THE USE OF ENIVORNMENTAL EDUCATION

WITHIN OKLAHOMA PUBLIC SCHOOLS

IN GRADES 5 THROUGH 9

By

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Chapter 1

Introduction

The use of environmental education in schools allows educators to teach students how to develop a better understanding of their relationship with the environment. The goal of environmental education is to help students become environmentally knowledgeable, skilled, and dedicated citizens who are willing to work, individually and collectively, toward achieving and maintaining an adequate balance between the quality of life and the quality of the environment (Hungerford and Peyton, 1976). It is known that environmental education is utilized within the state of Oklahoma, but to what extent it is used in the public school systems is unknown.

To ensure a good quality of life for ourselves and our children, people must act as responsible stewards of our air, our water, and our land (Browner, 1995). All people are affected by their environment be it in- or out-of-doors, city or country. It is therefore, important that all people become more knowledgeable of their environment and their relation with it. The passing of the National Environmental Education Act in 1990 is considered to be the starting point of the most important tool we have to deal with damage caused to our environment which is education (Chafee, 1995).

Browner (1995) stated that as a result of environmental education, our nation has made tremendous progress in protecting public health and our environment. There are no more rivers that catch fire due to chemical pollutants, and improvement in air quality is

becoming evident with efforts to control air pollutants. Much more remains to be accomplished and deepening environmental awareness through education is a start.

Environmental education is not learned from books alone. It has made use of innovative academic methods including: "hands-on" activities; subject matter that is relevant to everyday life; and topics that engage students and allow them to become active participants in changing the way the world works (Lieberman, 1995). An awareness and understanding of their community and its associated problems such as the careless overuse of water; mis-use of pesticides; and air, water and land pollution is created through environmental education. Students can then learn the processes needed to work toward solutions of biophysical environmental problems through laws, public policies, planning, resource management, research, technological developments, and institutional arrangements (Stapp, 1969).

It is suggested by Lieberman (1995) that environmental education has a valid place throughout the curriculum, is the key to understanding and relating to the world, and should be fully integrated into as many disciplines as possible. The environment is not an entity that can be studied in only one subject area. The environment is a part of every subject in the educational curricula: the humanities, social sciences, physical and life sciences (Studebaker, 1973). Current environmental education curriculum material covers the full range of academic areas, from almost pure propaganda pieces to scientifically valid, authentic and controlled experiments (Lieberman, 1995).

Environmental education has many attributes that create not only a basis of information about the environment but ways to correct current problems and to help to prevent future problems. Expanding information, expanding involvement: these are key

to solving environmental problems - problems as small as the contamination of the local creek and problems as large as the ozone hole. Educators can continue to increase the depth of environmental understanding throughout the country and enable Americans to participate in passing along a safe, healthy world to future generations (Browner, 1995).

Environmental education can enhance the curriculum in a number of ways. As Disinger (1993) states environmental education can make significant contributions to what are typically considered the general goals of education such as thinking skills. "Teaching students to think" has historically been identified as a basic education goal. Environmental education can provide real problems that can be studied or simulated, topics and problems that can be adjusted to the developmental levels of specific groups of students, and topics and problems that cut across the curriculum and enhance the integration of knowledge.

The purpose of this study is to get a descriptive view of the use of environmental education by teachers in public schools of grades 5-9 in the state of Oklahoma. It will be determined which teachers use environmental education curriculae and which do not. For those who engage in environmental education, a list of curriculae which are used will be established. This study will also provide knowledge about which school subjects are used by teachers when utilizing the environmental education curriculum and at what grade levels environmental education is taught. To achieve these goals a questionnaire pertaining to the use of environmental education was sent to teachers from a sample of public schools in the state of Oklahoma.

The results of this study can be used by the State Board of Education and environmental education coordinators as a baseline of information revealing the involvement of environmental education in the state public schools. Other organizations,

such as state parks, recreation centers and camps located throughout the state which use environmental education programs, will also benefit from the results of this study.

Environmental Education Defined

The pioneers that settled our country relished in the plentiful amount of fresh water, clean air, vast forests and beautiful grasslands. Over the centuries it has been discovered that the great abundance of natural resources once available are now in danger of becoming depleted. Therefore, it is important to assist each individual to attain a fuller understanding of the environment, problems which confront it, and the interrelationship between the human community and the surrounding land. This is accomplished through environmental education which has been defined as "education aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution" (Stapp, 1969).

Bogan (1973) states that environmental education is the process that fosters greater understanding of society's environmental problems and also the processes of environmental problem-solving and decision-making. He goes on to explain that environmental education helps the learner perceive and understand environmental principles and problems, and enables the learner to identify and evaluate the possible alternative solutions to these problems and assess their benefits and risks. His belief is that this process is accomplished by teaching the ecological relationships and principles that underlie environmental problems, and showing possible alternative approaches and

solutions. It involves the development of skills and insights needed to understand the structure, requirements, and impact of interactions within and among various environmental entities, subsystems, and systems.

Stapp (1969) gives four major objectives of environmental education. These are:

1. A clear understanding that humans are an inseparable part of a system, consisting of man, culture, and the biophysical environment, and that man has the ability to alter the interrelationships of this system.
2. A broad understanding of the biophysical environment, both natural and man-made, and its role in contemporary society.
3. A fundamental understanding of the biophysical environmental problems confronting man, how these problems can be solved, and the responsibility of citizens and government to work toward their solutions.
4. Attitudes of concern for the quality of the biophysical environment which will motivate citizens to participate in biophysical environmental problem-solving.

Environmental education activities do not promote a particular viewpoint or solution, but rather bring about special awareness, perspectives, and skills by allowing the student to experience a problem hands-on and develop his/her own understandings and conclusions. This enables the learner to see the particular issue at hand as a phenomenon related to other phenomena and help him/her understand the nature of possible approaches to the issue (Browner, 1995).

Justification

The growth of the human population became a concern in the late 1950's along with the pollution of air, water, and soil. The need to conserve our country's wild places and wildlife also became apparent during this time if any natural environments were to remain intact (Dasmann, 1968). Since this time, our nation has made progress in protecting public health and our environment (Browner, 1995). According to Chaffee (1995) the passing of the Clean Water Act in 1972 set some very ambitious goals, including the elimination of all discharges into surface waters. This law along with the Endangered Species Act in 1973, which called for preservation of wildlife habitats for animal species that were in danger of becoming extinct due to the destruction of their natural habitat, were positive steps in the direction of improvements in the natural environment. These laws brought about environmental regulations such as requirements for safe drinking water, industrial clean-up and the preservation of wildlife habitat. Through reports by the media, these regulations have been kept in the public eye. By this we gain expanding information, and expanding involvement by the public which is the key to solving environmental problems (Browner, 1995).

To increase this expansion of environmental knowledge, the public also needs to be educated on how to decipher the information they are given. Environmental education will lead to the development of public understanding of, support for, and national efforts to protect our limited natural resources (Chaffee, 1995). People who love, enjoy, and appreciate the beauty of the natural environment will become protectors of that entity.

These actions will increase as they become more aware, more skillful, and more knowledgeable about their environment (Burrus-Bammel and Bammel, 1990).

By integrating environmental education into the school curriculum, we are able to expand the knowledge and interest to the younger generations. This will allow environmental education to prepare individuals to be responsive to our rapidly changing world, to understand contemporary problems, and to provide the skills needed to play an effective role in the improvement and maintenance of the environment (Ramsey, et al, 1992).

Extent of the Study

The research questions, addressed in this study are as follows:

1. In which grade levels of grades 5 through 9 is environmental education being taught?
2. In which school subjects are educators utilizing environmental education?
3. Which environmental education curriculae do educators have in their possession, which they use, and which do they wish to obtain?
4. What facilities do educators utilize when teaching environmental education?

The following delimitations of this study were: teachers of grades 5 through 9 in the public schools of randomly, selected Oklahoma school districts were surveyed, surveys were mailed to the librarians of schools to be distributed to the teachers.

There were several limitations of this study which included: not all teachers received a copy of the survey, not all teachers respond to the survey, and the librarians may decide which teachers should or should not receive a survey. The assumptions of this study were: that all responses will be given honestly and correctly, that the survey was reliable and valid, that all teachers within the sample receive a copy of the survey, and finally that teachers within the sample respond to the study.

Definition of Terms

The following are terms and definitions used in this study which could be defined in other ways not related to the study.

Conservation: The use of natural resources in a way that assures their continuing availability to future generations; the intelligent use of natural resources for long-term benefits (*Project Learning Tree*, 1994)

Curriculum: The courses offered by an educational institution (Webster's 9th, 1983)

Endangered species: An "endangered" species is one which is in danger of extinction throughout all or a significant portion of its range (*Project Wild*, 1992).

Environment: All the conditions, circumstances and influences surrounding and affecting the development or existence of people or nature (*Animal Tracks*, 1995).

Environmental education: Education aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution (Stapp, 1969).

Environmental topics: Issues dealing with natural or man-made environment.

Farming systems: Dealing with the practices of farmers such as use or non-use of fertilizers, machinery, etc.

Forestry issues: The principles and practices utilized in the management, use, and enjoyment of forests (*Project Learning Tree*, 1994).

General ecological principles: Dealing with the function, controlling influences, structure, and response to change of an ecological system.

Human population growth: The increasing number of humans on the planet and its effects on the surrounding natural and man-made environments.

Land use: The development or manipulation of land.

Large School Districts: School districts with 500-2500 teachers.

Medium School Districts: School districts with 100-499 teachers.

Pollution: Harmful substances deposited in the air, water, or land, leading to a state of dirtiness, impurity, or unhealthiness (*Project Learning Tree*, 1994).

Recycling: A multi-phased process which includes removal, separation, and/or diversion of materials from the waste stream; use of such materials as raw materials for the manufacture of new products; and the use of the new product (*Project Learning Tree*, 1994).

Small School Districts: School districts with 1-99 teachers.

Wetlands: Lands where water saturation is the dominant factor determining the nature of soil development and the types of plant and animal communities (*Project Wet*, 1995).

