. In your opinion, do you think that students will be better able to practice some conservation methods after this session?
7. If we want to find out if students practiced conservation methods, after this program, how should we do it or what kinds of questions would you suggest?
8. What did students seem to like?
Why?
9. What did students not seem to like?
Why?

APPENDIX KQUESTIONS FOR ADULTS (AFTER THE CAMP PROGRAM)Check One

Counsellor
Regular Class Teacher
Outdoor Teacher

1. List or describe how, in your opinion, this one week program was able to improve the attitudes of students towards conservation of
 - (a) Energy
 - (b) Plants
 - (c) Wildlife.
2. List and/or describe how you think this one week outdoor program may inhibit the development of favorable attitudes towards conservation of plants, energy, and wildlife.
3. Do you think that students developed more favorable or unfavorable behavior? Support this with any reasons you have (e.g., what they said, what they did, etc.).
4. If we want to find out if students actually practice conservation methods, what kinds of questions will you suggest that we ask their parents?

APPENDIX LQUESTIONS FOR TEACHER INTERVIEW (AFTER ACTIVITY)

1. How helpful was the activity in changing the attitudes of students towards conservation of
 - (a) Energy?
 - (b) Plants?
 - (c) Wildlife?
2. How important was the lesson/activity to the student? - and to you?
3. How interesting was the session? - to students and to you?
4. Do you think that the lesson will influence the attitudes of the students towards conservation of
 - (a) Energy?
 - (b) Plants?
 - (c) Wildlife?
5. In what ways do you think it will influence their attitudes?
6. In what ways do you think it may inhibit the development of favorable conservation attitudes?
7. If you were to teach the same topic again, with the aim of changing the attitudes of students, what would you do to achieve a better result?
8. Can you comment, or criticise, or suggest the ways in which this session will change, or inhibit changes, in the behavior of students towards conservation of energy, plants, and/or wildlife?
9. In your opinion, do you think that students will be able to practice some conservation methods after this session?
10. If we want to find out if students practiced conservation

APPENDIX MTEACHER INTERVIEW QUESTIONS (BEFORE THE PROGRAM)a) Background Information

Name of teacher:

School:

Grade levels currently taught:

Subject Specialization, if any:

Special responsibilities in school:

No. of years of teaching (a) in this grade:

(b) overall:

Highest degree held:

Have you been to camp before?

If yes, number of years?

Number of times?

b) Ideas About Conservation

1. How did you get involved in conservation?
2. What conservation topics interest you the most?
3. What topics (if any) relating to conservation have you studied extensively?
4. What special areas of expertise (if any) do you have on such topics?
5. What other kinds of experience have you had related to conservation issues?
6. What kinds of conservation concepts (if any) have you taught recently?
7. What is your most important reason for participating in this outdoor program?
8. What kinds of skills and/or attitudes did you expect students to have after the program?
9. How important is changing the attitudes of students towards conservation of energy, plants and wildlife to you?

c) Preparations Done for Development of Conservation Attitudes

1. What specific things did you do to prepare the students for the outdoor education program?
2. How did you present the Outdoor School rules and philosophy to the students (e.g. telling, discussions, etc.)?
3. To what extent were the students involved in this preparation?
4. During the preparation, what did you discuss about conservation of plants, animals and/or energy?
5. If you did #4, in what way do you think that it could have affected student attitudes and/or behavior towards conservation of plants, animals and energy?
6. What do you think that students want to learn about conservation of plants, animals and/or energy?
7. How much did they learn during the preparation period about conservation of plants, animals, and/or energy?

APPENDIX NSTUDENT INTERVIEW QUESTIONS (AFTER THE PROGRAM)

Think about what you did in class before the Outdoor School, and what you did during the outdoor program.

1. Do you think that the outdoor school program made you feel like saving
 - (a) plants?
 - (b) wildlife?
 - (c) energy?
2. What is it that made you feel like saving
 - (a) plants?
 - (b) wildlife?
 - (c) energy?
3. What is it that made you feel like not saving
 - (a) plants?
 - (b) energy?
 - (c) wildlife?
4. Which parts of the program did you like?
Why?
5. Which parts of the program did you Not like?
Why?

APPENDIX OREASONS GIVEN BY STUDENTS WHO WERE NOT SURE OF A POSITIVE EFFECT
ON THEIR ATTITUDES TOWARDS CONSERVATION OF ENERGY

1. We did not do anything about energy there.
2. We did not learn much about energy.
3. Gave me only information.
4. I knew most of the things already.
5. I already knew those things.
6. In my cabin they left the lights on, and we were last.

