PERCEPTIONS OF SELECTED TEACHERS AND STUDENTS ON THE NATURAL RESOURCES PROGRAM OF AGRICULTURAL EDUCATION IN OKLAHOMA

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CHAPTER I

INTRODUCTION

Through a collaborative effort by many individuals, organizations, and department systems, the new Introduction to Natural Resources course was formally added to the Oklahoma secondary agricultural education Core Curriculum in the Fall of 1990.

Thus, agricultural education in Oklahoma began the process of educating its students in the important area of specific, sustainable natural resource management and progressive conservation. Present public awareness and concern for environmental issues make the addition of the program to agricultural education an important and timely educational complement.

Several factors must be involved in any program to assure its success. Positive relationships between students, instructors, administrators, parents, and supervisors are prerequisite to an effective program. Attitudes, aptitudes, and perceptions of the persons involved in the program, periodically appraised through formal and informal evaluative means, also play a determining role in the achievement of goals and objectives.

Since the inception of the program, conflicting informal reports concerning the general effectiveness of the program have surfaced. These reports range from the extremes of; how well the program seems to be instilling values of responsible environmental behavior in the students, to the negative implication that no actual instruction in conservation education is being given the students. If the principal aim of education is shaping human behavior, and the ultimate goal of environmental education is the development of environmentally responsible and active citizens, then real data should be presented.

If the program is to be considered effective in eliciting the appropriate knowledge, attitudes, and behavior in the students, then assessment, or evaluation of these desired characteristics should be considered necessary. The involved persons should be the principal group in a determination of program effectiveness. The students enrolled in the Introduction to Natural Resources course in SY 1990-91, and the agricultural education instructors who have taught it should be the primary evaluators of its effectiveness, and of those areas which were regarded as either faciliatory, or detractory in the overall program of instruction. To assemble and analyze their respective assessments of the course, collected immediately after the first full school year it was taught, was the primary intent of this study.

Statement of the Problem

In considering the newly installed Natural Resources component of the secondary agricultural education curriculum in Oklahoma, three main areas of program-related contention were noted, and were regarded as critical factors to be considered. The three areas are listed as follows:

1. Conflicting reports from ancillary sources concerning how well, or how poorly the program was supplying students with essential knowledge, attitudes, and skills in environmental realms;
2. No other formal evaluative efforts to determine the two-way convergence of perceptions of this vital area of instruction, had been extended; and
3. There had been expressed concerns, statewide, relating to instructional methods, prepared curriculum materials, background preparation, employed practices, and selected activities included in the instruction of the course.

Therefore, the chief problem precipitating the undertaking of this study was that: the teacher-educators, the Vo-Tech supervisory staff, and other interested parties in Oklahoma were not informed as to how the involved students and instructors have responded to the Natural Resources course. The effectiveness of the new program is important to its continuance, and it was hoped that this evaluation study would assist in further instituting it.

Purpose of the Study

The purpose of this study was then: to ascertain the perceptions held by selected students and instructors, of the Introduction to Natural Resources program of instruction, and to determine what areas of the curriculum materials, background preparations, instructional methods, employed practices, and selected activities were considered contributory or detractory to program efficacy.

Objectives of the Study

To accomplish the stated purpose, a three-tiered system of objectives was formulated. The first level consisted of the following overall objectives:

1. To facilitate the teacher-evaluation of student perceptions of the Natural Resources program; and
2. To determine the perceived effectiveness of the Natural Resources program, as related by the program-directing instructors.

Instructor-specific objectives were the second level and provided impetus:

1. To describe relevant demographic, background, and orientation information of the instructors.
2. To relate their views on teaching the curriculum;
3. To report activities they thought were effective;
4. To determine what teaching methods and materials they thought were effective, and;

5. To determine the purposes in adopting the program.

Finally, a set of student-specific objectives were developed as follows:

1. To describe relevant demographic and background information of the students;
2. To relate how they felt about the new curriculum;
3. To report activities they considered to be interesting and helpful in understanding the lessons;
4. To determine what they considered to be important of what they learned in the course, and;
5. To designate their purposes for taking the course.

Assumptions of the Study

The basic assumption of the study was that the answers given by the respondents were honest, truthful, and offered as earnest recollection.

Scope of the Study

The scope of this study included all students enrolled in the Introduction to Natural Resources program of secondary agricultural education during the SY 1990-1991, and the programs' directing instructors, from 37 randomly selected schools in Oklahoma. Each of the five Agricultural Education Districts of the state were represented with the following frequencies: Northwest District - 5, Southwest District - 7, Central District - 8, Northeast District - 8, and the Southeast District - 9.

The cluster sampling technique of the 37 schools yielded an instructor sample of 37, and a student sample of 475. Two distinct, separate researcher-constructed questionnaires were prepared to determine the perceptions of both groups.

Definitions

The following definitions are offered in explanation of selected terms as they are used in this study.

Conservation Education- Education concerning wise use of natural resources. Study of relationships within Nature, the balance between demands and sustainable production, and methods of preserving the resource base for future inhabitants of the earth. Used interchangeably with Natural Resources Education, and Environmental Education.

Environmental Education- In addition to the definition of Conservation Education, this is the study of living things and their surroundings, and even more specifically, to human intervention in the relationships of Nature. This is usually thought of as a separate disciplinary entity. However, in this study it is considered part of a unified effort to educate toward the maintenance of the overall environment.

Experiential Education- Learning by experience in a particular endeavor. Also referred to as hands-on learning or learning-by-doing. The very fundamental principle of

vocational education, although certain distinctions are made by various authors in this study as to added implications of experiential education.

Introduction to Natural Resources- The recognized designation of the newly introduced program of instruction in secondary agricultural education. Designed to develop awareness and ultimately, useful skills in the students regarding wise use of finite resources, occupations within the agriculturally-related areas of natural resources, and the application of available technology toward repletion, conservation, and sustainable, dynamic permanence.

Primary Resource Use- The use of natural resources directly to produce usable products. Includes farmers, fishermen, lumbermen, etc., generally regarded as "owners" of at least part of the resources they utilize.

Responsible Environmental Behavior- The goal of instruction in environmental, natural resources, and conservation education. Exemplified by behavior that is conducive to both remediating and maintaining environmental quality. Used interchangeably with Environmentally Responsible Citizenship and Stewardship.

Secondary Resource Use- The indirect use of natural resources- goods and products made from primary resources. Even members of the primary resource use group are sometimes included in this "consumer-type" group.

CHAPTER II

REVIEW OF LITERATURE

Preambulary Comments

Until approximately 10,000 years ago, there was no organized agriculture. As disclosed by Ponting, (1990) hunter-gatherer people roamed about, constantly in search of water, food, and shelter. Their lifestyle allowed the environment to be relatively unchanged, but it also limited human population. With the advent of the science of agriculture, and its evolving, improving vocational education, the environment was altered dramatically and the subsequent food surpluses allowed civilization to grow.

Ponting (1990) pointed out that although the chronological timeline from the beginnings of agriculture until now is a minor fraction of the total time of man on earth, this time frame has shown disproportionate accomplishment in all areas. Populations have expanded, cultures flourished, cities risen up, and industrialized societies emerged. Successive dominant civilizations have come and gone, with each more glorious than its predecessor. Institutions have been founded to promote health and education, consistantly raising the quality of life for many, ever increasing the scope of ideals and positive accomplishment.

Negative accomplishments however, have also been forthcoming. Disproportional results in environmental impacts have been the most recent focus of international discussions. Overpopulation, spurred by relatively abundant food supplies, and the subsequent cycle of increasing demand upon resources, are now at the center of environmental issues. Modern agricultural production is both a cause, and a result of the present global environmental situation.

As reported by Ponting (1990), in ancient Greece, records of Aristotle and Solon indicate that they argued for agricultural conservation practices, and for the education of farmers. However, an expanding population and increased demand for more food overrode the practical application of the conservation practices. Eventually the Grecian powerbase crumbled, chiefly due to deterioration of the soil and lack of sufficient foodstocks. One can only imagine previous similar pleas made by insightful citizens of the Sumerians, or of the Mayan civilization, toward the saving of their cultures by using their resources wisely. Caesar Tiberius, the ruler of Rome in B.C. 29, said, concerning citizens' unwise use of resources, "To be a good shepherd is to shear the flock, not skin it" Rawson & Miner (1988, p.313). But his pleas were not heeded and the Roman Empire also went the way of the previous dominant cultures.

Presently, the impact of human activities upon the environment is not only making a difference in localities, but according to consensus of environmental scientific opinion, it is also affecting the entire bio-sphere adversely. Heft (1984) asserts that where before, mismanagement of the resources brought about the decline of area cultures, today it is possible for mismanagement of resources to bring about wide-scale lost quality of life.

The voices of leaders are once again attempting to invoke conservation, only now the voices are coming from all disciplines, all corners of the globe. However, this diversity of voices is, for the most part, an unharmonious effort. Different groups have different methods and motives in promoting environmental responsibility, often criticizing the other groups for their similar efforts. However, Johnson (1990) registered that one encouraging note of incidental harmony rings out with increasing regularity; the universal call for education as a base for all environment-focused activities.

Agriculture is still the center of natural resource use. Soil, water, air, and energy resources used in agriculture present the ultimate dilemma. The same dilemma was faced by all the previously mentioned civilizations- that is; what price is necessary to continue to feed the earth without bankrupting our resource accounts?

In light of agricultural use of resources, and the problems in maintaining productive environments, agricultural education would seem to be a logical choice in ongoing efforts toward environmentally responsible citizenry. The masses of people look to agriculture to continue to provide quality of life, or even life itself. If a harmonious chorus of voices presented the trilogy of sustainable development, environmental responsibility, and continued quality of life, coordinated by effective agricultural education and orientation, the world could look to agriculture correctly, as the means to protect, and insure the survival of the planet, as well as the people on it.

Leaders in agricultural education have championed the cause of natural resource conservation and environmental education as an immediate, necessary, and quintessential reality. The ability of agricultural education to provide at least a cursory base of relevant environmental instruction to enrolled students may be one of the last opportunities to change from the direction of historic resource use, to a modern system based on principles of sustainability and dynamic permanence.

Agricultural education has begun to adopt the philosophy of teaching sustainable principles in specific natural resources conservation, and more programs are being added to convey this instruction all the time.

In light of the mandates that Nature, world population, education, and conservation philosophy offer, it is imperative that this instruction be effective.

Developments Affecting Natural Resource Education

Smith(1966) reported that in 1907, Gifford Pinchot defined his newly coined word, conservation, as; "The management of resources to achieve the greatest good for the greatest number" (p. 6). This viewpoint was shared and sponsored by, Theodore Roosevelt, and initiated U.S. policy on forest-use. In general, the European-descent Americans looked upon Nature as the supplier of resources which were to be utilized to depletion. In contrast, according to Booth and Jacobs (1990), the predominate Native-American philosophy with the environment was that of mutual transactions between all of Nature's residents and Nature itself, and the method by which the environment was sustained. They felt that if something was taken out of the environment, then something of equal value should be put back into it, and contributions back to Nature were simply natural reimbursements. This fundamental "holistic" philosophy has been "rediscovered" recently, and is now regarded by many as the correct means of sustaining our finite resource base.