Wildlife: Animals that are not tamed or domesticated; includes, but is not limited to, insects, spiders, birds, reptiles, fish, amphibians and mammals if non-domesticated (*Project Wild*, 1992).

Chapter 2

Review of Literature

Introduction

The purpose of this chapter is to review the literature pertinent to this study. The topics considered for this review were: status of environmental education in the U.S., status of environmental education in Oklahoma, environmental education within the curriculum, limitations that keep environmental education out of the curriculum, and the values of environmental education.

Status of Environmental Education in the U.S.

Environmental education is not a concept that has just developed in the last couple of years. The Ohio Department of Education was a pioneer in the field of environmental education and started programs in the 1940's (Lieberman, 1995). According to Disinger (1993) the term environmental education has been used to signify education focusing on the environment since the late 1960's. Preceding titles of environmental education have been "nature study," "outdoor education," and "conservation education."

In 1949, Aldo Leopold's A Sand County Almanac was published. In what is considered an environmental classic, Leopold talks about the need for people to have a

land ethic. He states, " ... a land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such." When discussing the ecological conscience, he says that conservation is "... a state of harmony between men and land." What was then referred to as 'nature study' he explains as "... the perception of the natural processes by which the land and the living things upon it have achieved their characteristic forms (evolution) and by which they maintain their existence (ecology)." He viewed outdoor recreation not as just being out-of-doors, but rather as a reaction to the experience. His theories express a strong conviction that people must do what they can to educate youth so that future generations will have the knowledge and understanding to appreciate their surrounding environment.

At present there are efforts being made to incorporate environmental education into the nation's school systems. A study regarding the status of state environmental education programs was conducted by the National Environmental Education Advancement Project (NEEAP). The NEEAP based at the University of Wisconsin, was established in 1991 to assist states in their efforts to incorporate environmental education programs into K-12 schools. NEEAP detailed 16 components that are believed to compile complete environmental education programs within the schools. These components are listed below.

* Environmental Education Master Plan
  A Comprehensive state plan whose purpose is to chart a course of action and to provide an implementation schedule for meeting state goals for EE. These plans set forth the goals and objectives for EE within the state and typically list who is best suited to achieve or implement these goals and objectives (e.g. the legislature, the business community, school administrators, etc.). They are

created through input from a wide range of EE leaders, educators, legislators, state agency representatives, business representatives, and others.

* State By-law or Requirement for K-12 Environmental Education Instruction Requirement that schools and K-12 teachers incorporate EE into their existing curriculum. This component is achieved through legislative or administrative avenues.

* Coordinated Statewide Teacher Inservice Training in Environmental Education Teacher training that targets K-12 teachers and enables them to become fully competent to teach to all of the goals of EE. A coordinated system of inservice programs that makes EE training available to all teachers within a state and allows for professional development options in EE as well as credits to maintain teaching certification.

* Required Environmental Education Training prior to Teacher Certification or Licensing
  EE pre-service training required for teachers desiring to teach certain subjects or grade levels that provides instruction in and ensures competencies in environmental/ecological concepts, the range of instructional and assessment methodologies used with EE and effective approaches for infusing and inserting EE into the curriculum.

* State Environmental Education Curriculum Guide
  EE Curriculum Guides often include instructional strategies, resource listings and suggestions for developing curriculum. They assist in integrating EE into existing curriculum and helping with curriculum/ school restructuring. EE Curriculum/Resource Guides sometimes have units and lessons for use by teachers and school districts.

* State Environmental Education Learner Objectives
  Objectives, Outcomes, Benchmarks, Essential Skills, etc. are intended to assist educators in developing specific instructional plans and assessment strategies for incorporating EE in given subject areas. These help ensure instructional consistency within academic disciplines among the state's schools and may be exit oriented or lesson oriented.

* State Supported Environmental Education Grants Program
  Grants program that uses state and/or private sector funds to increase EE programming at the grassroots level. EE grants programs are typically overseen by state offices for EE, state EE Boards or Advisory Councils and are accessible to both formal and non-formal education entities for enhancing or creating state and locally based EE projects.

* State Assessment Program that includes Environmental Education
  Application of assessment "tools" (including standardized testing, authentic/performance assessment measures and other evaluation methods) to determine the extent to which EE curriculum and instruction is having the desired impact on students.

* State Environmental Education Board/Advisory Council
  State EE Boards or Advisory Councils are the policy making and implementation oversight bodies for many state EE programs. EE Boards/Councils include key representatives of sectors/constituencies supporting EE including school teachers and administrators, university and business representatives, legislators, state agency representatives, and leaders from nonprofit conservation organizations. These entities often oversee implementation of an EE master plan's recommendations. Further it may also complete assessments of the status of EE statewide, continue to identify needs and set priorities for EE, consult with Department of Education (or equivalent), Department of Natural Resources and other state agencies and offices about EE program priorities, complete regular reports to the legislature, oversee and EE grants program and solicit funds.

* State Environmental Education Office
  State office and staff with EE responsibilities such as the following: assess the status of environmental literacy; prepare and EE plan; staff the EE grants program; promote and assist in the development of EE learner outcomes; promote and aid in the development of EE pre-service and inservice teacher training; cooperate with federal government, agencies and the private sector around EE programs; function as an EE clearinghouse; initiate, develop, implement, evaluate, and market non-formal EE programs; initiate research on EE; and coordinate EE conferences on a periodic basis.

* State Level Environmental Education Centers and/or Regional Offices
  EE Center(s) whose primary goal is to assist educators and administrators throughout all levels of the education system in the incorporation of EE as required or recommended by the state legislature. Typical services include: inservice EE programs, assistance in infusing EE into district and school curriculum, resource libraries, school networking programs, and EE literacy assessment projects.

* Interagency State Environmental Education Committee
  Committee of state agency representatives (sometimes include Federal agency representatives with state offices) which work to eliminate overlap in EE programs and to leverage their resources for greater impact.

* State Environmental Education Association
  Non-profit, professional grassroots organization whose members typically include teachers, agency and nature center professionals, college students and community educators as well as organizational members such as colleges and universities, school districts, environmental groups, businesses and county, state and federal agencies. This organization helps support and implement EE programming as well as providing members with networking opportunities, professional development and communication about EE concerns.

* Computerized Networking System for Environmental Education Materials and Services
  Computer network that provides educators and EE leaders with access to EE resources, events, funding opportunities and other helpful information.

* Funding Sources for Environmental Education
  Source(s) of funding to support the state level EE program infrastructure and specific programs, such as an EE grants program. Can be provided by a variety of means such as general revenue, license plate fees, resource user fees, polluter fines, taxes, lotteries and private donations and grants.

* Environmental Education Trust Fund
  Mechanism for generating and disbursing financial resources for EE. Trust funds are a permanent fund enabling EE leaders to collect and spend both private (grants and donations) and/or government dollars (NEEAP, 1995).

Abby Ruskey (1995), Coordinator for the NEEAP, stated that nearly every state in the country has some form of environmental education. However, no state has a complete program of study in environmental education for grades K-12 supported by environmental education guidelines or outcomes, and state-specific curriculum guides. There are six states which are considered "models" because they have achieved most of the components

set by NEEAP. There are only 12 states that require K-12 environmental education instruction. Thirty states have one or more "cornerstone" components in place on which to build a comprehensive environmental education program. These states also have active state environmental education associations or coalitions that are in the process of strengthening their programs.

Two states that border Oklahoma stand out in their efforts to include environmental education in their school curriculum. In Arkansas, all state course content guides contain environmental education skills. The schools are all required to use these state course content guides (Disinger, 1987). The NEEAP report (Ruskey, 1995) shows that Arkansas has eleven of the sixteen components in place for a complete state environmental education program.

The second, Texas, requires schools to comply with Texas Education Code 21.101, which lists the skills, processes, and content to be taught in 13 content areas, K-12. Science essential elements list environmental topics K-6; life science and earth science in Grades 7-8 list environmental topics, and Grades 9-12 courses either list environmental essential elements, and/or students take environmental science as one of their two science courses (Disinger, 1987).

There are several environmental education curriculum guides available throughout the nation. Some states such as California, Wisconsin and Vermont have developed their own state curriculum guides for environmental education. According to Disinger (1993) the best-known, most widely used supplementary K-12 environmental education teaching materials in the United States are *Project Learning Tree* and *Project Wild.*

Project Learning Tree (PLT) is a two-volume set of supplementary teaching materials dealing with human interdependence with the total forest community. It was developed in the mid-1970s under the leadership of the Western Regional Environmental Education Council (WREEC), and an association of environmental education specialists from the education and resource management agencies of the thirteen western states. PLT materials were developed by professional educators, many of them classroom teachers. This assured practical workability, a high degree of objectivity, and an abundance of acceptance among teachers and other professional educators (Disinger, 1993).

In the late 1970s, *Project WILD* was developed by WREEC using the same general model as used with PLT. Originally a two volume, interdisciplinary supplementary environmental and conservation education program emphasizing wildlife, the materials were developed by teachers and other professional educators, with consultant support. In 1987, a third volume was added - *Aquatic WILD*. Since autumn 1983, more than 380,000 teachers have participated in *Project WILD* training session averaging seven hours in length (Disinger, 1993).

The Status of Environmental Education in Oklahoma

There is no mandate for environmental education from the Oklahoma State Board of Education. However, three bills have been passed that place partial influence on environmental education: (1) a broad education objectives bill mentions environmental education "indirectly," suggesting that students "will interpret and draw conclusions" from environmental science data; (2) a license tag bill passed allowing people to purchase

specialized license plates for twenty-five dollars; a few dollars go for taxes and the rest funds environmental education through the Department of Environmental Quality (DEQ); and (3) in 1992 State law gave the Oklahoma Conservation Commission (OCC) responsibility for coordinating environmental education. Together with the Center for Environmental Education (CEE) at Oklahoma State University, the OCC has provided K-12 teachers with preparation for environmental education studies (Wade, 1994).