(Note: Four students would not indicate why.)

APPENDIX PRESPONSES GIVEN BY STUDENTS ABOUT WHAT THEY BELIEVED TO HAVE
MADE THEM FEEL LIKE SAVING PLANTS

	<u>Classification</u>
Well, what is happening to animals is happening to plants.	2
Through the program at the Outdoor School.	5
Just studying and going out there and looking at them	5
They teach you stuff about trees, then you know if you are hurting trees or not.	1
Our studies. We studied plants.	3
The people at the Outdoor School told us.	1
Learning about nature.	1
Because I got to know about them and everything, like I never knew before.	1
We learned that we need the plants too and if we don't have them we can't live.	
Our teacher told us that there is not much of everything, and if one thing dies another thing will die, and it will carry on.	1,2
All the ecology things like every day, and our reports.	1,3
Plants are sort of like humans. They have a right to live too.	5
We learned about the forest trees.	1
Just being there, all the talks about it and the films.	5,1,4
We learned not to throw litter around.	1
Seeing the plants and watching the films.	3,4
We learned not to break any bushes or trees.	1
The films, we don't do this in school.	4,3
The films we saw, the farm studies, and the books.	4,3,1

The forest ecology stuff.	3
We don't have to walk or pull plants. They are living too.	1
Because I like them.	5
The field studies.	3
We learned that the plants give the animals food.	1,2
Because if we don't save them, in about 20 years we will not have vegetation.	2
If we pull the plants we will not be able to live; we learned in the field studies.	2,3
Talking about them in the forest, etc.	1,3
The field studies. We were writing poems.	3,5
We did it in the field studies.	3
The way they taught us at the Outdoor School. Like they made it a fun way to learn to do things.	1
What we did in the studies. At school they show you things which don't move.	3
If we cut them down there will not be any left.	2
Because they are living things.	5
Just being in the outdoors.	5
The plants outside our cabin made it pretty. If someone had dug them up it would not have looked nice.	5
We need the forest.	2
They explain what they do for you.	1
Because they are beautiful.	5
I understand them. The forest is like a teacher in many ways.	1
If we don't save them we will not have the forest.	2
We saw different types of trees. It made it easier to understand.	5

APPENDIX QSTUDENTS' RESPONSES INDICATING ASPECTS OF THE PROGRAM WHICH STUDENTS BELIEVED TO HAVE MADE THEM FEEL LIKE SAVING WILDLIFE

	<u>Classification</u>
At school you don't really see the animals.	3
If we keep killing them there will be nothing left.	2
The whole program is about saving them.	5
We learned a lot at the Outdoor School.	5
We are not the only ones. There are other things in the forest that share all the things with us.	2
They taught us all these at the outdoor school.	1
They explain what they do in the forest.	2
We always did animals. I understand them better.	3 1
It made it easier to understand.	1
I feel good about saving them.	2
I learned a lot, and we were feeding the farm animals and the racoons.	1 3
The field studies.	3
They are living and we are living too, so we don't have to kill them.	5
Because I liked them.	5
All the animals would die. They told us to save them; and the bugs for the fish.	1
The animals are nice.	5
We learned that we should save them.	1
Because if we don't save them now, in about 20 years the animals will get extinct and die.	2
We learned these in the field studies.	3
They talked about animals and plants, that we can protect the eggs and larvae.	1

We saw the different kinds of bird feeders.	5
I don't want people to hunt the animals because if we keep hunting them there will be nothing left.	2
We talked about how endangered they are.	3
Well, when you learn that people are not the only ones living and we should take more care because all the animals will die.	1 2
Our teachers told us that there is not much of everything.	1
If one thing dies another thing will die and it will all carry on.	2
All the ecology things and our reports.	3
The farm session, and when we were doing all sorts of stuff, they told us.	3
We learned about birds and some of the stream animals, and the films.	3 4
Seeing the animals and watching the films.	3 4
We learned more about the wild animals, and I liked it.	1
The films and the field studies.	3 4
The films and the field studies on the farm, birds and stream.	4 3
What is happening to animals is happening to plants.	2
Through the program at the Outdoor School.	5
Just studying the animals and going out there to look at them.	5
Through what we did at the Outdoor School.	3
They teach you about animals and what they eat.	1
Our studies, we studied water, insects and fish.	3
The people and the animals at the Outdoor School.	5
Because I found out how they really are like, and it is more quieter.	5

Learning, where they lived and everything, I
didn't know about stepping on
them and everything.