Clepper (1971) noted that after more than a century of settlement in America, the hitherto inexhaustible

resources were dwindling. Men such as George P. Marsh, John Muir, Louis Agassiz, John J. Audubon, Aldo Leopold, and others, called attention to the fact that all of our vast, abundant resources were disappearing. The efforts by these people, and others, to bring to light this lessening of resources, were made chiefly through the dual medium of education-literature. For the most part, these were educators and writers and they felt that information was the first step in alleviating the situation.

Smith (1966) reported that during the period of time from the mid-1800's until the early 1900's, public awareness increased dramatically and many indicator projects and activities were instituted. National Parks and Forests, wildlife refuges, governmental regulatory agencies, the Chautauqua system, conservation organizations, water-use projects, and many educational activities were all results of this period in public environmental awareness.

Smith (1966) also recounted that the Morrill Act of 1862 provided for the establishment of land-grant colleges to teach agricultural sciences, and that the Smith-Hughes Act of 1917 financed vocational agricultural education for high schools. Many of the educational efforts of the era were directed toward the emerging conservation issues, with the hands-on training, or learning-by-doing method of instruction.

The period from 1910 to the 1930's was generally a prosperous time with relatively few environmentally-

oriented outcries. In the 30's however, the breadbasket had turned to dustbowl. Economic disaster was both a cause and effect of the cycle of continued agricultural resource deterioration. The economic problems allowed what Smith (1965) called the "Golden Age of Conservation" (p.9) to be ushered in by the Franklin Roosevelt administration. Smith (1966) also reported that in the New Deal era, public sentiment was not the direct precipitating factor in changing resources policy as it was earlier. The immediacy of the situation demanded complete control by existing and newly formed governmental agencies. The Soil Conservation Service (SCS) was implemented under the direction of Hugh H. Bennett. The SCS, the Civilian Conservation Corps, (CCC) the Tennessee Valley Authority, (TVA) and other departments helped control the rampant soil erosion by immediate, decisive action directed mainly from the chief executive's office. The main thrust of this era was immediate action in financial and manpower expenditure necessary to bring our basic resources back under control. The educational endeavors toward the environment of the period were chiefly what educators today call experiential education. Then, educators such as Beard, (1949) called this type of instruction on-the-job training, hands-on experience, or learning-by-doing education.

Zurbrick (1990) defined experiential education as, "Learning activities that involve the learner directly in

the phenomena being studied . . . addressing a real world problem in a natural setting" (p. 3). Members of the CCC and the TVA were mostly young, unemployed people that were first taught about the problems of the environment, and then put to work to correct them. The CCC built many shelterbelts, dams, terraces, and other soil-erosion control measures and were a major part of the recovery of the stricken land. World War II was, as Smith (1966) said, the end of the "Golden Age of Conservation" (p. 11).

The Soil Conservation Service (SCS) and some other agencies formed during the 1930's continued to operate well following World War II. Part of the impetus of the SCS down through the years has been the educative effort toward informing and helping farmers to prevent and control soil erosion, and to incorporate land-use planning. The Cooperative Extension Service affiliated with land-grant colleges and universities, came to strength during the years following the war, with its main objective to inform and educate farmers in all areas of agriculture.

Following the war, government was necessarily concerned with putting veterans to work, and setting the economy back on track. Private industry was entrusted with much of the conservation effort. Educators again called for conservation to be a part of formal education.

In statements as appropriate now as when they were issued, men like Ward Beard, Stuart Chase, and John

Studebaker made eloquent arguements for inclusion of environmental science and conservation into public schools at all levels. Beard (1949) quotes both Chase and Studebaker in his book, Teaching Conservation.

> Stuart Chase, in an article in the NEA Journal said, We attach great importance now to the preservation of our democratic system of government. It is well that we do this. But how can democratic civilization survive if the soil itself is impoverished and destroyed? Let us as a part of our process of education lead every child to love the soil and to appreciate its relationship to human welfare (p. 27).
>
> The U.S. Commissioner of Education, John Studebaker, in a speech stated, The problems of conservation are now of paramount importance in our national life, and the need of considering them in the program of the schools is being increasingly recognized (p. 18).

In 1949, Ward Beard issued a statement in the book, Teaching Conservation, that has been echoed since he made it. Uniquely transcendent through time, the brief statement summed up even current American educational goals.

> The success of natural resource conservation rests on a thorough understanding by citizens of the value of soil, water, wildlife, forests, and related resources to individuals and their community, their state, nation, and planet. Education to bring about this understanding should begin in the public schools (p. 19).

Since World War II, agriculture has been transformed by the technology of production, and specific conservation measures initiated have been more often influenced by extraneous economic inducement factors than by simply a need for such actions.

In the 1960's, several environmental concerns prompted more discussion, legislation, directives, and educational policy changes. The Vocational Act of 1963 was implemented to help develop new up-to-date programs, and to encourage scientific research within vocational education. In 1968, amendments were made to the 1963 Act to include funding for specific projects, and to assure that all persons vocational educational needs would be served. In the spirit of the newly rekindled public awareness, the National Environmental Policy Act of 1969 was enacted. Lemons, et al. (1990) delineated the specific purposes of the NEPA as follows:

> To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of ecological systems and resources important to the nation; and to establish a Council on Environmental Quality (p. 313).

Marland (1973) explained that with the passage of the Environmental Education Act in 1970, called Public Law 91-516, public education was placed in a somewhat different capacity than it was previously. It was then intended to instill education focused on environmental quality and ecologically-oriented instruction.

In 1970, the first Earth Day was celebrated. Although it was generally regarded as another high-visability protest movement, it again increased public awareness of the environmental issues of the day.

Legislation in 1972, and again in 1976, amended the Vocational Act of 1963, and extended the Higher Education Act of 1965. The Carl C. Perkins Vocational Act of 1984 replaced the 1963 Vocational Act and expanded purposes to include improvement of the vocational instruction offered, to help make students more employable, and give disadvantaged students equal opportunities for training. Many of the programs implemented, had as a base-Natural Resources and conservation training.

In the time since the middle 1960's, many environmental issues and problems have arisen. Agriculture has been both praised and blamed through these years. Rodale (1984) and others have said that depletion and degradation of energy, soil, water, and air have all increased greatly in the last 30 years. Williams and Weber (1990) stated that education toward understanding of the complex issues of the environment has been called for, and in some instances-delivered.

Conservation has been taught in agricultural education since its beginnings, but incorporating conservation practices has historically been weighted on the side of production economics. Clearly, the management of resources for sustainable development is a complex situation that cannot be treated lightly or addressed simply.

Riesenberg (1989) advanced the premise that one sector of an informed public cannot remediate accumulated problems

by itself, and to solve the problems facing the nation and the world in the environment, an organized, interdisciplinary, unified system should be devised. Scientific problem solving used extensively in agriculture, involves several steps in logical order. Riesenberg (1989) also contends that if the formal scientific method were applied to solving the environmental problems of today, education may play a significant role in; defining the problem, seeking data and information, and evaluation of the solutions offered. Agricultural education, with its research portion involved, could function in all areas of the scientific method of environmental problem-solving.

The close ties between agriculture and resource use, coupled with the above-mentioned argument for problem-solving ability, make relevant, effective natural resource instruction within agricultural education a natural choice for leadership status in future directives.

Rawson and Miner (1988) printed a quote attributed to Cicero, that stresses the significance of the contentions of the preceding segment of the literature review; "Not to know what has been transacted in former times is to always be a child. If no use is made of the labors of past ages, the world must remain always in the infancy of knowledge" (p. 67). Agriculture in general, and agricultural education in particular, must keep learning from past mistakes, and looking to the future.

Innovation in Education

Within the context of the environmental issues being addressed in this discussion, the undulance of public opinion and awareness concerning environmental education is quite evident. From pre-historic times, leaders have brought the issues to light, then after the immediate problem is circumvented or faced, public support again fades into the shadows. The decade of the 1990's has given rise to public venting of frustrations concerning worldwide conservation efforts. The global community is alarmed, collectively, and as Bruce Johnson (1990) stated, "Once again, more and more people are calling for the education of young people as the long-term solution to the environmental crisis" (p. 38).

The public generally invests its money in education for consciously projected returns. From time to time, insurrections concerning the desired effectiveness versus perceived results occur, bringing with them sweeping changes to remediate evaluated shortfalls. Riesenberg (1989) narrows the discussion to two basic reasons for the American public investing in public education: "Individuals are important to our society . . . and education is good for the individual, and society in return" (p. 4).

In agricultural education, conservation principles should be taught in combination with other main areas.

Traditionally, instruction in natural resource management has been relegated to secondary status. The subject is separated from most conventional agriculture course work and is not generally afforded the priority availed to production-type courses. Williams and Weber (1990) call for this type of treatment to end, and as they state, "Instruction in natural resources needs to be expanded and focused to help youth and adults to understand the relationship between agriculture and conservation" (p. 14).

Innovation in approaches to environmental education is required for the immediate future. New delivery systems, new instructional methods, and unique supportive activities are necessary to yield satisfactory long-term results. However, true to the saying ascribed to Mille Bertin by Rawson & Miner,(1988, p. 248) "There is nothing new except that which has been forgotten." Some of the most basic, original teaching methods are being used in natural resources studies with a great deal of success.

The first type of teaching was practiced by the hunter-gatherers. The type of teaching method they employed was vocational education. One generation passed down the secrets of how to make a living to the next. Vocational education has been used successfully in natural resource education as shown in several agricultural education programs. The Prairie Heights School Farm in Indiana is a notable example.

Stump (1984) tells of the large school farm and the conservation-orientation visible in its operations. The 230-acre farm began as an offshoot of the Vocational Act of 1963, which encouraged expanded programs to include conservation and other non-traditional agricultural enterprises. The program courses include wildlife conservation, forestry, soil and water activities, and resources management.

Stump (1984) states that all of the farm's conservation orientation and the specific areas mentioned are; "providing a practical theory-skills link in training students, and the supervised experiences on the farm are developing essential occupational competencies" (p. 14). Many former students have gone on to successful careers in conservation-oriented fields, exhibiting learned values.

Hands-on learning, or learning by doing is a traditional key element in agricultural education, and a useful method in environmental education. Presently though, the term "experiential education" is being described as an extension of the hands-on type learning practiced by students from the days of the first harvest until today. The additions to the original learning theory as explained by Grady (1990, p. 3) are; ". . . grounded in concrete experience. The student observes the experience and then reflects, builds, concludes, and acts on it. Learning is enhanced when content is practiced in context"

Experiential education is an innovative teaching method wherein the instructor becomes a facilitator, or a good questioner, to help guide the students to form conclusions and action plans. With experiential education, Grady (1990, p. 3) also states that, "learning becomes a transaction between the student and the environment" The student learns to form and conform to the learning environment. Experiential learning is a cultivated method of learning which lends itself well to environmental studies, and essentially teaches the student how to learn and to transfer that learning.

Environmental experiential education teaches, or more correctly, allows the student to learn from Nature. The combination of theoretical classroom studies and the practical studies of, and in, the environment makes for the strongest learning available. Throughout the history of the conservation movement, educators have advocated that in the study of the environment, a sizeable portion of the instruction should be outdoors.