Oklahoma is one of several states which Ruskey (1995) states has a "cornerstone" component in place and has a solid foundation to build a comprehensive environmental education program. There are six of the 16 components activated in Oklahoma. The six components consist of :

* Coordinated Statewide Teacher Inservice Training in Environmental Education
* State Supported Environmental Education Grants Program
* State Environmental Education Board/Advisory Council
* State Environmental Education Office
* State Interagency Environmental Education Committee
* State Environmental Education Association

A 7th component, Networking System for Environmental Education Materials and Services, is currently being developed (NEEAP, 1995).

The Oklahoma Environmental Education Coordinating Committee has established a program known as "Seeds of Success," which fosters an awareness and appreciation of Oklahoma's natural resources. The program offers examples of effective programs planned and implemented by local schools with community and business participation. It highlights how schools keep existing programs going, and provides information and

encouragement for developing new ones. The program identifies and communicates the common factors that make school-based programs successful and transferable (OEECC, 1995).

A curriculum that has been developed for the state of Oklahoma and covers environmental issues is entitled *Critters and Concepts*. The introduction of the curriculum states that the purpose of the curriculum is to provide students with wildlife facts, so they can evaluate the effects of man's activities on other living things. It also encourages the students to be aware of the responsibility for decisions concerning natural resource use (ODWC, 1978).

Environmental Education Within the Curriculum

According to Ramsey (et al, 1992) environmental education should prepare individuals to be responsive to our rapidly changing technological world, to understand contemporary world problems, and to provide the skills needed to play an effective role in the improvement and maintenance of the environment. The most effective place to accomplish such a goal is the classroom. Because the student population of classrooms is easily viewed as a ready-made, captive audience, the formal education system is sometimes considered a conveniently accessible, strategically valuable subset of the public.

Environmental education uses various academic methods including: "hands-on" activities; subject matter that is pertinent to everyday life; and topics that engage students and allow them to become active participants in changing the way the world works. Some educators perceive the role of environmental education as "a good hook for science, math

and literature." They believe in using environmental education as a tool that can be "the hook and bait to accomplish performance-based standards." (Lieberman, 1995) This coincides with Disinger (1994) who reports that environmental education is most frequently integrated into the science curriculum. Science educators have been encouraged to look to the experiences of environmental education for a research-and-practice base for their new emphases.

Since science is the most prevalent subject, we need to know just which topics are discussed. The six most commonly covered topics in environmental education programs are: wetlands, wildlife conservation, general ecological principles, endangered species, water pollution, and recycling. The least common topics are land use, farming systems, human population growth, temperate ecosystems and toxic waste (Lieberman, 1995). Land use and farming systems are two subjects which would be useful in Oklahoma environmental education due to the diverse use of the land and the constant problems that farmers face with weather conditions.

The grade levels that are reported by Lieberman (1995) to have the most use of environmental education are kindergarten to 6th grade. These students represent 70% of the participants in environmental education programs, while tenth through twelfth grade students receive the least attention from current environmental education programs.

According to the Priority Academic Student Skills (Oklahoma Department of Education, 1993) book that describes the core curriculum for Oklahoma, environmental issues are first discussed in kindergarten science. It states, "Science knowledge is developed through experiences with real animals, plants and objects in the classroom

science center and the environment." The first five objectives for the kindergarten science curriculum deal with the natural environment. They are as follows:

A. Observe and describe characteristics of the four seasons such as temperature, weather, appropriate clothing, etc.
B. Observe and describe characteristics of weather using vocabulary such as sun, rainbow, clouds, fog, shadows, dew, frost, rain, hail, sleet, snow, lightning, thunder, temperature and tornado.
C. Observe and describe what various plants and animals need for growth.
D. Observe, classify and describe the sensory attributes of objects according to taste, smell, hearing, touch and sight.
E. Observe, describe and classify real objects according to their common properties (e.g., animals, plants).

The objective which specifically deals with the environment states that by the end of the school year students will be able to "describe simple conservation measures used to protect our environment (e.g., recycling)."

The environment as part of the curriculum does not appear again until the 6th grade social studies curriculum under world geography and extends through the 12th grade. It states that the students will be able to "assess the impact of humans on the biosphere." This is to be accomplished by completing the following requirements:

A. Relate human population growth to world atmospheric changes.
B. Give an example of the effects of industrialization and transportation on the environment.

Limitations that Keep Environmental Education Out of the Curriculum

The key to establishing environmental education in schools resides with the classroom teacher (Stone, 1990). However, there are still many educators who do not wish to utilize environmental education. A study conducted in Wyoming regarding

teachers' perceived competencies, attitude toward and class time devoted to environmental education stated results which showed that 30% of the 915 teachers surveyed indicated they did not teach about the environment. Reasons given were that there is a lack of environmental education background among the educators and that it is believed that environmental education is unrelated to their subject areas (Lane, et al, 1994). Another study by Young and Simmons (1992) conducted in Chicago regarding urban teachers' perspectives on teaching natural resources showed a positive attitude toward environmental education. Yet, there was negative response to accepting personal responsibility for delivering environmental programs. As with the Wisconsin study, the teachers of this study did not see teaching environmental education as important as the basics.

Because environmental topics have not had a curriculum home of their own, teachers wishing to include such topics have been faced with the trying to identify its appropriate place (Disinger, 1987). According to Wade (1996), the use of environmental education does not seem to find its way into the non-science classrooms very often. Environmental education coordinators believe the lack of involvement of non-science educators is due to the widespread belief among these educators that environmental education is strictly a natural science and is not relevant in other class subjects. This concept is most likely due to the lack of training in environmental education for those educators.

Training is needed to help teachers learn how to reduce the barriers they face (Young and Simmons, 1992). However, according to Lieberman (1996) the availability of funding and staff time for curriculum development were two other very limiting factors in

the use of environmental education. A corresponding focus on environmental education training and support for teachers has been lacking due to the fact that there are too few environmental education staff development opportunities for teachers and very little systematic information on the nature and effectiveness of the programs that are in place (Wade, 1996).

The non-use of environmental education within the schools does not solely lie on the shoulders of the educators. The state education agency has to be willing to participate in adequate training and training opportunities. Wade (1996) states that environmental education is a low priority of most state agencies and that state agencies are not committed to high levels of staffing in environmental education. Wade also adds that this lack of commitment to environmental education by state education agencies presents a large obstacle to the goal of infusing environmental education across disciplines and throughout any state education system.

Where is a good starting place for environmental education? Stone (1990) indicates that the preparation of teachers to become involved as environmental educators should begin in the teacher education curriculum. The first step, which must be taken for a successful training program, is to identify the components of an effective environmental education program. Some key principles and their explanations to consider would be:

1. Environmental education includes a human component in the exploration of environmental problems and solutions.
   Environmental solutions are not only scientific – they include historical, political, economic, cultural, and many other perspectives. This also implies that the environment includes not only pine trees and coyotes but also buildings, highways, and ocean tankers.

2. Environmental education rests on a foundation of knowledge about social and ecological systems.

   Knowledge lays the groundwork for analyzing environmental problems, resolving conflicts, and preventing new problems from arising.

3. Environmental education includes the affective domain: the attitudes, values, and commitments necessary to build a sustainable society.

   The role for educators in addressing the affective domain is not always easy, but it should include clarifying that differing personal values exist, that these values make it difficult to derive the facts, and that controversy is often motivated by differing value systems.

4. Environmental education includes opportunities to build skills that enhance learner's problem-solving abilities.

   These skills may include:

   - Communication: listening, public speaking, persuasive writing, graphic design;
   - Investigation: survey design, library research, interviewing, data analysis;
   - Group process: leadership, decision making, cooperation.

(Unknown, 1996)

The ideal situation for training teachers in environmental education, according to Stone (1990), would be to have separate courses specifically designed to teach environmental education competencies for teacher education majors. It seems that it would be feasible to insert environmental education into existing teacher education courses. This could take place without compromising either the quality or the goals of existing courses and programs.

The Values of Environmental Education

The goal of environmental education is to help students become environmentally knowledgeable, skilled, and dedicated citizens who are willing to work, individually and

collectively, toward achieving and maintaining an equilibrium between the quality of life and the quality of the environment (Hungerford, 1976). Since environmental education is interdisciplinary and multidisciplinary, which is essential for it to accomplish its unique goals, then according to Bogan (1973) at least four broad areas must be utilized. These areas include: the total environment and its problems; ecological principles, relationships, and concepts; the entire educational system (both formal and non-formal sectors); and most of the traditional disciplines, from chemistry, physics, and biology to sociology, economics, physics, and biology to sociology, economics, psychology, and the arts. Uniting them in a manner that creates a greater comprehension and understanding of environmental issues and problems possible by bringing about deeper awareness of relevant interrelationships and, where appropriate, the nature of possible alternatives to existing environmental situations.

For this to be completed, the objectives for environmental education must be adhered to when developing curriculum and instruction materials. Ramsey (1992) lists these objectives as being:

> Awareness - Helping students acquire an awareness and sensitivity to the total environment and its problems; develop the ability to perceive and discriminate among stimuli; process, refine, and extend these perceptions; and use this new ability in a variety of contexts.
>
> Knowledge - Helping students acquire a basic understanding of how the environment functions, how people interact with the environment, and how issues and problems dealing with the environment arise and how they can be resolved.
>
> Attitudes - Helping students acquire a set of values and feeling of concern for the environment and the motivation and commitment to participate in environmental maintenance and improvement.
>
> Skills - Helping students acquire the skills needed to identify, investigate, and

contribute to the resolution of environmental problems and issues.

Participation - Helping students acquire experience in using their acquired knowledge and skills in taking thoughtful, positive action toward the resolution of environmental problems and issues.

Utilizing these objectives through environmental education in the school curriculum and beginning at an early age, environmental education will help integrate students into the problem-solving world of adulthood. This would help to create an in-depth knowledge of environmental issues. Volk (1993) indicated that ideally, environmental issues should be local in nature at the early years, and expand into more regional, national, and international concerns at succeeding grade levels. In addition, as learners grow older, their information about issues should increase in depth and quality. Environmental education can accomplish this due to the fact that it provides, according to Disinger (1993), real problems that can be studied or simulated, topics and problems that can be adjusted to the developmental levels of specific groups of students, and topics and problems that cut across the curriculum and enhance the integration of knowledge.