1

T

APPENDIX R

STUDENTS' RESPONSES INDICATING ASPECTS OF THE PROGRAM WHICH THEY
BELIEVED TO HAVE MADE THEM FEEL LIKE SAVING ENERGY

	<u>Classification</u>
Because we will not have more left over for the future years.	2
Through the program at the Outdoor School.	5
We couldn't afford it, if there is not much energy.	2
They told us this [save energy] at the Outdoor School.	1
Everybody is using up all the power.	2
What the people tell you.	1
Because they don't use as much energy as they do in towns.	5
Because we were forced [expected] to turn off the lights or else we would not get very good cabin marks.	5
When you learn about all the different things you sort of understand that we may be running out soon, and man [humans] can't make it again.	2
Our teachers told us that there is not much of everything left.	1
Because we will run out in about 20 years.	2
The counsellors told us.	1
Because we did not use much in the cabins.	5
I learned more about it.	1
Because if we don't save them in about 20 years we will not be able to drive cars, heat homes, and will also die.	2
We learned these in the field studies.	3
They told us and gave us lots of information.	1
They told us everything.	1

I think I would save them because they are going
to run out.

2

I feel good if I save them.

5

T

APPENDIX STHE PARTS OF THE PROGRAM WHICH STUDENTS SAID THEY LIKED

Part of Program	n**	%***
Field Studies	33	85
Everything	17	44
Recreation	11	28
Chores	4	10
Food	2	6
Snacks	1	3

* Total no. of students=39.

** Number of students who indicated part of the program.

*** Number of responses presented as percentages which add up more than 100.

APPENDIX T

COMMENTS MADE BY PARENTS

On Energy

1. Marla is good at shutting off the lights and turning down the heat.
2. Talking about conservation of energy. Turning off lights when not needed.
Watching T.V. programs about energy.
Turning off the T.V. set when no one is watching.
3. Talking about conservation of energy.
Reading about conservation of energy.
Turning off lights when not needed.
Watching T.V. programs about energy.
4. Turning down the heat in the bedroom.
Watched T.V. program on insects.
5. Since learning about conservation of energy, George has been showing an awareness of home heating system and turning down heat system below our normal setting to help conserve energy.
6. Allan's energy conservation behavior probably reflects the majority of the population. He worries that eventually we won't have enough energy but really doesn't see any immediate solution. Turning off the T.V. is definitely NOT one of his strong points.
7. No obvious change.
8. My child is more concerned now, and tries to conserve
9. Interested in reading energy issues of National Geographic.
Conscious of extra lights left on in house.
10. We have always been concerned about the conservation of energy in this home - turning off lights when not needed, and our children automatically turn off the T.V. when no one is watching.
11. Show some realism at school. Schools are always overheated and often open windows to cool.
12. Turning down heat when thermostat is above 65°.

Turning off heat before going to school.

13. Turning off lights and T.V. Has spoken about various things concerning Outdoor School and will probably put into practice when opportunity presents itself.
14. Turning off lights and T.V. set when not needed.
15. Sometimes! But we do talk about this more often than before Outdoor School.
16. We have always taught our children to turn off lights or T.V. when not in use. There has been no talk of conserving energy.
17. Is more careful about turning off lights (and telling friends who are visiting, to do the same!). We have talked about energy conservation (turning down the thermostat, driving a small car, benefits of good insulation in the home, etc.).
18. Talking about saving energy more than before.
19. No change. Turns lights on in the daytime and does not turn them off. Leaves T.V. on and leaves the room to do something else.
20. My child talks about conservation of energy but does not turn off lights or T.V. when not used.
21. I think too little time has elapsed since their return for changes to become apparent. I feel sure after a while the experiences of Outdoor School will surface.
22. Talking about conservation of energy; reading about conservation of energy; turning off lights when not needed; watching T.V. programs about energy; turning off the T.V. set when no one is watching.
23. We all talk, read and occasionally watch T.V. programs about conservation of energy. She still doesn't turn off every light. Yes T.V. turned off. Heat is turned down at night and during the day if all out.
24. Has always been good about turning off lights not in use.
25. No, but only because he has been very much aware of conservation already. Those not deteted (i. e. taking about conservation of energy, turning off lights when not needed, turning off

the T.V. set when no one is watching.) Andre does already quite a bit. He did comment that at the Outdoor School there was a lot of food wasted. Even if this discarded food does go to the pigs, Andre understands that it is still a wasteful habit for the kids, and that the pigs would be better off whole grain fed rather than Campbells noodle fed.