Beard (1949) noted that all conservation education should entail outdoor field work. This offers the teacher and the student real world problems to solve, and the hands-on experience that comes from solving them is necessary to give the students an understanding that conservation is practical. "Finding solutions to real problems is the ultimate test of effective teaching"(p. 8).

Modern environmental educators, Hungerford and Volk, (1990) and others state that effective environmental education requires that a large segment of instruction should be in the environment, conducted in the experiential mode. They also indicate that environmentally responsible behavior can only come from working with real life environmental problems. Terms they refer to in achieving responsibility are "empowerment" and "ownership" (p.12). Empowerment refers to the feeling that the person is actually helping to change things and correct a problem situation. Ownership is the feeling that the issues are very close to, and important to the person. According to these and other educators; "Ownership values, appear to be critical to responsible environmental behavior, and Empowerment seems to be the cornerstone of this training" (p.12).

These two areas of exploration are not included in many environmental education programs. The combination of experiential and environmental education seems to be an innovation that could significantly contribute to the effectiveness of conservation instruction. However, much time must be devoted to the planning and organizing of such studies. Added to that, expense of time, effort, and money, make this teaching philosophy even more difficult. Administrators are often opposed to extended periods away from the classroom. As Cundiff (1989, p. 16) wrote, "It's OK to skip school in sports, but not to study environment."

Goals of Environmental Education

Grady (1990) reports that most learning theorists indicate the goal of education, in general, is to modify behavior. The prime direction of agricultural education is toward providing relevant information, useful service, and leadership opportunities in agriculture and agriculturally related activities. One of the main objectives of agricultural education is to assist the individual students in attaining their potentialities.

Conservation, environmental, or natural resource management education, in the words of Hines et al.(1987, p. 1) ". . . has for its ultimate goal, the development of environmentally responsible and active citizens." Stewardship is a word being used more all the time in interdisciplinary communications; most often used to describe this environmentally responsible citizenship.

Hungerford and Volk (1990) identified a super-ordinate educational goal that states, "to aid citizens in becoming environmentally knowledgeable, skilled, and willing to work toward quality in life and environment" (p. 13).

Environmental Education Models

Hungerford & Volk (1990) describe the five objectives for environmental education defined in the 1977 Tbilisi Intergovernmental Conference on Environmental Education as: Awareness, Sensitivity, Attitudes, Skills, and

Participation.

Incorporating the objectives into a general pattern for environmental program effectiveness, a resultant effect could be the defining of both effective program design, and stewardship values of the students. Consider the following comparative offered by Hungerford and Volk (1990).

Objective	Program	Individual
Awareness	Help to see total environment and issues.	Is aware of total environment and its main issues.
Sensitivity	Give students opportunity to gain experience in and understanding of environment and its issues.	Has basic understanding of environment and its issues.
Attitudes	Help students acquire values and feelings of concern, motivation to be involved in environmental improvement and protection.	Has feelings of concern and motivation for participation in environmental improvement action.
Skills	Help students to acquire skills in identification and solving of environmental problems and issues.	Has skills in identifying and solving environmental problems
Participation	Provide the opportunities for students to be actively involved at all levels in working toward resolution of environmental problems and issues	Is actively involved in working toward the resolution of environmental problems.

(p. 8).

Contrary to traditional thinking in environmental education, Hungerford and Volk (1990, p. 9) charge that, "we cannot change behavior by simply making human beings more knowledgeable about the environment and its associated issues." They further elucidate concerning the linear reasoning concerning traditional educational views, or that, "Increasing knowledge leads to favorable attitudes...which in turn lead to action promoting better environmental quality" (p. 9). The synthesis of the research concerning the traditional behavior change system of; Knowledge--leading to awareness or attitudes--leading to action, indicates that the validity of this theory does not hold up.

Hines, et al. (1987) in their meta-analysis of 128 environmental behavioral research studies ranging from 1971 to 1986, formulated a model of responsible environmental behavior utilizing 15 variable factors under 3 main headings previously discussed. The main headings and variables under each are as follows: "Entry-level variables;" environmental sensitivity, knowledge of ecology, androgyny, and attitudes toward pollution,technology & economics. "Ownership variables;" in-depth knowledge about issues, personal investment in the environment and issues, knowledge of the consequences of behavior, and personal commitment to issue resolution. "Empowerment variables;" skill in environmental action

strategy, locus of control, action intent, and knowledge.

In attempting to form a model of agricultural environmental education with any background of proven effectiveness, again we must borrow from other disciplines. Hungerford and Volk (1990) offer a listing of critical educational components intended to maximize opportunities to change learner behavior in relationships with the environment, if offered by the schools and they will:

1. Teach environmentally significant ecological concepts and environmental interrelationships that exist within and between these concepts;

2. Provide carefully designed and in-depth opportunities for learners to achieve a level of environmental sensitivity that will promote a desire to behave in appropriate ways;

3. Provide a curriculum that will result in an in-depth knowledge of issues;

4. Provide a curriculum that will teach learners skills of issue analysis and investigation as well as provide the time needed for the application of these skills;

5. Provide a curriculum that will teach learners the citizenship skills needed for issue remediation, as well as the time needed for the application of those skills; and

6. Provide an instructional setting that raises learners' expectancy of reinforcement to act in responsible ways, i.e., attempt to develop internal locus of control in learners (p. 14).

Without the ownership and empowerment variables added to the informational entry-level variables, transfer, or generalizability of learning, will not take place, and the students will not have the knowledge or skills to assume everyday environmental responsibility.

Differences in Environmental Learning

Agricultural education programs that include natural resources/ conservation/ environmental studies, in most cases will have students from diverse backgrounds. The instruction may be appropriate for some of the group, but may not be effective for others. The changing demographic characteristics of agricultural education students mirrors the general population of the nation. The environmental programs offer new areas of instruction and may draw students that have not been previously connected to the agriculture sector of the school.

Beard (1949) assessed the two main areas of differences and suggested that the two groups should be recognized and the teaching objectives should be adjusted. Although the comparative ratio between students from farming backgrounds and those with no farming background has changed considerably since 1949, the basic overall differences are still similar and the idea of adjusting instruction is still appropriate from the stand point of basic background differences.

Those students with an agricultural background, or who are planning to be actively involved with production agriculture are considered in what Beard (1949) refers to as "the primary resource involvement group" (p. 47). The primary group directly influences natural resource use through the production of crops, livestock, and trees.

The "secondary resource involvement" (p. 48) group is so far removed from direct natural resource use that its members have a different concept of conservation and the significance of resources in their everyday lives.

Beard (1949) contended that education for the primary group should be approached from the personal interest approach. This group, through working with, and in Nature, have already acquired some ownership values discussed earlier. He further qualified instruction for the primary group that should be directed toward developing;

> good habits, skills and abilities, backed by understanding and attitudes. These people of the land need training in the persistent problems of making a living, and how to do so without destroying or degrading the basic resources. A course such as agricultural education in which learning is based on doing is the most effective type of conservation education for those who would deal directly with the resources. These courses preceded or paralleled by a study of conservation in other subjects in classes with students whose interests differ is desirable (p. 64).

This viewpoint is reflected also in Peter Nowak's 1984 treatise on what conservation education should be;

> Conservation education is not just providing nice pastoral pictures to teach our children appreciation of Bambi-like creatures or yellow-bellied sapsuckers. Teaching tomorrow's farmers appreciation of our natural resources without instructing them on how to earn a living from the environment will guarantee them the same frustrations faced by their parents (p. 220).

Beard (1949) then wrote about the secondary resource involvement group, stating that, "their lack of contact with resources makes their conservation education doubly important" (p. 49).

Beard (1949) also chided, "Education for this group (secondary) should consist of primarily developing attitudes than 'know how'" (p. 49). He noted however, everyone that uses Nature for recreation should learn the basic and fundamental practices of environmentally responsible citizenship with understanding of the significance of natural resources in their lives. The disparity in numbers in the secondary group (now roughly 98%) indicate that the attitudes of this group may actually be more important than the know-how of the primary resource involvement group. Concerning the secondary group, Beard (1949) further suggested;

> Conservation education for this large group should develop those attitudes and understandings that every good citizen should have, in order that they may properly support or censure what certain agencies and owners do with the resources, and so they may realize what cooperation there should be between the state and the private individual who owns some of those resources (p. 50).

The students of today will be the future policy, and decision makers. They will have a collective voice that will be heard. If at least rudimentary conservation education values are afforded for all students, their future decisions concerning the environment may be based on fundamental principles of natural resource management. Beard (1949) extols that, in addition to instruction for both primary and secondary resource involvement groups, "urban schools should not overlook the potentialities of adult classes in conservation for both groups" (p. 52).

Instructor Characteristics

The instructor in environmental education has a uniquely different role than those in most disciplines. The attitudes of the teacher toward the environment and conservation are very often reflected in the students'. As stated previously in the discussion, teachers of experiential environmental education should be facilitators or expert questioners, to enhance learning, and guide the actions of the learner. To indulge a modicum of analogy, the instructor in studies about Nature should act in the role of a guide. Grady (1990) states, concerning the role of the teacher in experiential education;

> . . .the teacher's role will be different. The teacher will be more active in experiential learning in a variety of ways. One must become a better questioner to help students think at higher cognitive levels as they reflect on an experience. In addition, the teacher is more a facilitator than an expert transmitter of knowledge. The teacher nurtures the student through talking with, rather than at them. The teacher must also be able to identify where the student is in the experiential learning process to know what kind of questions to ask, to help guide when a student needs help through a stage. The teacher must also be a systematic planner. Planning to establish and organize the experiences and direct the learning outcome, the learning setting, questions asked, and addressing the potential problems that might arise in the student's reflected conclusions. But always, the nature of the learning depends upon the experience (p. 4).

Playing off of this phrase, logically then the nature of the experiences offered depend upon the guide's priorities.

The teachers' view of what is important or relevant in conservation or the environment will be what the students' attentions are directed toward most often. Sivek and Hungerford (1989) added that teachers in environmental education;

> would have to be willing to serve as strong, environmentally responsible role models as well as to provide numerous opportunities for students to interact with important media and the environment itself.... at least three variables should be attended to by educators in developing environmentally responsible citizens: (1) citizenship action strategies, (2) locus of control, and (3) environmental sensitivity (p. 39).

Hungerford and Volk (1990) added to the ideas above and the relevant characteristics by inserting;

> . . . it seems important that learners have environmentally positive experiences in non-formal outdoor settings over long periods of time. And, in the formal classroom, we must look for teachers who are, themselves, sensitive to the environment and willing to act as positive role models for learners. Both of these conditions, for millions of learners, are hard to meet (p. 14).

The possibility of agricultural education instructors' personal characteristics meeting the guidelines for effective teaching are excellent; for role models, for environmentally sensitized, and willingness to serve the needs of the students. However, the part about long-term teaching in the environment that helps produce stewardship values is more difficult to arrange for. Some teachers however, have the disposition, commitment, time, facilities, energy, planning skills, and administration approval at their disposal, and are able to arrange for it.