Once this has been accomplished, then a level of developing problem-solving skills is met. The students learn to access and process information which will lead to decision making by identifying and evaluating the implications of environmental issues and alternative solutions (Volk, 1993). With this achieved then the skills of "citizenry," which Stapp (1969) mentions in his definition of environmental education, begins and students become involved with their community. They do this, according to Volk (1993), by taking physical action to help improve the status of an issue such as picking up litter; by the act of trying to persuade the opinions of a person or group of persons through letter writing or speeches; by relying on economic power to support or not support certain ideas

by reduced use of products which may be environmentally controversial; by becoming involved with political and government agencies through lobbying or campaigning, to convince officials a certain action should be taken; and by learning the use of the legal system to bring about actions regarding certain solutions to issues through injunctions and court orders.

As children grow they rely on adults such as educators and government leaders to assist them in their endeavors. By utilizing environmental education throughout a student's entire learning years, they will develop knowing how to make decisions before they enter the adult world. Evidence of such accomplishments have occurred in the Youth Conservation Corps (YCC), where after three to six years corps members when compared to a comparable group of individuals, spent more time reading and participating in community affairs, and engaged in more energy conservation (Burrus-Bammel and Bammel, 1990).

Another example is in Sumter, South Carolina, where the state education director indicated that the response from the community regarding the use of a 40-acre area as an environmental education center, were that the students stayed in school longer and were more interested in learning (Schmidt, 1989). In Austin , Texas, Gullett Elementary School is said to be a school every child wants to attend. Their motto is "A Living Experience," which is exactly what they have. Cages with animals from a variety of species fill the halls, and posters and murals dealing with animals and nature cover the walls and the *students* are the caretakers. The students are rotated in groups to care for the animals with the experienced group staying on until the new group know their tasks. The children not only learn about the animals, but also how environmental factors can affect them. For nine

days each school year the 5th graders put on an environmental program inviting students from other schools, and give talks and slide shows about the animals and the environmental issues affecting them (Estes, 1993).

Summary

On the national level, environmental education has begun its climb into the school curriculum. The NEEAP (1995) has established 16 components to help states in their efforts to incorporate environmental education programs into K-12 schools. Although no state has all 16 components in place, the majority have "cornerstone" components in place on which to build a comprehensive environmental education program.

Some states such as California, Wisconsin and Vermont have developed their own state curriculum guides for environmental education. According to Disinger (1993) the best-known, most widely used supplementary K-12 environmental education teaching materials in the United States are *Project Learning Tree* and *Project Wild.*

From the state level we find that in Oklahoma there is no mandate for environmental education from the State Board of Education. However, in 1992 State law gave the Oklahoma Conservation Commission (OCC) responsibility for coordinating environmental education. Together with the Center for Environmental Education (CEE) at Oklahoma State University, the OCC has provided K-12 teachers with preparation for environmental education studies (Wade, 1994). Oklahoma is one of several states which Ruskey (1995) considered a "cornerstone" state because it has six of the 16 components, which is a solid foundation to build a comprehensive environmental education program.

Focusing on environmental education within the curriculum, it is indicated that environmental education uses various academic methods including: "hands-on" activities; subject matter that is pertinent to everyday life; and topics that engage students and allow them to become active participants in changing the way the world works.

Environmental education is most frequently integrated into the science curriculum (Disinger, 1994). With this being so, the six most commonly covered topics in environmental education programs are: wetlands, wildlife conservation, general ecological principles, endangered species, water pollution, and recycling. The least common topics are land use, farming systems, human population growth, temperate ecosystems and toxic waste (Lieberman, 1995).

The grade levels that are reported by Lieberman (1995) to have the most use of environmental education are kindergarten to 6th grade. These students represent 70% of the participants in environmental education programs, while tenth through twelfth grade students receive the least attention from current environmental education programs.

According to the Priority Academic Student Skills (Oklahoma Department of Education, 1993) book that describes the core curriculum for Oklahoma, environmental issues are first discussed in kindergarten science and then not again until the 6th grade social studies curriculum under world history continuing through the 12th grade.

Based on the literature, there are still many educators who do not wish to utilize environmental education. Reasons given were that there is a lack of environmental education background among the educators and that it is believed that environmental education is unrelated to their subject areas (Lane, et al, 1994). This theory is supported by environmental education coordinators who believe the lack of involvement of non-

science educators is due to the widespread belief among these educators that environmental education is strictly a natural science and is not relevant in other class subjects. This concept is most likely due to the lack of training in environmental education for those educators. The non-use of environmental education within the schools does not solely lie on the shoulders of the educators. The state education agency has to be willing to participate in adequate training and training opportunities. Wade (1996) states that environmental education is a low priority of most state agencies, and that state agencies are not committed to high levels of staffing in environmental education.

Where is a good starting place for environmental education? Stone (1990) indicates that the preparation of teachers to become involved as environmental educators should begin in the teacher education curriculum. The first step, which must be taken for a successful training program, is to identify the components of an effective environmental education program.

To determine the value of environmental education, we first look at the goal of environmental education which is to help students become environmentally knowledgeable, skilled, and dedicated citizens who are willing to work, individually and collectively, toward achieving and maintaining an equilibrium between the quality of life and the quality of the environment (Hungerford, 1976). By utilizing objectives based on awareness, knowledge, attitudes, skills, and participation through environmental education in the school curriculum and beginning at an early age, environmental education will help integrate students into the problem-solving world of adulthood. Once this has been accomplished, then a level of developing problem-solving skills is met. The students learn

to access and process information which will lead to decision making by identifying and evaluating the implications of environmental issues and alternative solutions (Volk, 1993).

Chapter 3

Methodology

Introduction

The purpose of this chapter is to describe methods and procedures used to study the status of environmental education in grades 5 through 9 of Oklahoma public schools. This will be accomplished under the following headings: research methodology, selection of sample, survey development, and analysis of data.

Research Methodology

This is a descriptive study to establish a baseline about the extent that environmental education is used within Oklahoma public schools between grades 5 through 9. A survey was developed to obtain answers to the research questions. The research questions were developed to gain a descriptive view of the use of environmental education by public school teachers grades 5-9 in the state of Oklahoma. These research questions are as follows:

1. In which grade levels of grades 5 through 9 is environmental education being taught?
2. In which school subjects are educators utilizing environmental education?

3. Which environmental education curriculae do educators have in their possession, which they use, and which do they wish to obtain?
4. What facilities do educators utilize when teaching environmental education?

Selection of Sample

A list of public school districts was taken from the Oklahoma Educational Directory for the school year 1995-1996. A random sample of these public school districts was selected. This was accomplished by first separating the school districts into three categories based on the total number of teachers in each district. Small districts consisted of 1-99 teachers. Medium districts consisted of 100-499 teachers. Large districts consisted of 500-2500 teachers. The school districts were then typed out in categories alphabetically. Within each section, the count started with the second school district and every eighth district was selected to be in the sample. The first school districts were over lapped with the last count of eight to give every district a fair chance of being selected.

The sample sizes were as follows: 59 small districts, 9 medium districts, and 2 large districts. A total of 2,622 teachers for grades 5 through 9 were included in the survey with the breakdown per category as 1,088 (41%) teachers in the small districts, 777 (30%) in the medium districts, and 757 (29%) in the large districts.

The teachers from the schools within each sample district which teach the selected grades were surveyed. Phone calls were made to each school district or school to obtain the number of teachers per grade per school, so that an accurate amount of surveys were

be sent. Envelopes containing the surveys (one for each teacher per school) were sent to the librarian of each school to be distributed to each teacher. Participation was voluntary and subjects provided consent to conform to IRB.

Survey Development

The survey begins by requiring that each respondent state the school and the school district so that each returned survey can be associated with the correct category (small, medium, large). The second question asks the educators to indicate which grade(s) and subject(s) they teach. The subjects provided for selection were science, math, social studies, English, physical education, history, home economics, and agriculture education. If the educators taught subjects other than those listed, they were asked to list the subject they taught. This question allowed the researcher to gain a better insight as to the range of subjects and grades each educator encounters.

Question three asks if the school or school district has a written policy for environmental education. Since there is no state-wide curriculum in Oklahoma, this will inform the researcher where environmental education is a designated part of the curriculum. Following this question, four asks the educators if they discuss environmental concepts in their class. This question is used as an indicator for the researcher. If the answer was no, then the rest of the survey would be unanswered. If the answer was yes, then the responses continue on to question five which asks the educator what environmental topics are discussed or taught. The topics used in this question were taken from Lieberman (1995) which stated that the six most common topics of environmental

education are: wetlands, wildlife conservation, general ecological principles, endangered species, water pollution, and recycling. The least common topics are: land use, farming systems, human population growth, temperate ecosystems and toxic waste. For a more fitting topic to the state of Oklahoma, temperate ecosystems was replaced with forestry issues.

Question six on the survey narrows down the answers given in questions two and four by asking the educators who teach more than one subject to list the subject in which they primarily discuss environmental education.

Now that the researcher knows what educators use environmental education and in which subjects and grades, question 7 asks about the curriculae. The curriculae used in this question were: *Project Learning Tree*, the most widely used environmental education curriculum according to Disinger (1993) and the second most used curriculum, *Project Wild*. Two of the more recently established curriculae for environmental education *Project Wet* which deals with water education and *Project WOW (Wonders of Wetlands)* were also used. A curriculum which is based on Oklahoma wildlife was included and is titled *Critters and Concepts*. The final two curriculae selected for this question were recognized by the Conservation Commission as being utilized by educators in Oklahoma. They are *Away with Waste* and *Ag in the Classroom*.

The educators were given three responses for this question. They were asked to check the appropriate box which signifies if they *have* any of the listed environmental education curriculae; which environmental education curriculae they *use*; and if they do not have or use any of these, are there any they would *want* to obtain for use.