26. Turning off lights when not needed; turning off the T.V. set when no one is watching.
27. Turning off lights when not needed; turning off the T.V. set when no one is watching.

On Plants

1. The Outdoor School experiences reinforced the positive attitude toward the conservation of plants which she already had.
2. She (Marla) does water the plants.
3. Watching T.V. programs about conservation of plants.
4. Talking about the need to conserve plants. Watering plants.
5. He has since been talking about the need to conserve plants and he seems to be concerned about the future. He has also been watering some plants around the house.
6. Has always shown an interest in living plants and possibly the interest has increased as a result of your program.
7. No obvious change.
8. No obvious change has been observed.
9. Has own plants for which she cares totally. Comments on erosion--due to removal of trees from our area. Commented, when travelling through forest fire area--waste.
10. Our child was very impressed about what he learned about trees and plants and does watch informative programs on plants and animals apart from regular programs. He commented especially on this part of his experience at Outdoor School, because he does show an interest from time to time in the trees and plants in and

around our home and does help with the watering out-of-doors for which there isn't a need at present.

11. Showing of films of land developers disregarding plants and foilage in the construction of complexes, etc. Explain the weakness of the Government system allowing and encouraging this.
12. Not as much interest shown in this area, but may apply teachings if we should go on a hike or similar outing.
13. Caring for plants and removal of unwanted undergrowth and weeds.
14. My child has for the past four years, helped plant, water, and weed a garden. Also helps care for indoor plants and has own to take care of.
15. We have noticed no change.
16. I cannot see any measurable change in attitude about plants--they do not hold any great interest to him. However.... he has expressed an interest in starting his own vegetable patch, but I can't be certain that love of plants and caring for them, is the motivation factor! I think the pleasure of eating fresh, own-grown vegetables is the reason.
17. He started to show some interest in our backyard flowers and plants.
18. No change.
19. My child cares for plants by watering, planting, and watching T.V. programs about same.
20. I think too little time has elapsed since their return for changes to become apparent. I feel sure after a while the experiences of Outdoor School will surface.
21. Reading about conservation of plants; watering plants; caring for plants?.
22. Family never destroys needlessly. Children do care for plants sometimes. (Not so positive about plants as energy saving and animals.)
23. No. This positive attitude of conservation may have been reinforced by Outdoor School, but was already instilled. Andre always did show a lot of interest in these areas. We were glad that the Outdoor School reinforced these principles.

24. Talking about the need to conserve plants, watering plants.

Animals (Wildlife)

1. Again, the experience reinforced the positive attitude toward the conservation of animals. Also, she became more aware of animals. Apparently it was in the animals that she was most interested.
2. Marla is very interested in protecting wild animals.
She even donated her own money to the Greenpeace to save the seals.
She is interested in animal T.V. shows.
3. Watching T.V. programs about conservation of animals.
4. My child feeds the birds on our property each day and is taking time to watch animal-related T.V. programs such as Untamed World, Wild Kingdom, etc.
5. Talking about conserving animals.
Reading about animals.
Watching T.V. programs about conservation of animals.
Showing some concern for the need to conserve animals.
6. Talking about conserving animals.
Watching T.V. programs about conservation of animals.
Feeding birds.
7. George has always been concerned re: need to conserve animals and your program has certainly not diminished this attitude.
8. 2 (plants) and 3 (animals) can be answered together.
Since we have a cabin in Hollyburn Mountain which is still a wilderness area, he has since he was very young, been very concerned with litter and damage to the plants and trees on the mountain. Scraps are always left out for the jays and chipmunks and we once were refused entrance to our "outhouse" by a resident racoon. Allan refused to let us move her out.
9. Seems to be more aware of life and eating habits of animals.
10. No obvious change.