To achieve the full scope of teaching conservation and stewardship principles that the public, and Nature itself are calling for, all students should receive instruction in environmental education. This would entail education at all grades, across disciplinary boundaries. Conservation-environment studies have traditionally been taught as a specific segment of science classes. In agricultural education, depending on the orientation of the instructor, the horizontal approach toward conservation is sometimes utilized. The horizontal approach according to Beard (1949, p. 43) is, "to teach a certain phase, or phases of conservation that applies to all resources (areas) because all of them are interlocked."

In agricultural education, the interrelationships that exist between all resources, and the different areas of production agriculture utilizing the resources, are often studied with common horizontal conservation headings.

Beard (1949) comments concerning traditional conservation instruction by saying;

> In too many schools, conservation, if taught at at all, has been taught by one or two biology or social studies teachers. While better than none, instruction in one subject, biology for example, does not give students an adequate understanding of the relation of conservation of resources to other fields of subject matter. Moreover, unless the one or two teachers are teaching in required courses, not all students receive instruction in conservation (p. 38).

More agriculture teachers are incorporating the basic tenets of sustainable development and production in class.

Disinger (1989) issued views on the concept of sustainable development in regard to environmental issues when he stated:

> Until those championing education over sustainability find ways to clear the twin hurdles of resistance to interdisciplinarity, and lack of acknowledged priorities, education about sustainable development will, at best, be spotty. It appears that those who can best introduce this subject are those who are involved in environmental education/studies/science. But the strong interest of social science educators in environmental sustainability issues is particularly encouraging. Perhaps education about sustainability that focuses on the environment will provide the mechanism for the development of interdisciplinary educational efforts across the natural and social sciences (p. 6).

In teacher viewpoint concerning the teaching of classes in natural resource conservation, many background variables must be considered. The teacher's attitudes toward the environment, training, orientation, and upbringing, play significant parts in the individual's program effectiveness.

Concerning agricultural education instructors and teachers involved in natural resources instruction, Whent and Williams (1990) in their research stated that;

> One teacher variable significantly (20% variance) contributing to student achievement in natural resources knowledge tests, was a teacher's positive attitude about teaching natural resources (p. 188).

Their studies also showed that several factors should be used to promote good teacher attitudes toward teaching environmental conservation. Those named were: teaching materials, inservice sessions, and preservice programs.

McCaw (1977) researched several teacher variables in regard to environmental studies. He reported teachers' views on use of the environment was affected by personal knowledge of environment, availability of materials, and understanding of the environment as a teaching method. McCaw also stated that, "Teacher in-service must be considered the basis of an effective environmental education program" (p. 22). And, that teachers were, for the most part, interested in more training in environmental education methods. Godfrey (1986) also stressed the issue by stating, "In-service is essential for teachers to keep current in the face of changing technology . . . so as to be able to teach the new developments" (p. 10).

In a related study concerning environmental education status in Texas, Adams, et al.(1985) reported the implementation difficulties, as viewed by science curriculum supervisors and science teachers. Both groups ranked the following most to least important:

(1) no place to fit environmental education into the present curriculum,
(2) no good time in the school day to do it,
(3) lack of available funds,
(4) large class size,
(5) no place to visit or study outdoors,
(6) administrative policy on out of school activities and travel,
(7) personnel shortages,
(8) lack of appropriate curriculum material,
(9) lack of acceptance of teachers, and
(10) lack of student interest (p. 22).

Agricultural education has faced, or will face several of these issues, but has contingencies for most.

Perceptions of Students and Instructors

The goal of education has been described as the changing, modifying, or guiding of behavior. The methods of changing behavior in reference to environmental issues have also been described, in general. Akerman and Sternberg (1990) intimated that behavior, or more properly, the consistency of behavior comes primarily from perceptions. Perceptions of accepted behavior, perceptions of accepted values and requirements, and inner perceptions of moral development are part of the affective and cognitive realms of learning.

Perceptions are based upon trained feelings. Johnson (1990) stated that,

> The feelings are just as important as the understandings.(toward environment) Developing feelings requires first-hand contact with natural places. The processing components ensure that the learning transfers back to the participants' lives and that they actually change some of their habits in order to live in harmony with the earth. Processing components help internalize understandings, enhance feelings, and to form some good environmental habits and break some bad ones (p. 40).

Leftridge and James (1974) researched Kansas urban and rural secondary students to study perception differences between the two groups. Some of the pertinent findings are:

> Regardless of issue, rural students were more perceptive of environmental issues than urban students. This is probably due to relevance of the issues to the learner. The urban youths view physical changes as relative, while rural view changes in an absolute nature (p. 7).

This research indicates a need for curricula to be developed that helps urban youth to become more aware of relevant issues in their own surroundings. And, as Leftridge and James (1974) state: "The research shows the need for a concerted effort in identifying the student's immediate milieu as the natural environment" (p. 7). This should help them to learn about, relate to better, and to understand their world. If the things studied in classes are not meaningful to the students, they will not internalize the issues.

In a 1979 study of factors which show the influence of environmental education on certain environmental attitudes, Gifford, et al. report relevant results as follows:

1. males have more environmental knowledge than females,
2. natural science majors have more environmental knowledge than social science majors,
3. environmental education students express testimony more than non-environmental,
4. natural science students show more emotion on environment than social or non-science,
5. environmental education students report more actual commitment than other students,
6. females express greater affect about the environment than males,
7. environmental education students have more knowledge than others, and
8. females express more commitment than do males. (p. 22).

In the comparisons, Gifford, et al. (1979) included key demographic data that had confounding influence upon the findings. These included age, sex, year in school, and academic orientation, but independent of these factors, the students in environmental studies reported these results.

Gifford, et al summarize the information as follows:

> Environmental education students not only know more and are more verbally committed to the environment, but they report more actual commitment than non-environmental education students. These results provide empirical support for the existence of the educational outcomes that environmental education strive for. In sum, attitude is importantly related to individual difference measures. Greater understanding of individual differences in relation to environmental attitude will create greater potential for designing and implementing programs that work well (p. 23).

Whent and Williams (1990) reported similar findings in an agricultural education format. They summarized their findings and in their recommendations assert that:

> Instructional materials about conservation of resources should address the needs of both rural and urban students enrolled. Based upon their attitudes toward conservation of resources, female participation in agriculture programs should be encouraged. Students should be encouraged to join FFA, participate in soils and crop judging teams, and initiate SAE programs incorporating natural resource components. New instructional materials must increase teachers' as well as students' basic interest (p. 188).

Barriers to Program Adoption

Many of the barriers to adopting and implementing environmental-conservation-natural resources education programs have been alluded to in preceding portions of the study. The most pervasive issue affecting the adoption of these programs as well as conservation measures in general, is economic value perception. In adopting conservation practices, a study by Napier, et al.(1984) showed that the "best predictors of farmer acceptance were economic constraint factors" (p. 205). Information alone sways few.

van Es and Pampel (1975) studied voluntary acceptance of pollution control practices by farmers in Illinois. The authors cite even earlier studies which indicate how social norms and personality traits may also affect adoption practices. The crux of their study however, revealed that at least in part, characteristics of a specific practice influenced the timeliness in adoption. They stated that,

> Practices that make the most money, save the most time, and are similar to practices now used are adopted most rapidly. Also, certain farmers are consistently more willing to try new practices. These farmers tend to have more education, higher income, larger farms, as well as certain personality characteristics. Environmental quality campaigns must be designed first to reach these, the most receptive farmers. Special efforts in explaining the need for adoption of these practices and their importance to the long term welfare of the farming community are necessary to begin (p. 15).

Nowak (1984) also tells of the factors that make conservation education for the farmer adoptable. In his position paper, the emphasis is on what conservation education really is. Eloquently stated, he indicates first what it is not, and then what it is in the few following lines:

> Conservation education is not just providing sermons on stewardship. Believing one has a responsibility to be a steward of the land is different from having the ability to act on that belief. Thus, conservation education needs to move beyond creating guilt through ethical arguments and begin putting emphasis on addressing practical concerns of the landuser. Conservation education is providing that landuser with the necessary ecological, agronomic, and economic information so that sound conservation decisions can be made. Timely, accurate, usable, and relevant information must be at the heart of any conservation education program (p. 221).

The practical aspects of any program will necessarily be the deciding factors in adoption of it. This applies to farming, as well as school program adoption. Many of the emphasized passages above may be applicable to adoption of a environmental education program in a school or system. The adoption process has many theoretical, as well as practical factors underlying the implementation procedure. Ham, et al. (1987) studied their perceived slow progress of environmental education in public schools, and said that it could be attributed to several barriers hindering teachers from instituting environmental education. Ham, et al. cite four broad categories of barriers, listed and explained as follows:

1. Conceptual-barriers stemming from lack of consensus on scope and content of environmental education
2. Logistical-barriers stemming from a perceived lack of time, funding, instructional sources, suitable class sizes, and so forth
3. Educational-barriers stemming from teachers' misgivings about their own competence to conduct environmental education programs
4. Attitudinal-barriers stemming from teachers' attitudes about science and environmental instruction (p. 25).

The authors research also concerned the use of a workshop type of in-service training for the Idaho teachers, concentrating on the use of the environment, curriculum, and actual environmental issue activities. The findings indicated that the use of the workshop actually reduced some of the barriers in the conceptual, logistical, and the educational categories significantly. The results of this study suggest that workshops are invaluable in reducing barriers.

Barriers to effective conservation education that have been briefly alluded to previously, could conceivably include other areas as: lack of community support of such programs, political pressure from other involved teachers-toward avoidance of duplication, administrative efforts to save money, the attitudes of surrounding persons that the programs are just fluff, or these programs are only for students that cannot negotiate regular classwork, the back to the basics attitude that there would not be the proper amount of reading, writing, and science and math taught, the dual barrier of introspective and/or external critical negative evaluation of actual experiential and institution training in how to teach environmental studies. It is certain that in any field so vastly complex as the interrelated areas of natural resources, conservation, and the environment, that a great deal of training, either formally or informally, should precede teaching it.

In Oklahoma, the state of the focus of this study, agricultural education instructors have included in their required college subjects, a great deal of conservation instruction- horizontally related. However, the problem is that no specific training in teaching conservation is mandated by the state. However, the natural resources course is but one year old, and it can only be assumed that compulsory training in the field will be forthcoming. Most of the state's involved teachers have a total of 1 hour of in-service training covering the new curriculum/materials.

Overview of Oklahoma Natural Resources Program

The current public awareness concerning natural resources and conservation has affected the basic trends seen in education lately. The Oklahoma Department of Vocational and Technical Education (State Department) initiated the program mentioned previously, in the Fall of 1990 within agricultural education, to address the public concern for environmental education.

In recognition of the general national and even global concerns about natural resource use, and acknowledging the value of instruction in the area of conservation, a Memorandum of Understanding (MOU) between the United States Department of Agriculture (USDA) and the United States Department of Education (USDE) was formally enacted, Williams and Weber (1990) report. They also report that the MOU was put into place to develop a "cooperative effort between the USDA and the USDE to provide students practical conservation education, while helping farmers implement plans" (p. 14). Williams and Weber further reported that:

> The MOU encourages schools to become involved in helping to implement federal agricultural policy. Farmers enrolling land under the 1985 Food Security Act were to have developed conservation plans by the end of 1989, and have the plans implemented by the end of 1995. This partnership between education and agriculture encourages expansion of classroom/laboratory instruction, FFA activities, and supervised agricultural experience programs focusing on natural resources conservation and management (p. 14).