The final question pertained to the facilities used when educators were teaching environmental education. The facilities listed are as follows: indoor classroom, outdoor classroom site school grounds; local, neighborhood park, city or county park, state park, Corps of Engineers park, national forest or grassland, wildlife management area, camps (e.g. YMCA, Girl/Boy Scout, Campfire); whether use of camps was overnight or day use; near by natural areas such as fields, ponds, woods (within walking distance); natural areas such as fields, ponds, woods (requiring driving), nature center, national wildlife refuge, water treatment plant, landfill, industrial plant, farm, or recycling center. Educators were also asked to name any other facility used which was not listed.

Questions one, three, and seven were taken from a needs assessment study conducted for the Kerr Nature Center, Outdoor Education and Program Facility located in the Quachita National Forest. The study was conducted by Dr. Lowell Caneday, Suzie Ruby, and Dr. Chris Cashel all from Oklahoma State University.

The survey was viewed and approved by Dr. Chris Cashel, professor in the school in Health, Physical Education, and Leisure at Oklahoma State University; Lisa Knauf, coordinator of the environmental education through the Oklahoma Conservation Commission. The questions on the survey were viewed as being adequate to retrieve the information being sought through the research questions.

Analysis of Data

As the surveys were returned by the responding educators, they were divided into school district categories which were defined as: small districts consisting of 1-99

teachers, medium districts consisting of 100-499 teachers, and large districts consisted of 500-2500 teachers. This was accomplished by the respondents indicating the name of the school and school district in which they work. If a survey was returned without this information the survey was deemed non-usable.

Once this was complete, each response to each question was counted individually and tallied. In the event that the responses to the questions were marked in a manner that was considered by the researcher as being vague and not understandable, the survey was deemed non-usable.

The totals of each response were then converted to totals and percentages using the Micro-Soft Excel program. Responses were entered onto spreadsheets and calculations were completed by the program.

The responses to question 1 regarding the school name and the school district were primarily for the researcher, so that the responses to the remaining questions would be entered in the correct categories: small, medium, and large school districts. The responses to question 2 were counted for two separate responses. The first was the grade level(s) taught by each educator and the second was the subject(s) taught be each educator.

The responses to questions 3 and 4 were taken at face value and counted individually. For question 3, it was determined how many schools or school districts have an officially adopted, written policy on environmental education, how many do not have such a policy, or how many do not know of such a policy. Concerning question 4, educators either discussed or did not discuss environmental issues in their class. If the

answer was no then the rest of the questions were deemed irrelevant. If the answer was yes then the researcher followed through to the rest of the survey questions.

On question 5, there were two analysis completed. The first was to see how many educators discussed which environmental topics. The second was to discover in which subjects the topics were discussed. At this point, question 6 regarding the primary subject in which environmental topics were discussed came into play. This question narrowed down the subjects in which educators discussed environmental topics, if an educator taught more than one subject.

Responses to question 7 were regarding the environmental education curriculae educators *have*, *use*, or *want* to obtain for use. Each response was counted individually. It was noted, however, that the *use* of a curriculum did not indicate that the educator *has* a personal copy.

The final question, number 8, was asked which facilities were used by educators when discussing environmental education. Each response was counted individually.

Chapter 4

Findings

Introductions

The purpose of this chapter is to report the results of the study. The results will be discussed under the headings *survey return*, which will include results specifically pertaining to the surveys returned by respondents; *survey question results* which will include survey results question by question; and *discussion* which will interpret the responses. The results of this study are related to the following research questions:

1. In which grade levels of grades 5 through 9 is environmental education being taught?
2. In which school subjects are educators utilizing environmental education?
3. Which environmental education curriculae do educators have in their possession, which they use, and which do they wish to obtain?
4. What facilities do educators utilize when teaching environmental education?

Survey Return

A total of 2,622 teachers for grades 5 through 9 in Oklahoma public schools were included in the survey with the breakdown per category as 1,088 teachers in the small districts, 777 in the medium districts, and 757 in the large districts. This resulted in the most equal distribution among the three categories. As shown in Figure 1, the percentage of surveys sent to each category were close with the 41% for the small school districts, 30% for the medium school districts, and 29% for the large school districts. A survey was sent to each educator in each school district for a total of 2,622 surveys distributed. The total number of returned surveys was 301. There were 9 surveys that were deemed non-usable due to unclear responses which did not allow the researcher to properly categorize the survey. This gave a return rate of 11% based on the remaining 292 usable surveys. This number served as the basis for responses of questions 1 - 4.

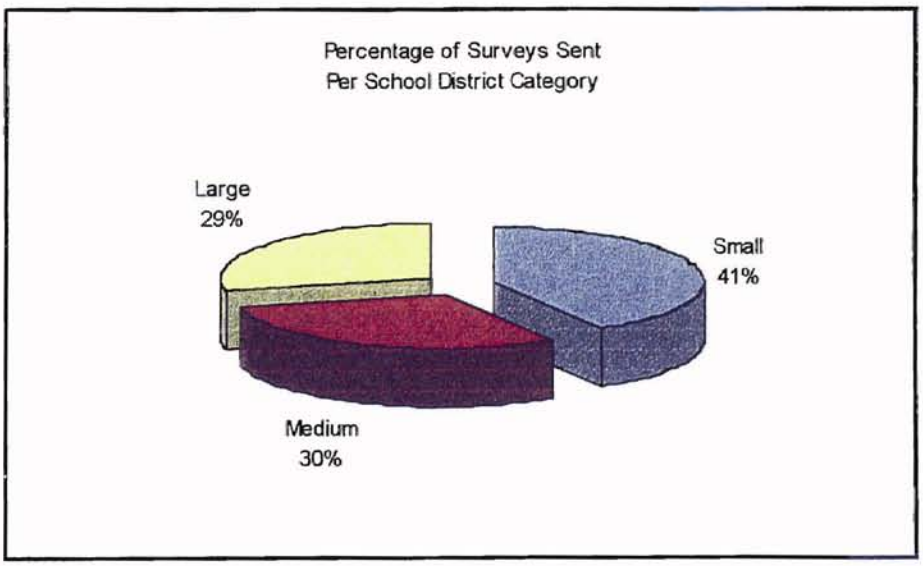

Figure 1: The percentage of surveys sent to teachers in each school district category.

Survey Question Results

The first question asked for the school and school district names so that surveys could be categorized by school district size. The breakdown shown in Table I of the return rate per category was 102 (9%) for small school districts, 112 (14%) for medium school districts, and 78 (10%) for large school districts.

Table I

Number of responses and percentage per school district category.

SCHOOL DISTRICTS	RESPONSES	PERCENTAGE
SMALL	102	9%
MEDIUM	112	14%
LARGE	78	10%
TOTAL	292	11%

Educators were then asked in question 2 to designate which grade level(s) and subject(s) they teach. In Table II , the break down of responses per grade level are shown.

Table II

Percentage of grade levels taught by responding educators.

Number of Grade Levels	Percentage
Single Grade Level Taught	**70.55%**
5th	16.78%
6th	16.10%
7th	10.96%
8th	10.27%
9th	16.44%
Two Grade Levels Taught	**14.38%**
5th - 6th	1.71%
6th - 7th	3.08%
7th - 8th	6.85%
8th - 9th	2.74%
Three Grade Levels Taught	**11.30%**
6th - 8th	7.19%
7th - 9th	4.11%
Four Grade Levels Taught	**0.34%**
5th - 8th	0.34%
All Grade Levels Taught	**2.74%**
Grade Unknown	**0.34%**

The second part of question 2 related to the subjects taught by responding educators. The subjects listed for this question were science, math, social studies, art, English, physical education, history, home economics, and agriculture education. Each subject was designated as being taught by a responding educator. Other class subjects that were listed by responding educators were; gifted and talented, reading, writing, music, technology education, speech, library media, computer, Native American studies, Spanish, English as a Second Language (ESL), special education, careers, health, business, keyboarding/typing, spelling, economics, humanities, study improvement, and an elective class entitled "I Teach... I Touch the Future."

In question 3, the educators were asked if their school or school district had an officially adopted, written policy on environmental education. One hundred and seventy-

five responders (60%) stated that they did not know of a policy. One hundred and one (35%) educators responded that their school or school districts did not have any such policy and 11(4%) educators stated that their school or school district did have an officially adopted, written policy on environmental education. There were five (2%) educators who did not respond to the question. Figure 2 shows the responses devided into school district

categories.

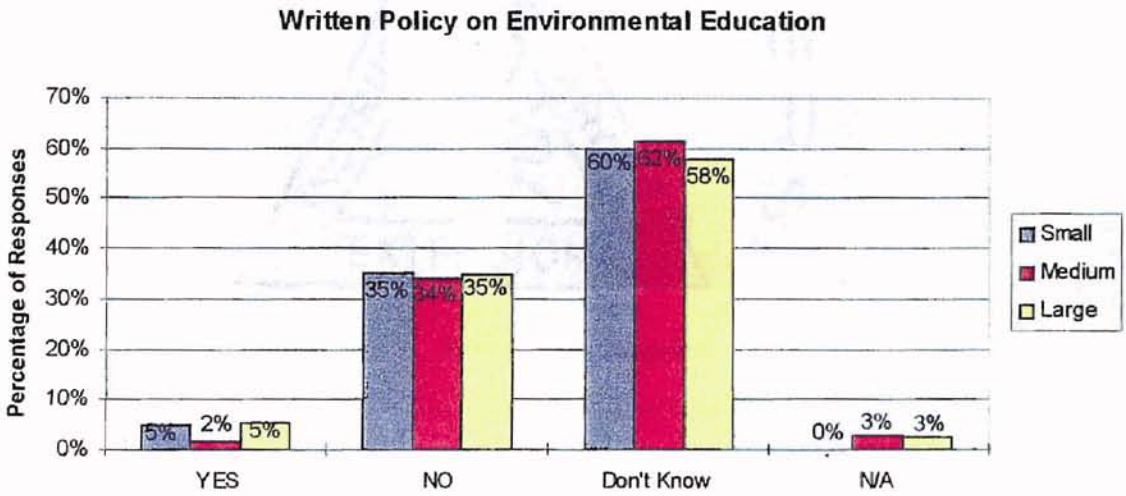

Figure 2: Percentage of schools or school districts which have an official, written policy on environmental education.