11. Interest in National Geographic program on gorilla.
Subscribes to World Magazine - interest in animals from other lands and their peculiarities.
Member of fish and game club - quite aware of and appreciates nature.
12. Our child does, from time to time, watch programs about animals, and birds. He also commented on the bird watching at Outdoor School. He does sometimes read about animals and birds. Our family, in general, does not like the killing of animals. Our child enjoyed the Outdoor School experience.
13. Explained mans encroachment on the territories of wildlife and disregard for them for the so called advancement of humanity. Show some realistic films.
14. Reading and talking about wildlife.
Watching T.V. programs about wild animals.
15. The subject of animals has come up but hasn't been in a situation involving animals other than our own dog. However, the children have always fed the ducks or birds at the park.
16. Feeding birds and showing concern for animals.
17. Enjoys watching documentaries on T.V. about all forms of wildlife. Bird feeders made and put out in the winter.
18. Very concerned about the welfare of animals, especially the very young.
19. We have always taught the children about wildlife and a respect for it. They have always watched many T.V. programs about animal conservation and have read many books about wildlife. We notice no change in attitude.
20. He has always displayed a real concern for any life-form, and is frequently trying to help injured animals, birds or insects. We have often discussed the need for wild-life conservation, and animal stories on T.V. programs have always appealed to him. It's therefore difficult to say whether or not there has been any change in this regard.
21. Has always liked animals, watches T.V. about animals, and reads books on animals.

22. My son has a positive attitude towards all the above mentioned. He is very animal oriented.
23. I think too little time has elapsed since their return for changes to become apparent. I feel sure after a while the experiences of Outdoor School will surface.
24. Talking about conserving animals, reading about animals, watching T.V. programs about conservation of animals, feeding birds.
25. Always been positive. Tends wounded animals, e.g. squirrel, made bird feeders and feed. Dislikes cats--our bird population has decreased over the years. If I stand on an ant or spider, I get a row. We already have racoons and the occasional bear in our garden so are not unused to animals.
26. No change as he has always shown a positive attitude towards animal conservation.
27. No. This positive attitude of conservation may have been reinforced by the Outdoor School, but was already instilled. Andre always did show a lot of interest in these areas. We were glad that the Outdoor School reinforced these principles. Andre told us of a situation which disturbed him at the Outdoor School; and that was to see a pig which had got loose from its pen pulled back a long distance on its back and by its legs, squealing in fright and pain.
28. Reading about animals; watching T.V. programs about conservation of animals; feeding birds.
29. Reading about animals; watching T.V. programs about conservation of animals.

Other Comments Made by Two Parents

I have just asked my child the questions above, have read each one and when I finished the whole thing (he/she) asks. "What does conservation mean?" I guess we missed the boat! Actually it is only one week since Outdoor School and perhaps it is too soon to tell. Since (it) came back the T.V. has not been on, we always put out lights when not in use, saves money, nothing has been read, there is no time in our household, homework, and practicing and eating and sleeping takes it all. Now we have heard every bit of all the skits, all about the animals, and the lovely time. Just because the conservation bit was a flop here doesn't matter, the camp was a huge success and I wish there was going to be a repeat for this child. Thank you

all very very much.
Sincerely,

I have not responded to the questionnaire because I feel that in being totally negative (all answers No), I may convey the impression that I do not feel the "Outdoor School experience" to be beneficial. This is not the case, as I am in full agreement with the aims of the school and think the week was extremely worthwhile.

The reason for the No answers is simply that I feel my child was already aware of the areas of concern that you have identified in your questions.

Yours truly,

APPENDIX URESULTS OF ADDITIONAL DATA

After the posttest was administered to the subjects in the experimental and comparative groups, students in the comparative group proceeded to take part in the outdoor education program. Ten days after the second program the questionnaire was again administered to students in both the original experimental and comparative groups (called the post-post test).

The post-posttest scores were analysed with the same procedure which was used for the pretest and posttest scores, and at $\alpha=.05$. The comparison of the dispersions of the two groups on the nine dependent variables taken simultaneously, resulted in a calculated F-ratio of 0.11. This led to the conclusion that, taking all the nine dependent variables simultaneously, there was no difference in the dispersion of scores between the experimental group and the control group. That is the two groups did not differ significantly in the dispersions of scores on the nine dependent variables, taken simultaneously.

The comparison of the group centroids resulted in the calculated F-ratio of 1.93. This value was less than the tabulated F-ratio of 1.96 at $\alpha=.05$ and $df=(9,123)$. These results led to the conclusion that there was no statistical difference between the two groups on all the nine dependent variables, taken simultaneously.

The results of the additional data support the idea that the effect of the program was real. That is, it enhanced the conservation attitudes of students on both occasions. Secondly, the additional results also showed that the effect of the program was not attributed to the presence of the writer during the case study in the first treatment, since the writer did not interact with the comparative group during the program, and similar results were obtained.