This arrangement could only have helped in precipitating addition of the new curriculum to Oklahoma's agricultural education program. This understanding between government departments will continue to help institute similar, new programs in other states. In Iowa for instance, Williams and Weber (1990) report, "the Soil Conservation Service and agricultural education formed a partnership whereby new curriculum materials and teacher in-service resulted" (p. 15). This partnership may help states needing curriculum in conservation, while helping to actually incorporate practices of conservation by farmers.

Here, a collaborative effort by the State Department the Mid-America Vocational Curriculum Consortium, (MAVCC) helped to produce Oklahoma's new natural resources curriculum. MAVCC is now a ten-state association, of which Oklahoma is a member. It is a curriculum developing organization that reviews current curriculum needs, and through a modified Dacum process, (Delphi-type arrangement) select a few-from-many subjects to be included in new, relevant curriculum additions, to be used nationwide if the various member-states desire them. The well-timed, dual effort was produced by a simultaneous call for the addition of natural resources instruction by members of the State Department; notably, Dr. Ann Benson- Assistant State Director of Education Programs, and Mr. Eddie Smith- State Supervisor/ State FFA Advisor; and a completed Dacum process recommending inclusion of the resources curriculum (Huston, 1991).

Then, at the suggestions of Mr. Smith, the MAVCC, with the work of an inter-disciplinary committee of educators and resource specialists, and Mr. Phil Berkinbile as chairman, created the new natural resources curriculum material. Then, in the Summer In-Service Workshop for agricultural education teachers in June of 1990, the new additions to the curriculum were presented to the teachers for use in the Fall of 1990.

In the format of the workshop, the other new areas of instruction were presented also. These other new areas included Ag Sales and Service, Horticulture, Ag Products and Processing, Aquaculture, and Employment in Agribusiness. New record books were also discussed and shown at the busy conference. Each teacher was in-serviced in the new areas, with one hour and fifteen minute sessions for each, thereby giving the previously mentioned 1 hour total training time for use of the natural resources curriculum. Professional Improvement meeting sessions through the school year (1990-91) have featured the natural resources materials, and suggested supportive activities for teaching it, so in actuality, the total time spent in pre-preparation for the course may be up to two and a half hours for some of the Oklahoma teachers. Ag-Ed In-Service, (1990) and COLT Conference (1990)

The natural resources curriculum was incorporated into agricultural education rather quickly, with 260 of the 372 ag programs accepting the new material and the money. It

is assumed that the predisposing motives for the wide-scale acceptance were; the trends in public environmental awareness and desire for conservation education, the mandates of H.B. 1017, in addition to the equipment-purchase financial incentives intended to help implement the new programs.

Program Evaluation

In contemporary fields of education, especially in areas recently introduced, periodic evaluation should be conducted to determine the direction of movement in the program, or if any movement is shown at all. Again, Ward Beard (1949) stresses the importance of conservation education program evaluation, especially in its beginnings, as he offered:

> This situation indicates the need for a careful consideration of conservation education on the part of superintendents, principals, supervisors, and curriculum directors, as well as teachers. Teacher conferences should include reports and discussions on the significance of the conservation education, on progress made in certain schools, on available and suitable materials used in each phase of conservation teaching, on relevant concepts distributed in scope and sequence, and on the effectiveness of conservation education (p. 44).

In any progressive activity, there must be set goals achieve before beginning. There must also be means of evaluating advancement toward those goals. These means, like the pre-set goals, should also be described prior to the activity.

Within the realm of conservation education, if the

programs are to survive, or as in the words of Bennett (1987) ". . . if we want to find a permanent niche for environmental education, we cannot afford not to evaluate our programs" (p. 14). And, in order to persuade others of the value of the conservation education instruction to enhance the overall curriculum and make it more meaningful to learners, it needs to be evaluated.

Bennett defines evaluation as: "a systematic method of judging the worth or value of educational programs-answers questions of, what happened, how, and under what condition" (p. 14). Bennett gives four benefits of evaluating programs. One, the results will aid in facilitating the value of teaching methods, improving the learning settings, and efficient use of instructional materials. Two, more student learning is possible by interpretation of student needs and achievement. Three, more accurate evaluation of environmental education upon environmental activities is possible. Four, educators will be better equipped to elicit backing from administrations, parents, students, and the community.

Bennett (1987) reported five obstacles in evaluation. Time is considered the greatest obstacle to evaluation. To overcome time problems, evaluation should be considered as a critical part of the overall teaching process. Expense is a factor usually faced when external evaluators are involved. But with program participants and teachers evaluating, (internal evaluation) Subjectivity is often

cited. This may be largely overcome by inviting inspection and review, obtaining candid reactions from the participants, interested parties, and by reporting the results. Fear, or anxiety about being judged on the merits of the program evaluation can also be an obstacle to evaluation. This can be diminished by allowing the students a large part in the planning, clarifying the purposes of the evaluation, and protecting the rights of the students by maintaining confidentiality, or anonymity. Complexity is a common perception of evaluations and is a formidable obstacle. Bennett says that the following steps will help make evaluation less complex.

1. Set Expectations- start with goals and add general objectives and then behavioral objectives concerning knowledge, understanding, thinking skills, application, analysis, synthesis, values, attitudes, and action skills.
2. Plan the Evaluation- using proper evaluation design; post-test designs, and pre-post test variations; and appropriate instrument types; pencil and paper, performance tests, questionnaires, interviews, observational instruments, artifact examination, unobtrusive measures, instruments to detect unanticipated outcomes, and multiple measures.
3. Determine Results- by becoming familiar with instruments before collecting data, by treatment of results in summarizing data, and then careful treatment in conclusions by analyzing and interpreting the data.
4. Use the Results- by reporting them fully and accurately, to all interested and involved parties, and improve the program where it is possible (pp. 15-21).

"Ultimately the purpose of evaluation is to improve the program so that it will in turn yield greater returns for student learning about the environment" (p. 21).

Although this model for evaluation was applied to environmental education, it could be applied in almost any educational endeavor.

In application of evaluation principles, it should be prerequisite to weigh and reweigh objectives and goals. Summation of what the objectives are in the instruction of the newly instituted Natural Resources program in agricultural education in Oklahoma should be viewed and then reviewed prior to any formal evaluative effort. Any recommendations should be examined and re-examined in light of rationale, goals, and objectives listed. Then setting or resetting priorities, schedules for changes needed, and identifying positive or negative factors such as time, money, human resources, information, materials, and equipment, become the resultant tasks.

In noting the recent vocal public sentiment and awareness, Heft (1984) said, "Conservation is our business, (agriculture) and everybody's concern" (p. 293). Conservation education is now agricultural education's concern.

Compendium of Issues

> . . . nothing is longer-term to the promoting of sustainable development practices than environmental education, conducted from preschool age through the university years and all life thereafter, in school and out of school, for all succeeding generations. Problems and quality of the environment are not settled once and for all; they are a permanent concern and challenge (UNESCO 1988, p.1).

Throughout the ten thousand years that agriculture has

been practiced, local cultures have risen and fallen in connection with natural resource use. At various times throughout this history, certain leaders have called for prophylactic and therapeutic measures for resource use. Public involvement in the issues seems to undulate between apathy and activism. In the points of active involvement by the public, positive results sometimes are evidenced.

Education toward conservation has been an ideal of many leaders throughout the many generations in the agricultural timeline. Education has been asked to accomplish what the collective conscience of civilization knows to be necessary, but due to the pressures of expanding, progressive cultures, population increases, and the pervading dilemma of economic survival versus resource repletion, civilization has not yet been able to accomplish-sustainability of necessary resources.

Education for conservation can instill in the succeeding generations, attitudes and action skills to help achieve goals of sustainability, but according to the consensus of the authors in the reviewed literature, not by merely informing the students about the environment. Rather, by experiential instruction in and with the environment, may the needed characteristics be learned. Two variables that arise from experiential environmental instruction are ownership of issues and actions, and empowerment to play an active role in correcting problems.

In the swinging of the pendulum of public involvement,

we are now approaching another apex of the arc of societal concern and activity in environmental relationships. Recently, environmental concerns have prompted much discussion, legislation, directives, and educational policy changes, opening the door for increased educative efforts in regard to environmental education. In 1990, Oklahoma instituted a new curriculum concerning conservation into statewide agricultural education programs, through a cooperative effort of many individuals and organizations, and sparked by the renewed public awareness factor.

The natural resources and conservation curriculum that was added to the existing curriculum is a good start, but it, or any other environmental education program, must contain the proper "mix" of ingredients" to be effective. In order to continue to be effective environmental instruction it must be evaluated in achievement of expressed objectives and goals, and improve the areas that show deficits. Five objectives that encompass the changed behavior that should be demonstrated by environmental education are: Awareness, Sensitivity, Attitudes, Skills, and Participation.

The proper mix will necessarily include the public support for conservation education, the innovative teaching guide, equipped with stimulating teaching models and methods, interested and directed students, and sensitive supportive efforts from supervisory staff. With all of these groups on-line and focused on the goal of developing responsible environmental behavior, or stewardship values,

then effective instruction should follow.

Recognizing that there are many differences between both student and teacher demographics, abilities, skills, attitudes, and perceptions, it will be necessary to adjust instruction to be relevant to the circumstances. Teacher training and other barriers to program involvement are often remediated by pre-service and in-service training. The differences may be used to advantage in environmental instruction, with proper training and sensitivity.

Any new program should have stringent evaluative codes it would seem, especially when first beginning, to assess if reasons for the program's existence are being justified. However, these stringencies may be modified to allow more program inclusions during the inaugural period. Natural resources/conservation/environmental education should include as many effective programs as possible, and, as Beard (1949) remarked, "In developing a program, it does not matter what the organization or type of school, there is some way conservation can be taught" (p. 43).

CHAPTER III

DESIGN AND METHODOLOGY

Introduction

In order to assemble information from which to achieve the purpose and the objectives of this study, it was necessary that the design and implementation of the methods and the instrumentation be applicable and appropriate. This chapter was to indicate the manner in which these systems were employed, how they were deployed, and the procedures for collecting and compiling relevant data.

The Institutional Review Board

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before investigators can begin their research. The Oklahoma State University Office of University Research Services and the IRB conduct this review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with the aforementioned policy, this study received the proper surveillance and was granted permission to continue.

Design of the Study

The design of the study was as a descriptive survey of a group of randomly selected schools, and was fashioned to evoke initial perceptions of agricultural education instructors and their students, concerning reactions to the curriculum and supportive activities of the new course in Natural Resources. The review of literature revealed that evaluative instrumentation concerning agriculturally-oriented, sustainable, natural resource-use education was limited at best, and had few comparative antecedents. Therefore, adaptions of environmental education designs, methodology, and instrumentation seemed to be the most practical avenue of procedure.

It was determined through extensive literature review and discussion with the advisory committee, that the environmental studies would serve best as a pattern for the direction, design, and development of this study. And also, that the preliminary evaluation of the impact of the Natural Resources program, could be facilitated by traditional design and centralized data treatment. Perceptions of involved parties concerning the various areas in the program of instruction were assessed by two specifically designed questionnaires. With the course material fresh in their minds, it was felt they could best indicate program areas that assayed effective, and which did not.