The results of question 4 showed of those responding, 92.6% of the educators discuss environmental education in their classes, while 7.3% do not. As shown in Figure 3, when broken down into categories the small school districts' results indicated 93% do discuss environmental education and 7% do not. Medium school districts reported 91% of educators discussing environmental education and 9% not, while the large school

districts' results showed 94% do discuss environmental education and 6% do not. Because 7.3% do not discuss environmental issues in their classes the usable cases dropped from 292 to 270 which will be the basis for question 5.

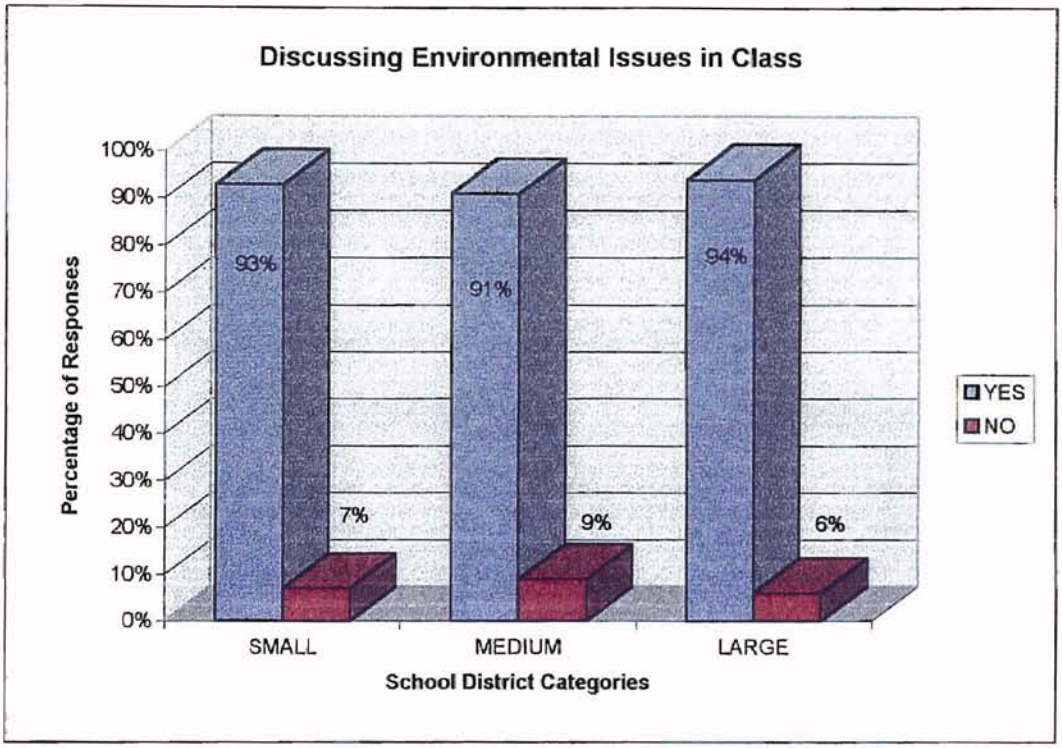

Figure 3: Percentage of educators discussing environmental issues in class.

When asked in question 5 which topics involving the environment were discussed the results showed the top six topics discussed were: 1) recycling; 2) pollution; 3) endangered species; 4) water use; 5) general ecology principles; and, 6) land use. The least discussed topics follow these with: 7) toxic waste; 8) human population growth; 9) wildlife conservation; 10 & 11) forestry issues and farming systems; and, 12) wetlands. These results are listed in Table III. The other environmental topics which 7% of the educators stated they discussed were composting, animal rights, humane education, national parks, genetic application to speciation, individual responsibility, global warming,

careful/frugal use of non-renewable resources, renewable resources, energy conservation, reusing, rethinking, water treatment, how genetic engineering may impact the environment, use and misuse of energy resources, alternative energy, ozone depletion, the environment as an indicator of our future, and land fills. Only one educator did not respond to this question.

Table III

Environmental topics discussed by educators.

	SMALL	MEDIUM	LARGE	PERCENTAGE
Recycling	84	80	67	**86%**
Pollution	81	84	65	**85%**
Endangered Species	59	63	51	**64%**
Water Use	65	57	43	**61%**
General Ecology Principles	50	51	38	**51%**
Land Use	52	47	32	**49%**
Toxic Waste	51	44	33	**47%**
Human Population Growth	45	43	36	**46%**
Wildlife Conservation	47	39	35	**45%**
Forestry Issues	39	22	28	**33%**
Farming Systems	39	34	16	**33%**
Wetlands	34	19	19	**27%**
Other	7	9	3	**7%**

For the remaining questions 6-8 the results were switched from group to individual responses which were counted equally and the results based on the total number of responses.

The educators were then asked in question 6 if they taught more than one subject, in which subject they primarily talked about environmental education. The results shown in Figure 4 are the responses from question 1 combined with question 6 to report the class subjects in which these topics were discussed the most. Combining all grade levels

the top three class subjects were: science at 44% total (grade levels reporting: 5th grade 11.78% , 6th grade 10.03%, 7th grade 7.52% , 8th grade 6.77%, and 9th grade 8.02%); social studies at 14% total (grade levels reporting: 5th 3.76%, 6th grad 4.26%, 7th grade 3.51%, 8th grade 1.50%, and 9th grade 1.00%); and English at 12% total (grade levels reporting: 5th grade 1.00%, 6th grade 2.26%, 7th grade 3.51%, 8th grade 3.76%, and 9th grade 1.50%). Following these subjects were in order: math at 6%; home economics at 4%; and history, art, and agriculture education all at 1%. There was no response indicating the use of environmental education in physical education. Class subjects that were not in the original list and designated as "other" made up 18% of the responses. However, this was for individual class subjects which consisted of library media, music, reading, computer science, special education, health, technology education, Spanish, English as a second language, geography, and gifted and talented.

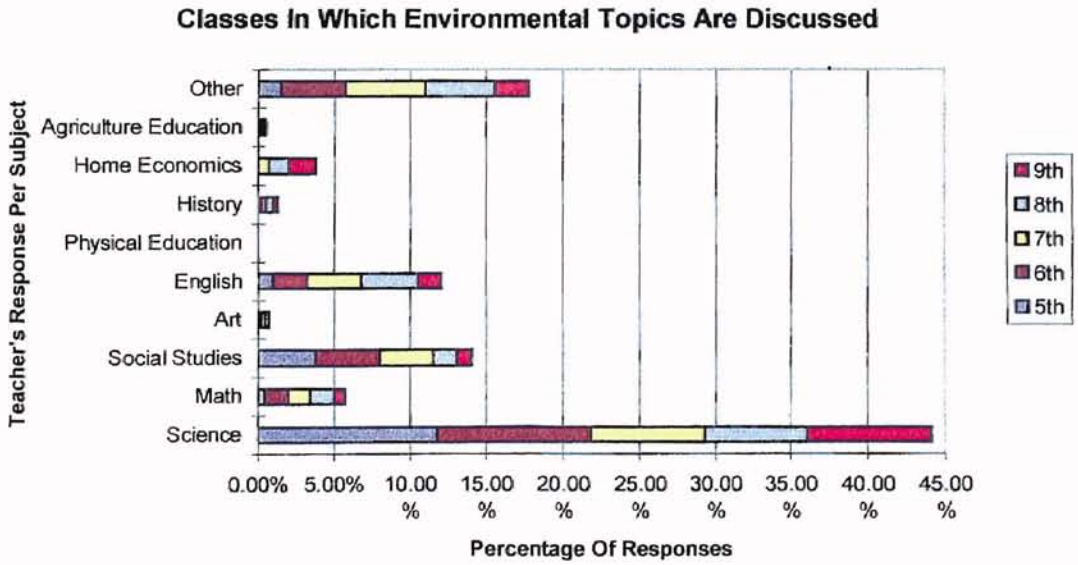

Figure 4: Percentage that environmental education is taught in selected subjects based on grade levels.

Educators were asked in question 7 to designate which environmental education curriculae they possess, use or wish to obtain. From the responses of all the returned surveys, *Project Wild* was the curriculum that the majority (10.67%) of educators had and used (8.39%). Second to this was *Project Learning Tree* with 5.97% of the educators having a personal copy and 3.70% reporting the use of the curriculum. Continuing on in order, *Project WET* with 4.13% educators having the curriculum and 2.84% using it. *Critters and Concepts* had 2.99% educators possessing a copy and 1.56% who used it. *Ag In The Classroom* followed with 2.28% educators having a copy and 1.14% using the curriculum. *Away With Waste* was next with 1.14% educators possessing a copy of the curriculum and 1.14% actually using it. The curriculum with the least educators reported having (0.57%) and using (0.43%) was *Project WOW (Wonders of Wetlands)*.

Educators did state several curriculae that they have and use other that those listed in the survey question. These are: Decisions Decisions a book by Tom Snyder Productions, *Book It*, Animals Alive by Dennis Holley, *AIMS*, Oklahoma Department of Wildlife conservation projects, *Ranger Rick*; the Department of Soil Conservation's *Lines on Land*, *One Green Tree*, and *What is a Tree*; 4-H's *Trees*, *Insects*, *Recycling*, the *Exxon Energy Cube*, *NEED Project*, state and federal regulations, *Hazardous Waste*, *Weekly Reader*, *Project Recycle*, the National Wildlife's work education packet. One educator stated that he developed his own curriculum and another educator reported that her class developed its own curriculum for the year.

As depicted in Figure 4, *Away With Waste* was the most requested curriculum with 10.24% of the responding educators indicating they would like to obtain a copy for use.