It was decided that to best obtain meaningful data

for the evaluation of the new program, that the teachers who taught the course should be the primary source. Also, in order for the teachers to have a method of program evaluation, and to complement the overall study, it was resolved to assist the instructors in administering and interpreting a student evaluation of the program.

Population of the Study

One population for the study consisted of Oklahoma secondary agricultural education teachers who taught the Introduction to Natural Resources course this year (SY 1990-1991). The other population was the students they taught this year. With the constraints which time and available financial resources imposed, 37 schools were randomly selected using a cluster sampling technique from a population of all schools in Oklahoma that offered the course during the 1990-1991 School Year (260). Table I was designed to present the distribution of schools by supervisory district, which submitted requests for the "start-up" money for teaching Natural Resources. It was from this group that the study populations were selected. by means of a random drawing.

The information shown in Table I was compiled by a search through the records on file in the Agricultural Education Division of the Oklahoma State Department of Vocational and Technical Education in Stillwater-3/15/91.

These records were actually request forms for the

TABLE I

DISTRIBUTION BY SUPERVISORY DISTRICT OF SCHOOLS TEACHING THE NATURAL RESOURCES COURSE

District	Distribution	
	Number	Percentage
Northwest	50	19.23
Southwest	53	20.38
Central	41	15.78
Northeast	53	20.38
Southeast	63	24.23
Total	260	100.00

$1000 "start-up" money allocated by the Department to purchase necessary equipment/materials for implementing the new curriculum/course. It is not certain how many schools did not actually teach the course, however, as a result of contacts with schools selected for the study, it was determined that three did not teach the program.

Thirty-seven schools, and the respective number of instructors were selected as approximating one-tenth of the total number in Oklahoma that offered agricultural education (372). There were 475 students selected, placing the sample within statistical guidelines.

Table II depicts the distribution of these two populations by district and state. The average number of students per instructor is also shown by district and state in the modified frequency distribution. In each of the finally selected schools, only one instructor directed the Natural Resources class. The terminal random selection of the schools resulted in five being chosen from the Northwest District, seven from the Southwest, eight from both the Central and Northeast Districts, and nine selected from the Southeast District. Interestingly, more schools were chosen from the Southeast District, and there also the number of students enrolled in each school was originally reported as proportionately larger than any of the other districts. Also, the schools selected from the Northwest were fewest, with second lowest student/teacher ratios.

Table II also indicates the response rates for the various schools-instructors and the students by district and state totals division. The adverse situation described toward the reduction of respondents is shown through the low percentages included in the frequency distribution and inventory determinations. The overall response rate for schools/instructors was 22 of 37, or 59%. The response rate of the student respondents was 157 of 475 possible, or 33%. Even with the end of school "busy-ness", and the subsequent low return rates, the response rate was within generally acceptable limits.

TABLE II

DISTRIBUTION OF RESPONDENT SCHOOLS, STUDENT NUMBERS, AND STUDENT TO TEACHER RATIOS BY DISTRICT

Specification	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
Potential # of schools*	5	7	8	8	9	37	100
# of Responding schools	3	5	5	4	5	22	59
Percentage of potential	60	71	63	50	56		59
Potential # of students	48	66	101	105	155	475	100
# Responding Students	9	36	30	45	37	157	33
Percentage of potential	19	55	30	43	24		33
Student/Teacher Ratios							
Schools reported S/TR	9.6	9.4	12.6	13.1	17.2	Mean-	12.8
Respondents actual S/TR	3.0	5.1	12.6	12.5	11.2	Mean-	7.1

Total Schools-Instructors 22 -- Percent of Potential 59

Total Student Response 157 -- Percent of Potential 33

Mean of Responding Schools Student to Teacher Ratio 7.1:1

* Each school had only one teacher

Design of the Instrument

Through the review of literature, discussions with the advisory committee, secondary teachers, and students involved with natural resource education, two specific survey instruments were constructed. The instruments were patterned after somewhat similar instrument designs found in the literature of both environmental and agricultural education publications. The questionnaires were both outlined parallel to the population-group-specific objectives of the study, and each item of the questionnaires was specifically designed to elicit response toward fulfillment of a stated, related objective. With the assistance of the advisory committee in directing the items toward the objectives, and developing and refining the item-types, the mailed-out questionnaires were organized to invoke relevant responses. Mostly multiple-choice, with just a few open-ended questions, the teacher questionnaire had 45 questions for response, while the student questionnaire had 44. The items on both questionnaires progressed generally from calling for more familiar, objective responses, to more judgmental, subjective reactions.

In the student questionnaires, there was considerably more emphasis placed upon items that surveyed the attitudes and feelings concerning environmental issues and practices that were incorporated into the course. Also, more emphasis was placed on demographic information and the perceived

significance of selected concepts and related activities, than in the questionnaire for the instructors. These areas were accented for the purpose of characterizing the first group through the course by the order of who they were, and what they felt about the curriculum, the activities, and the environment in general.

The main emphasis of the instructor questionnaire was upon the manner in which teaching methods and activities were chosen, restrictive areas to program development, education and orientation background, and perceived barriers to implementation of effective teaching practices. The intent of this was to accurately portray the first educators to teach the course and their general backgrounds, their motives for implementation, and the methods and activities they felt were most effective in instructing the new course.

Data Collection Procedures

Following validation and reliability challenges by the thesis advisory committee, and pilot studies within several graduate classes and a nearby school, the questionnaire-type instruments were enveloped into teacher-student packets for each of the 37 chosen schools. A preliminary phone call of solicitation to each of the 37 instructors allowed for determinations in the following three areas of concern:

1. If they were willing to participate in the study.

2. When their school session was to end.

3. How many students they had in the course.

A cover letter accompanied each of the packets, explaining each area of the phone conversation, along with information concerning administration of the student questionnaires, anonymity assurances, and mailing-in procedures. There was one instrument in the packet for the teacher, and the correct number of student questionnaires corresponding to number of students reported in the course.

The phone calls, the teacher-student packets, and accompanying letters were initiated the first week of May. The return of the packets was completed the last week in June, with the subsequent treatment of the data, completed in August of 1991. Copies of the script for the solicitation phone conversations, the cover letter that accompanied the student-teacher packets, and the instructor and student questionnaires are included in their entirety in Appendixes A, B, C, and D, respectively. The student questionnaires were considered primarily to be faciliatory to the teachers' evaluations of the course's effectiveness, but were sent back to the researcher along with the instructors' questionnaires for compilation, analysis, and for subsequent dissemination.

As items of incidental interest to the methodology of this study, the following occurrences are reported:

1. In the random selection process, six additional

schools were selected as alternates. For various reasons, exactly six schools disqualified themselves from the study. The alternate schools changed the district frequencies to those reported in Table I from the following: NW-6, SW-4, C-7, NE-8,(same) and SE-12.

2. Only 2 of the 43 instructors contacted expressed that they preferred not to be involved in the study.

3. The questionnaires were purposely sent as close as possible to the average last week of school. While this allowed a full overview of the course by the participants, it also gave one more thing to get finished at the end- adversely affecting the response rate of the students. The response rates are also shown in Table II.

The first two weeks after sending the packets, the return rates were quite lively and replete. Following this initial two-week period, a follow-up phone call was made to all the instructors from which the returns had not been received. Then, an additional follow-up was sent in form of a postcard reminder. A copy of the post card reminder is included as Appendix E. Through the phone calls, it was determined that seven instructors did not have time to secure the student questionnaire evaluation. However, the instructors were, for the most part, quite accommodating and obliging in their assistance, and most expressed genuine interest in return results of the overall evaluation of the Natural Resources Course in Oklahoma.

Treatment of the Data

The data received from the descriptive survey were analyzed with descriptive statistical treatment, employing the use of the frequency distribution format, with means, percentages, frequencies, and ranked orders used with the interval data. Where it was deemed appropriate, the data were analyzed using standard deviations, variance, and generalized through inferential treatment.

The questionnaires consisted mainly of closed, or forced-answer type items, with some open-ended items included. Some of the closed-answer items were structured with a five-point Likert-type scaling, with real limit ranges to facilitate quantifying the somewhat qualitative data received from the varied perceptions. The frequency distributions by educational district, measures of central tendency, the means, percentages, and explanations of the inter-related findings were issued on the data collected.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

The purpose of this study was to ascertain the perceptions held by selected students and instructors of the new Introduction to Natural Resources program of instruction.

To accomplish the stated purpose, a three-tiered system of objectives was formulated. The first level consisted of the following overall objectives:

1. To facilitate the teacher-evaluation of the student perceptions of the new course.
2. To determine the instructors' perceptions of the effectiveness of the new program.

Instructor-specific objectives were the second level and provided impetus:

1. To describe instructor demographic, orientation, and background information;
2. To relate their views on teaching the curriculum;
3. To report activities they considered effective;
4. To determine what teaching methods and materials they considered effective, and;
5. To determine perceived purposes for the course.

Finally, a set of student-specific objectives were developed as follows:

1. To describe certain relevant demographic and background information of the students;
2. To relate how they viewed the prepared curriculum;
3. To report activities they considered interesting, informative, or helpful in understanding lessons;
4. To determine what they considered to be important areas, ideas, and concepts studied in the course, and;
5. To designate their perceptions of purpose in the course.

The purpose of this chapter is to present the data that were assembled, assessed, and analyzed from the respondents' returns. The data amassed represent the reactions of 22 of 37 randomly selected agricultural education instructors, and 157 of 475 of their students. Both groups were asked to respond to selectively assigned survey items concerning their respective views of assorted areas of the new Natural Resources course. Both groups in this study were polled by researcher-fashioned, group-specific questionnaires. Discussion and analysis of data collected in the study followed the sequencing of the respective questionnaires' item grouping. To facilitate clarity of discussion and due to space considerations, percentage figures appearing in tables were rounded.

Demographic and Background Information

Instructor-Specific Characteristics

Objective 1 of the Instructor-Specific Objectives sought to describe selected items of instructor demographics, orientation, and background information. Findings regarding these are presented in Table III.

TABLE III

SUMMARY OF SELECTED DEMOGRAPHIC AND BACKGROUND INFORMATION OF THE AGRICULTURAL EDUCATION INSTRUCTORS

	Frequency or Mean by District					Totals	
Characteristic	NW	SW	C	NE	SE	N	%
Number of teacher respondents	3	5	5	4	5	22	100
$\bar{x}$ age	30	45	39	43	38	35.9*	
$\bar{x}$ years teaching	6	7	17	16	10	11.2**	
Number who:							
Farm or ranch	2	3	4	2	4	15	68
Hunt regularly	1	3	1	3	3	11	50
Fish regularly	2	3	2	3	3	13	59
Garden	2	4	3	3	4	16	73
Have outdoor facilities	2	4	5	4	3	18	82
Have adult programs	1	1	4	2	3	11	50
Teach Natural Resources in adult program	1	1	0	0	1	3	27

* Overall Mean ($\bar{X}$) age = 35.9, SD = 7.6
** Overall Mean ($\bar{X}$) years teaching = 11.2, SD = 6.9

The synthesis of responses indicates that, the average age of the teachers for all districts was 35.9 years, with a standard deviation of 7.58. The range of mean age by district was from 30 for the Northwest district teachers to 45 for those from the Southwest. The mean-years teaching for the entire group was 11.2, with a standard deviation of 6.97, and with a range from six for teachers in the Northwest, to 17 for those in the Central district. Teachers who farmed were 15 of 22, or 68%. Those teachers who reported hunting regularly, were 11 of 22, or 50%. Those reporting regular fishing were slightly higher, 13 of 22, or 59%. Teachers who reported gardening were 16 of 22, or 73%. Teachers who reported that they had outdoor facilities for teaching were 18 of 22, or 82%. It was interesting to note that the teachers with outdoor facilities most reported teaching Natural Resources less than 10% of the time in an outdoor setting. The number reporting adult education programs was 11 of 22, or 50%. Only three of 11, or 27% reported providing Natural Resources instruction in the adult education program.

Also in relation to the first objective, instructors were asked to comment on what they felt was the most notable feature of their agricultural education program. The data received in response to this question are presented in Table IV, which follows.

TABLE IV

SUMMARY OF INSTRUCTORS' OPINION AS TO MOST NOTABLE FEATURES OF THEIR AG-ED PROGRAM

	Frequency by District					Totals	
Features	NW	SW	C	NE	SE	N	%
Well-rounded program	2	3	3	3	3	14	64
Exhibition activities	1	1	0	1	1	4	18
Judging activities	0	0	2	0	1	3	14
Academic achievement	0	1	0	0	0	1	4
Leadership activities	0	0	0	0	0	0	0
Totals	3	5	5	4	5	22	100

As the most frequent response, 14 of the 22 instructors (64%) indicated they felt their program was known for being "well rounded." The next most frequent response was "exhibition activities" with four (18%) reporting. "Judging activities" was the next most notable feature recounted, with three (14%) so indicating. One teacher (4%) responded as having a program noted for "academic achievement." None of the respondents reported their program being known for "leadership activities."

Table V was developed to report the responses of the teachers regarding the types of training they had received.

TABLE V

SUMMARY OF TYPES OF SPECIAL TRAINING THE INSTRUCTORS HAD RECEIVED IN NATURAL RESOURCES

Types of Training*	Frequency by District					Totals	
	NW	SW	C	NE	SE	N	%
Summer In-Service	2	3	4	4	5	18	82
Prod.college courses	2	2	2	2	2	10	45
Experience in field	1	2	2	0	3	8	36
College NR courses	0	1	1	0	0	2	9
Extension-SCS courses	1	0	0	1	0	2	9
Other(watching OETA)	0	1	0	0	0	1	5
Totals	6	9	9	7	10	41	
Mean Number of Training Methods per Teacher						1.9	

* More than one type was provided by some respondents.

Most of the instructors (18 of 22, or 82%) responded that they had received special training by the "1990 Summer In-Service session." The next most reported answer by ten, or 45%, was "production college courses." "Experience in the field" was reported as the special training by eight.(36%). Next, "specific Natural Resources management courses" were reported by two (9%), as well as "Extension and SCS short-courses." One teacher (5%) reported "watching nature shows on OETA" as his special training.

Student-Specific Characteristics

To describe certain relevant demographic and background information about the students was a specific objective of the study. On his/her questionnaire, each student was asked to indicate: age, grade, sex, years in FFA, if Ag I had been completed, type of SAE program, FFA-related activities participated in, where he/she had learned the most about natural resources and the environment, and parents' reaction to the course. The findings regarding student demographic and background data are presented in Table VI.

Table VI depicts the data concerning the students' backgrounds. The mean age state-wide was 16.98 years, with a standard deviation of 1.09 and a range from 13 to 19. The modal age was 17 years. The mean number of years in FFA statewide was 2.44 years, with a standard deviation of 1.26. The range was from the 2.0 years of involvement, reported by the Northwest district students, to the 3.0 indicated by those of the Central district. The modal number of years was 3.0. The disclosures of grade-levels in schools revealed that state-wide, there were five, or 3% freshmen, 24 (15%) sophomores, 53 (34%) juniors, and 75 (48%) seniors enrolled in the Natural Resources class. It was also indicated that 47, or 30% of the respondents were female, and 110 (70%) were male. According to responses, 118 (75%) had taken, or were taking the Ag I course.

TABLE VI

SUMMARY OF STUDENT DEMOGRAPHIC AND BACKGROUND INFORMATION

Characteristic	Distribution by District					Totals	
	NW	SW	C	NE	SE	N	%
Number-Students	9	36	30	45	37	157	
Percent of Total	6	23	19	29	23		100
Mean Age	16.0	16.9	16.6	17.3	17.2	16.9*	
Mean Years-FFA	2.0	2.9	3.0	2.2	2.8	2.4*	
Number by Grade Level:							
Freshmen	0	1	2	2	0	5	3
Sophomores	2	6	7	4	5	24	15
Juniors	3	9	9	15	17	53	34
Seniors	4	20	12	24	15	75	48
Number by Sex:							
Females	2	10	6	17	12	47	30
Males	7	26	24	28	25	110	70
Number Taken Ag I	7	30	25	25	31	118	75
Number by Type of SAEP:							
Traditional	4	17	17	22	25	86	55
Related to NR	1	2	3	3	3	12	8
Total SAEP's	5	19	20	25	28	98	62

* Overall Mean ($\bar{X}$) age = 16.9, SD = 1.1

** Overall Mean ($\bar{X}$) years in FFA = 2.4, SD = 1.3

On their questionnaire teachers were asked for their opinion of the grade level for which the course was best suited. Parallel and relevant to the previous information, the instructors' answers ranged from the eighth grade to senior level involvement.

Table VI also presents the data received from students concerning responses to the open-ended question, "What is your SAE program", (supervised agricultural experience) indicated that a total of 98 of 157 students (62%) had SAE programs. The tally of types of SAE's indicate that 86, or 55% of the students had "traditional" SAE's, i.e. beef, swine, sheep, equine, etc. Those that responded as having SAE's that are related to natural resources or conservation numbered 12, or 8% of all students in the study. The most reported SAE area related to natural resources was speciality animal production, with five of 12 (42%) reporting this category. Raising game birds for release programs in wildlife management was reported with the next highest frequency, with four (33%) reporting such. Following was the outdoor recreation category where two (17%) reported involvement. Finally, the area of soil and water management was reported by one student, or 8% of those with natural resource related SAEP's.

In close relationship, a question asked the students to state what FFA activities they had participated in. Their responses are recorded in Table VII.

TABLE VII

SUMMARY OF STUDENT PARTICIPATION
IN FFA ACTIVITIES

	Distribution by Districts					Totals	
FFA Activities	NW	SW	C	NE	SE	N	%
	n=9	n=36	n=30	n=45	n=37	157	
Help w/activities	7	31	30	32	34	134	85
Show livestock	4	22	21	18	24	89	57
Judge livestock	3	16	18	15	14	66	42
Judge soil/land	3	12	9	30	5	59	38
Leadership train.	3	12	13	11	9	48	31
Chapter officer	4	12	8	10	13	47	30
Public speaking	3	7	14	5	4	33	20
St.degrees-awards	1	9	8	3	5	26	17
Parli Pro contest	2	7	6	0	4	19	12
Judge plants-crops	3	4	4	2	1	14	9
Other**	0	2	1	0	2	5	3
Totals	33	134	132	126	115	540*	
Mean number of activities per student					--	3.4	

* Several respondents reported participating in multiple activities.

** Activities written in- meats and dairy foods judging, ag mechanics, farm business mgt., and Sweetheart candidate.

Table VII contains a summary of the types of FFA activities in which student respondents had participated. The students were instructed to answer with all applicable responses on the list, which accounts for the large total. The entries in the frequency distribution are in rank order of numbers involved in each activity. The most frequent type of participation reported by students (134, or 85% of those responding) was to "help with activities."

"Showing livestock" attracted the next greatest number, with 89, or 57% of the students responding. The category ranked next was "judging livestock", with 66 (42%) of the students reporting involvement. The "soils-land judging" category was next in order of frequency, with 59, or 38% responding thusly.

The activity reported by the next highest proportion was "leadership training." This category was reported by 48, or 31% of the students. Closely following was "chapter officer", and was reported by 47 (30%). "Public speaking" activities were recounted by 33 (20%) of the student respondents. "State awards and degrees" was the category next most frequently reported with 26 (17%). "Parliamentary procedure" activity involvement was next ranked with 19 (12%) so reporting. "Plants-crops judging" was next with 14 (9%) reporting. The activities reported with the least frequency were entered under the "other" response, and included activities such as meats judging,

ag mechanics, farm business management, an FFA Sweetheart candidate, and dairy foods judging. Each of these written-in entries showed one (.6%) of the students responding.

The mean number of activities per student was 3.4, with the range from 0 activities reported by 23 students, to 12 activities reported by five students. The overall activities reported by the students of each individual school corresponded, for the most part, with the response of the directing instructor as to what their AgEd program was most noted for.

The data compiled concerning students' perceptions of their parents' reactions to the course in Natural Resources, are presented in Table VIII.

TABLE VIII

SUMMARY OF STUDENT PERCEPTIONS OF PARENTS' REACTIONS TO THE NATURAL RESOURCES COURSE

Perception of Parents' reactions	Distribution by District					Totals	
	NW	SW	C	NE	SE	N	%
No reaction	3	12	10	15	16	56	36
Interested/support	3	13	8	18	12	54	34
Thought it was OK	2	4	9	9	7	31	20
Probably would like	1	6	3	2	2	14	9
Did not like it	0	1	0	1	0	2	1
Totals	9	36	30	45	37	157	100

The response reported most frequently to the question, "What has been your parents' reaction to you taking the Natural Resources course," was "no reaction at all," with 56 (36%) reporting along that line. The next most frequent response was "they seemed interested and supportive," with 54, or 34% so reporting. The next ranked response was "they seemed to think it was okay," reported by 31 (20%). Fourteen, or 9% of the students said of their parents' view of the course, "they would probably like it if told about it." "Didn't like it" was the parental opinion reported by two (1%) of the students.

Table IX contains findings regarding sources from which students have learned the most about natural resources and the environment.

TABLE IX

SUMMARY OF SOURCES FROM WHICH STUDENTS HAVE LEARNED THE MOST ABOUT NATURAL RESOURCES AND THE ENVIRONMENT

Sources of Learning	Distribution by District					Totals	
	NW	SW	C	NE	SE	N	%
The Nat.Res.course	5	11	15	19	17	67	43
Books,magazines,TV	2	13	7	15	5	42	27
Outdoor experience	1	7	6	5	10	29	18
Teachers	0	3	2	5	4	14	9
Parents	1	2	0	1	1	5	3
Totals	9	36	30	45	37	157	100

The most frequent response concerning learning about the environment, was "the course in Natural Resources," with 67 students, or 43% thus reporting. The next most commonly cited source of learning was by means of "books, magazines, and TV," with 42, or 27% of the students thus reporting. The next most frequent response was "camping and outdoor experiences," with 29 (18%) of the students reporting this means. The fourth-ranked source of learning was "from teachers," with 14 (9%) of the responses. The least frequent response recorded was "parents," with five, or 3% of the student responses.