The second most requested curriculum was *Critters and Concepts* with 9.25% responding. *Project Wild* had 7.54% of the educators desiring a copy followed closely by *Project Learning Tree* at 7.11%. Even though the final three curriculae were the least requested, the numbers were still far above the possession and use responses. These are *Project Wet* at 6.83%, *Project WOW (Wonders of Wetlands)* with 7.25%, and *Ag in the Classroom* at 5.83%. There were 85 educators that did not respond to the question.

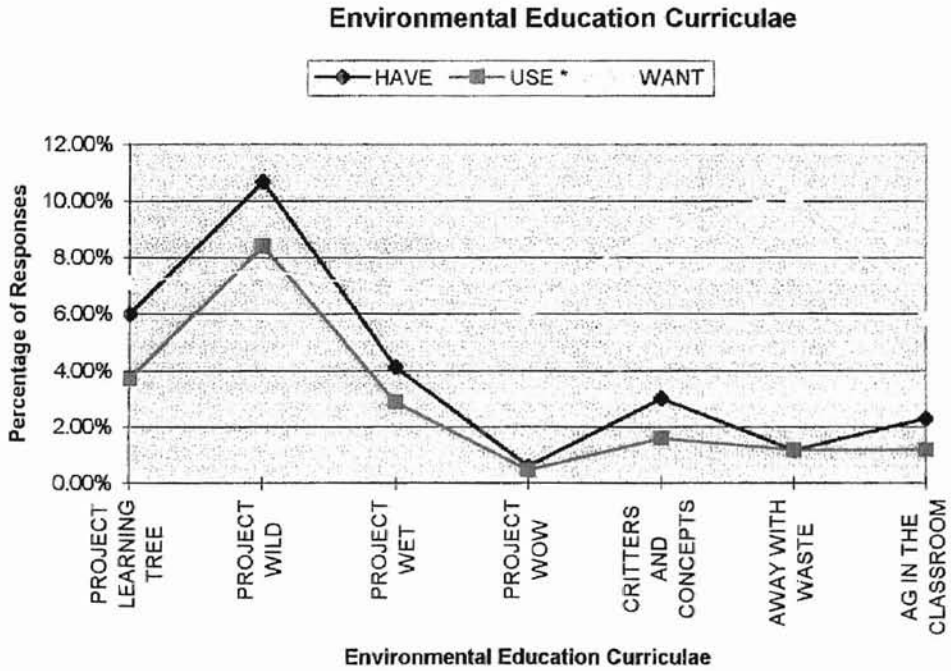

Figure 4: The curriculae which educator *have*, *use*, or *want* to obtain for use based on percentage of teachers' responses.

The final question deals with the facilities used when teaching environmental education and the results are shown in Table 4. Facility use among responding educators is primarily focused around the indoor classroom which is indicated by 36.8% of the

educators responding. Second to this is the school grounds with 21.9% of those responding. The third most used facility is an outdoor classroom site with 10.5% of the total responses reporting use for conducting environmental education curriculae. Table IV shows the percentage of responding educators indicating their use of facilities while teaching environmental education.

TABLE IV

LISTED FACILITIES WHICH ARE USED BY EDUCATORS ACCORDING TO SCHOOL DISTRICT CATEGORY

	SMALL	MEDIUM	LARGE	TOTAL	Percentage
Indoor Classroom	84	77	64	225	36.8%
School Grounds	54	43	37	134	21.9%
Outdoor Classroom Site	23	24	17	64	10.5%
Near by natural area such as fields, ponds, woods					
(within walking distance)	11	11	13	35	5.7%
Local, Neighborhood Park	12	11	2	25	4.1%
Near by natural area such as fields, ponds, woods					
(requires driving)	13	6	1	20	3.3%
Nature Center	7	2	9	18	2.9%
City or County Park	6	9	1	16	2.6%
Recycling Center	4	6	5	15	2.5%
Farm	9	3	1	13	2.1%
Water Treatment Plant	5	5	1	11	1.8%
State park	2	7	1	10	1.6%
Corps of Engineer Park	5	1	1	7	1.1%
Industrial Plant	2	5	0	7	1.1%
National Wildlife Refuge	4	0	0	4	0.7%
Wildlife Management Area	2	0	0	2	0.3%
Landfill	1	2	0	3	0.5%
Camps Day Use	2	0	1	3	0.5%
Overnight Use	0	0	0	0	0.0%
National Forest or Grassland	0	0	0	0	0.0%

Discussion

When asked which grade level(s) and subject(s) each educator taught, there were several educators who taught more than one subject and more than one grade. However, the majority of those responding only taught one grade level. Those educators who taught more than one grade were primarily from the small school districts.

There were several educators who, when asked about their school or school district having an official written policy on environmental education, indicated that there was no such policy and only a very few who indicated that a policy was in existence. Since Oklahoma does not require environmental education within the curriculum, then the large number of educators indicating that their school or school district did not have a policy was expected. However, those who indicated that they did not know whether their school or school district had a policy is very high and could be considered a definite barrier for use of environmental education in Oklahoma.

At first glance the overwhelming 92.6% of educators who stated that they discuss environmental topics in their classes seems exciting. It could be said that educators in grades 5 - 9 in Oklahoma public schools discuss environmental topics, but according to these results only 92.6% of 11% of responders to a survey of 5 grade levels in public schools discuss environmental education.

The responses given by the educators when asked which environmental topics were discussed are similar to the remarks that Lieberman (1995) made, which stated that the six most commonly covered topics in environmental education programs are: wetlands, wildlife conservation, general ecological principles, endangered species, water pollution, and recycling. The least common topics are land use, farming systems, human

population growth, and toxic waste. There are differences in the two lists, but these are understandable based on the characteristics of the Oklahoma land and people.

The main difference is the topic of land use. In Oklahoma, it is essential to the economic as well as the natural environment. The majority of Oklahoma's land is used for growing crops such as wheat, cotton, alfalfa, maze, and peanuts. Those areas not quite suitable for farming in the eastern part of Oklahoma are under forest management. The land is used for logging and recreational activities. Though most of the land in Oklahoma is arable there are portions that are too rocky to be farmed, yet do not have the forest potential for logging. Many of these sites are used for recreation activities such as hiking, camping, or hunting. To maintain a good balance and help keep the land healthy, the discussion of land use in the classroom keeps the information available to upcoming generations.

It was not surprising that the two most discussed topics were recycling and pollution. These two topics seem to be the most widely discussed across the country. This is due to the fact that through television, radio, newspaper and other public media, these topics stay in the public's eye.

Science was definitely the subject in which most of the responding educators discussed environmental issues. This occurred at all grade levels 5 through 9 and within each school district category. There is some concern of bias toward science. The researcher was notified that at some schools the librarians only distributed the surveys to science teachers. Even with this being true, the discussion of environmental issues is appearing in other subject areas.

In a national study, Disinger (1994) reported similar results regarding science as the subject in which environmental education was most frequently integrated. Social studies was indicated as the second subject in which environmental issues were discussed. This relates to the fact that environmental issues become part of the Oklahoma curriculum at the 6th grade level in social studies (Oklahoma Department of Education, 1993)

English was the next subject in which environmental issues were discussed. The use of environmental education within this subject allows educators to enhances the student's ability to understand environmental policy. This is accomplished by staying aware of past and current issues, and expressing opinions through papers written by the students on such policies. Although science, social studies and English were the subjects which most educators integrated environmental topics, this study showed that these topics ranged throughout the different curriculae. This indicates that environmental education is not "stuck" in one field of thought in Oklahoma, but rather has a large disbursement through the curriculae.

The grade levels indicated by Lieberman (1995) to have the most use of environmental education are grades K-6. When combining all subjects in the results of this study, the 6th grade level educators reported the most use of environmental education followed by 7th and 8th grade levels. This can be related to the fact that in the Priority Academic Student Skills (Oklahoma Department of Education, 1993) book the environment first appears in kindergarten then not again until 6th grade.

According to Disinger (1993) the most used curriculae in the country were *Project Learning Tree* and *Project Wild.* In this study we find that *Project Wild* is widely used across many subject areas with *Project Learning Tree* following close behind. It is also

indicated that the desire to obtain copies of environmental education curriculae is very high, and this shows that educators want to expand their teaching curriculae.

The facilities which educators indicated they used when teaching environmental education are those which are the most convenient for them; the indoor-classroom and the school grounds. There is nothing wrong with the use of these facilities when discussing environmental issues, however, to enhance the quality of the education an area that involves the environmental topic being discussed is beneficial. The students actually see, touch, and hear for themselves the process behind the topic they are learning about, such as going to a recycling center or a wildlife management area to view the operation in progress. These types of facilities offer more insight for the students by generating ideas and questions they may not have had by reading about or listening to someone speak about the facility.

Chapter 5

Conclusions and Recommendations

Introduction

The purpose of this study was to get a descriptive view of the use of environmental education in grades 5 through 9 of Oklahoma public schools. The results will assist the State Board of Education and environmental education coordinators by revealing a baseline of information. The conclusions which were made based on this study will be discussed first followed by recommendations.

Conclusions

It is first concluded that environmental education in Oklahoma is limited. There are six of the 16 components needed to compile a complete environmental education program within the schools which have been activated in Oklahoma. The six components consist of :

* Coordinated Statewide Teacher Inservice Training in Environmental Education
* State Supported Environmental Education Grants Program
* State Environmental Education Board/Advisory Council
* State Environmental Education Office
* State Interagency Environmental Education Committee
* State Environmental Education Association

A 7th component, Networking System for Environmental Education Materials and Services, is currently being developed (NEEAP, 1995).

When compared to the two neighboring states of Arkansas and Texas, Oklahoma still has a long way to go in developing a complete environmental education program. In Arkansas, all state course content guides contain environmental education skills. The schools are all required to use these state course content guides (Disinger, 1987). The NEEAP report (Ruskey, 1995) shows that Arkansas has eleven of the sixteen components in place for a complete state environmental education program.

Texas has only seven components in place, yet unlike Oklahoma, the state requires schools to comply with Texas Education Code 21.101, which lists the skills, processes, and content to be taught in 13 content areas, K-12. Science essential elements list environmental topics K-6; life science and earth science in Grades 7-8 list environmental topics, and Grades 9-12 courses either list environmental essential elements, and/or students take environmental science as one of their two science courses (Disinger, 1987).

At this time the Oklahoma curriculum only offers environmental education in kindergarten and then not again until 6th grade social studies under world geography (Oklahoma Department of Education, 1993) where it continues through the 12th grade. Starting with kindergarten is a good step, yet for the knowledge to be maintained throughout a students life the learning should continue on through the grade levels and progress with the student as they become more aware of their environment. This is confirmed by Burrus-Bammel and Bammel (1990) who stated that by utilizing

environmental education throughout a student's entire learning years, they will develop knowing how to make decisions before they enter the adult world.

Even though the state of Oklahoma does not require environmental education to be taught, the study shows an indication that there are some schools or school districts which have developed there own written policy on environmental education. This was implied by the 11 educators who responded that their school or school district had a written policy on environmental education. However, the number of teachers that did not know whether or not their school or school district has such a policy creates a concern as to the orientation educators have regarding their school policies.

The third conclusion is that there is some use of environmental education throughout Oklahoma public schools in grades 5 - 9. There were 292 educators that made up 92.6% who responded to the study stating that they discuss environmental issues within their classrooms. This is a small percentage, less than 1%, when it is considered that there are approximately 40,000 educators within the state of Oklahoma. However, this percentage may have been higher with a larger response rate. Looking back at the NEEAP components for environmental education programs, Oklahoma has statewide inservice training for educators and it is believed that the percentage of findings for this issue should be much higher.

Lieberman (1995) and Disinger (1994) both state that environmental education is used most within the science curriculum. Based on the results of the study, the fourth conclusion is that this is also true for environmental education within grades 5 through 9 of the Oklahoma public schools.

The majority of the educators responding to the study indicated that science was the subject in which they primarily discussed environmental issues. Even though science was the leading subject, there were several educators who taught more than one subject who indicated that they discussed environmental issues in other subjects as equally as they did science. Physical education was the only subject listed in which no educators indicated using environmental education. However, environmental education was discussed in all of the remaining listed subjects and an array of other subjects identified by the educators. Therefore, the fifth conclusion is that there are educators who are deviating from the so-called "norm" and expanding their curriculum by using environmental education. This is a good step, because it shows that environmental education can be used in other subject areas besides science. It is also an indication these educators are not afraid to try new styles of teaching and are trying to incorporate education about the problems of our environment.

According to Disinger (1993) the best-known, most widely used supplementary K-12 environmental education teaching materials in the United States are *Project Learning Tree* and *Project Wild.* This was also true in the results of this study, however, the order is reversed and *Project Wild* was designated the most used curriculum and *Project Learning Tree* ran a close second. To this it can be safely said, that Oklahoma public educators in grades 5-9 are following the national norm by using these two curriculae. But, limiting the curriculae use to just these two does not cover all aspects of environmental education.

There is a strong desire by the educators responding to this survey to obtain the different curriculae. This is most obvious in the results for *Away With Waste* where just

over 10% of the responding educators wanted copies compared to the 1.14% who actually have and use the curriculum. Similar results were given by educators for both *Critters and Concepts* and *Ag in the Classroom*, which are Oklahoma based curriculae.

This need for materials shown by the results verifies Burrus-Bammel and Bammel's (1990) statement that one of the barriers for environmental education instruction is the lack of instructional materials. From this the sixth conclusion is made that the distribution of environmental education materials to educators is not effective. The materials are not being made readily available for the educators.

The final conclusion is that Oklahoma public educators in grades 5-9 are not utilizing all facilities available to them when teaching environmental education. Facility use by educators who discuss environmental issues was focused primarily around the school facility. The indoor classroom was by far the leading facility. The second most used facility was the school grounds. The reasons that most likely explains the primary use of these facilities is financial funding and time constraints. These two facilities do not require any extra funding on the part of the educator, the school, or the school district and are readily available without travel time. However, this could inhibit the learning potential that the environmental curriculae provide. Environmental education materials help expand the learning quality only as far as the educator is willing to let it expand. By utilizing other facilities that are in the surrounding area, such as a city park or a vacant lot, the educators are continuing to remain in the school budget, but also allowing the students a natural setting in which to learn instead of sitting inside a classroom.

There were several school which have developed and utilized outdoor classroom sites. These facilities are the up-and-coming areas that many of the schools in Oklahoma

are trying to establish. In many instances, several schools or school districts will pull together to develop an outdoor classroom site and the cost of development and upkeep are shared, keeping the funding for the facility down for all involved.

Many of the facilities that were indicated as not being used very much, will also fall under the barrier of funding as well as time constraints. According to Lieberman (1995) the availability of funding and staff time for curriculum development are the most limiting factors. Burrus-Bammel and Bammel (1990) agree with this when they stated that the two greatest barriers to outdoor environmental education instruction are time constraints; not enough time in the school day and not enough time for preparation along with the lack of funding. To be able to utilize the larger natural areas which may be further from the school, but is best suited for the educational experience which is planned, educators will need to be able to count on funding from state and private sources.

Recommendations

Based on the literature the following recommendation was made:

1. Environmental education should be required in Oklahoma schools at all grade levels. At present, there is no mandate for environmental education in Oklahoma. However, by requiring that environmental education be included in the Oklahoma school curriculum we will be enhancing the education of our students. Through environmental education we help students become environmentally knowledgeable, skilled and dedicated citizens who are willing to work, individually and collectively, toward achieving and maintaining

an equilibrium between the quality of life and the quality of the environment (Hungerford, 1976).

The remaining recommendations are made based on the conclusions previously mentioned:

2. The Oklahoma Environmental Education Coordinating Committee (OEECC) headed by the Oklahoma Conservation Commission (OCC) along with the State Department of Education and any other agency involved with the committee should increase their efforts to activate the remaining 10 components required for the state to have a complete environmental education program. According to the NEEAP (1995) report, we are behind Texas and Arkansas in activating these 16 components. Oklahoma is known for being the *first* to pass educational reform, but we are far from that at the present time.

3. All Oklahoma schools or school districts should have an official written policy regarding the use of environmental education and all educators should be made aware of all existing policies on environmental education. According to the results of this study, the majority of educators did not know if their school or school district had such a policy. This indicates that the school and district administrators are not informing their educators of school policies.

4. The distribution of environmental education curriculae should be evaluated to determine what the barriers are that block educators from obtaining the materials. Based on the results of this study, educators are begging for more environmental education materials. There seems to be a lack of communication among the OCC, OEECC, the State Department of Education and the educators on when and where environmental education materials can be obtained. Oklahoma has a statewide teacher inservice training

for environmental education which would provide the various curriculae to the educators, yet it appears they are not receiving the information needed to attend training session or receive the materials.

5. Environmental education materials should be made available for Oklahoma educators. Even though this study shows that *Project Wild* and *Project Learning Tree* are used by a good portion of the responding educators, they were still high requested by those who do not have a personal copy. *Critters and Concepts* and *Ag in the Classroom* are Oklahoma based environmental education curriculae and should be in the possession of all Oklahoma educators, yet according to this study they are not. It is recommended that the OEECC should obtain a copy of each curriculae and coordinate from whom and how the curriculae is distributed.

6. According to this study the facilities most used when teaching environmental education are inside the classroom and the school grounds. Oklahoma has many other facilities that can increase the learning potential of environmental education. The state has a national forest, national grassland, wildlife refuges, wilderness areas and several state, county and city parks. Being a farming state, there are small natural areas such as streams, fields, and ponds on private land that could be used if permission is sought. A new wetlands area in southwest Oklahoma has been established and is available for use. There is also a great deal of industry in Oklahoma. Conoco and Phillips Petroleum are two of the largest oil companies in Oklahoma. Weyerhaeuser is the main lumber extraction company in the state. On the more local levels, there are water treatment plants, land fills, and recycling centers that can be utilized when teaching environmental education. Another alternative to consider would be to utilize nature centers throughout

the state, such as the Martin Nature Center in Oklahoma City, the Oxley Nature Center in Tulsa, and the 4 WINDS Nature Center in southwest Oklahoma. These centers can provide a structured area and professional staff to provide environmental education for schools. It is then recommended that a study be done to determined why these facilities are not being used and if there is a way that to make them more readily available for educational purposes.

7. The results from this study create the desired baseline, however, this is only for grades 5 through 9 in the Oklahoma public schools. Similar studies should also be conducted on Pre-K through 4th grades, and grades 10 through 12. There are several private and special needs schools within the state of Oklahoma . To ensure that these students are receiving the same type of curriculum as students in the public schools, a study should be conducted to receive the same information. Home schooling is another facet in the Oklahoma education background that should also be considered for a similar study. This would give a complete picture of the use of environmental education within the school systems of Oklahoma.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 09-19-96 **IRB#: ED-97-012**

Proposal Title: THE USE OF ENVIRONMENTAL EDUCATION WITHIN OKLAHOMA PUBLIC SCHOOLS IN GRADES 5-9

Principal Investigator(s): Chris Cashel, Maggie Sasse

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature: _____ Date: September 26, 1996
Chair of Institutional Review Board

VITA

Mary Margrette Sasse

Candidate for the Degree of

Master of Science

Thesis: THE USE OF ENVIRONMENTAL EDUCATION WITHIN OKLAHOMA PUBLIC SCHOOLS IN GRADES 5 THROUGH 9

Major Field: Environmental Science

Biographical:

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Education: Graduated from Colbert High School, Colbert, Oklahoma in May 1984; received Bachelor of Science degree in Recreation with a specialization in Administration and Management from Oklahoma State University in May 1989. Completed the requirements for the Master of Science degree with a major in Environmental Science at Oklahoma State University in December, 1997.

Experience: Seven years as camp counselor and director at Camp Longhorn Indian Springs in Burnet, Texas; employed as program associate at Wyman Center Outdoor Education Camp in Eureka, Missouri; four Summers as nature interpreter at Cedar Lake National Recreation Area in the Quachita National Forest; presently owner/operator of 4 WINDS Nature Center in Blair, Oklahoma.