Implementation of the Natural Resources Course

One of the instructor-specific objectives was: "To determine the purposes for adoption of the course." Three items on the teacher questionnaire were related and assigned to this objective. The question items were related to the main reason for adding the Natural Resources course, the main purpose to be accomplished with the Natural Resources course, and effectiveness in achieving the main purpose of the program.

Instructors' Reasons for Adding the Course

Information was solicited about precipitating factors in beginning the course. The data gathered from the instructors' recollections are presented in Table X.

TABLE X

SUMMARY OF TEACHERS' REASONS FOR ADDING THE NATURAL RESOURCES COURSE

	Distribution of Responses by District					Totals	
Reasons	NW	SW	C	NE	SE	N	%
Personal interest	2	1	0	3	2	8	36
Public interest	1	1	3	0	0	5	22
Student interest	0	0	1	1	1	3	14
Financial incentive	0	1	1	0	1	3	14
Other	0	2	0	0	1	3	14
Supervisor suggest	0	0	0	0	0	0	0
Totals	3	5	5	4	5	22	100

The reason cited most frequently by teachers was "personal interest," with eight, or 36% reporting such. The next most frequent response was "public interest and support," with five entries (22%) of those responding. Next in frequency was "student interest," with three (14%) reporting in the category. An equal response rate was attached to the answer "financial incentives," with three, or 14% reporting. The same frequency of responses also came in the division labeled "other," with three (14%) thus reporting. These written-in responses all dealt with "the opportunity to bring about change in the curriculum

and subsequent course offerings. One respondent (4.6%) added, "so as to increase AgEd enrollment." There were no responses to "supervisor's suggestion.

Table XI summarizes data collected relative to what teachers perceived to be the main purpose of the program and their assessment of how effective they had been in achieving that purpose. To allow for comparisons of effectiveness, a procedure was followed to calculate "grades" teachers gave themselves. This procedure involved self-assignment of letter grades, A, B, C, D, F, with numerical values of 5, 4, 3, 2, 1, attached respectively. Each teacher's number grade was totaled with the answers of other district teachers. The mean grades for each district and the state were calculated. To convert numerical grades to letter grades, the following real limits were established: 5.00 - 4.50 = A, 4.49 - 3.50 = B; 3.49 - 2.50 = C; 2.49 - 1.50 = D; and 1.49 - 1.00 = F.

The purpose receiving the highest frequency of response was "to develop awareness concerning the environment," with 11 of 22, or 50% responding thus. The mean grade for this purpose was 3.46, or C. Teachers in the Southwest and the Southeast districts considered themselves to have been less effective in achieving this purpose.

TABLE XI

INSTRUCTORS' PERCEPTIONS OF THEIR ASSESSED EFFECTIVENESS "GRADE" IN ACHIEVING SELECTED PURPOSES

	Frequency and "Grade" by District														
Purpose	NW		SW		C		NE		SE		Totals				
	n	g	n	g	n	g	n	g	n	g	N	G	$\bar{X}$		
develop aware.	1	4	3	9	3	12	1	4	3	9	11	38	3.46		
inform students	0	0	2	8	2	8	2	8	0	0	6	24	4.00		
env. responsible	2	8	0	0	0	0	1	4	2	8	5	20	4.00		
solving skills	0	0	0	0	0	0	0	0	0	0	0	0			
job skills	0	0	0	0	0	0	0	0	0	0	0	0			
Totals	3	12	5	17	5	20	4	16	5	17	22	82	3.73		
Mean "Grade"	4.00		3.40		4.00		4.00		3.40				3.73		
Letter "Grade"	B		C		B		B		C				B		

The next most reported response was "to inform students about natural resource use," and was the response of six instructors, or 30%. The mean grade for this stated purpose was 4.00 = B. The least frequent response reported was, "development of environmental responsibility," and was reported by five instructors (23%). The overall mean effectiveness grade for this purpose was 4.00 = B. The overall mean grade score for the perceived effectiveness of

all purposes was 3.73, a B. The two remaining response choices were not selected by any of the teachers.

Students' Reasons for Taking the Course

One of the student-specific objectives was "To designate their perceptions of purpose in the course." Achievement of this objective was directed by attaining responses to two different questions: (a) their purposes for enrolling in the course, and (b) what the purpose of the course was. The students were queried as to the main reason they took the Natural Resources course. The results of student responses are shown in Table XII.

The most common response given was that the course "sounded interesting," with 85 students (54%) reporting this as their main reason. The next most frequent response was "needed another class," with 37, or 24% reporting. "Teacher's suggestion" was reported with the next highest frequency, with 20 (13%) so answering. The response of "friends taking it" ranked 4th with 13, or 9% reporting. "Publicity concerning environmental issues" was reported by only one student, or .6%. Also, under "other," one student, (.6%) wrote, "My brother told me to take it."

Students' Views of Purpose of the Course

Paralleling an action undertaken with teachers, students were asked to indicate the purpose of the course. The data received in response are presented in Table XIII.

TABLE XII

SUMMARY OF THE REASONS GIVEN BY THE STUDENTS FOR TAKING THE NATURAL RESOURCES COURSE

	Responses by District					Totals	
Reasons	NW	SW	C	NE	SE	N	%
sounded interesting	7	26	20	11	21	85	54
needed another class	1	7	5	20	4	37	24
teacher suggested it	1	2	4	6	7	20	13
friends taking it	0	1	0	8	4	13	8
publicity of issues	0	0	1	0	0	1	.5
other	0	0	0	0	1	1	.5
Totals	9	36	30	45	37	157	100.0

TABLE XIII

SUMMARY OF STUDENT PERCEPTIONS OF THE MAIN PURPOSE OF THE NATURAL RESOURCES COURSE

	Frequency by District					Totals	
Reasons	NW	SW	C	NE	SE	N	%
inform about NR use	2	17	7	18	7	51	33
develop awareness	3	12	8	10	17	50	32
env. responsibility	3	2	11	7	3	26	16
issue-solving skills	1	3	3	2	6	15	10
develop job skills	0	2	1	4	0	7	4
other	0	0	0	4	4	8	5
Totals	9	36	30	45	37	157	100

The most frequent main purpose cited by the students was "to inform students about natural resource use," with 51 students (33%) replying suchwise. Closely following, the next most frequent response was "to develop awareness concerning the environment," with 50, or 32% answering accordingly. There were 26 students (16%) who indicated they took the course "to develop attitudes and skills demonstrating environmental responsibility."

The fourth ranked response was "to develop skills for solving environmental issues," with 15 (10%) of the students reporting in this manner. The next response in order of frequency was "to develop environmentally-related occupational skills," with seven, or 4% selecting thus. As "other" responses, there were two main types written-in. The one with higher frequency, with five (3%) of the students responding was "All of the above." The lowest frequency response was "to update Ag classes," with three (2%) of the students so indicating.

Perceptions of the Prepared Curriculum

Instructor Perceptions

One instructor-specific objective states: To relate their views on teaching the curriculum. The specific question items corresponding to this objective asked the teachers to: rate the Natural Resources Core Curriculum, to estimate for what grade level the Natural Resources course is best suited, name the one factor which made it

most difficult to teach the class, to recount the one factor that was most helpful in teaching the class, to indicate which units were taught the most and least effectively, which units the students were most and least interested in, and which units were not covered.

Also, teachers were asked to respond to whether they used the curriculum tests, their own prepared tests, or a combination of both. Other questions related to the objective solicited instructors' perceptions of: what one factor will most influence the future success of the Natural Resources course in Oklahoma schools, whether or not they will teach the course next year, and if so, what changes would they make in their program.

The results of the teacher responses to the "grade" they would give the curriculum are charted in Table XIV. Mean numerical grades were converted to letter grades by using the same real limits scale as was used for Table XI.

The lowest frequency of response given was for the "A" (excellent) grade, with only 1, or 5% of the instructors so signifying. The "C" (average) grade received the most responses with 9 (41%) reporting in this range. The "B" (good) grade was the next most frequently entered with six, or 27% indicating such. The "D" (passing) grade was given by four (18%) instructors, while two (9%) gave the curriculum a grade of "F" (failing). The sum of all the scores was 66, with 22 instructors reporting, yielded a mean score of 3.0, or the midpoint of the "C" range.

TABLE XIV

SUMMARY OF THE INSTRUCTORS' "GRADE" RATING OF THE NATURAL RESOURCES PREPARED CURRICULUM

	Frequency by District					Totals	
"Grade" Ratings	NW	SW	C	NE	SE	N	%
C, Average	2	2	1	3	1	9	41
B, Good	0	2	1	0	3	6	27
D, Passing	1	1	2	0	0	4	18
F, Failing	0	0	0	1	1	2	9
A, Excellent	0	0	1	0	0	1	5
Totals	3	5	5	4	5	22	100
Scores (summed)	8	16	16	10	16	66	
Mean Scores	2.66	3.20	3.20	2.50	3.20	3.00 = C	

The data entered in Table XV, which follows, are responses to the question, "In your estimation, for what grade level is the Natural Resources course best suited?"

The most frequent response was "10th grade," with 11 (50%) thus replying. Ranking next with five (23%), was "11th grade." The next most frequent response was "8th grade," with three (13%) entering replies in this class. The next most reported response was "9th grade," and was entered by only two (9%) of the instructors. Curiously,

TABLE XV

SUMMARY OF INSTRUCTORS' PERCEPTIONS CONCERNING THE OPTIMUM GRADE LEVEL FOR NATURAL RESOURCES STUDENTS

	Frequency by Educational District					Totals	
Grade Level	NW	SW	C	NE	SE	N	%
10th grade	0	4	1	2	4	11	50
11th grade	0	1	2	2	0	5	23
8th grade	1	0	2	0	0	3	13
9th grade	1	0	0	0	1	2	9
12th grade	1	0	0	0	0	1	5
Totals	3	5	5	4	5	22	100

the choice for "12th grade" was used by only one (4.6%) of the respondent teachers.

Table XVI is a presentation of data received in response to the questions posed to the teachers concerning what factor that they felt made teaching the class most difficult, and which factor they considered the most helpful in teaching the class. The factors which made it the most difficult, with the highest response rates, were "lack of materials," and "lack of training," each with seven, or 32% of the teachers reporting thusly.

TABLE XVI

SUMMARY OF FACTORS WHICH TEACHERS FELT MADE IT THE MOST DIFFICULT AND THOSE WHICH HELPED THE MOST IN TEACHING THE NATURAL RESOURCES CLASS

	Frequency by District					Totals	
Factors	NW	SW	C	NE	SE	N	%
Made Difficult							
lack of materials	1	1	2	2	1	7	32
lack of training	0	2	1	1	2	6	27
lack of time	1	2	2	0	0	5	23
student disinterest	1	0	0	1	0	2	9
class size	0	0	0	0	2	2	9
Totals	3	5	5	4	5	22	100
Helped the Most							
your own interest	2	2	2	2	1	9	40
prepared curriculum	0	1	2	0	3	6	30
student interest	1	0	1	2	0	4	15
other	0	1	0	0	1	2	10
listed resources	0	1	0	0	0	1	5
requested materials	0	0	0	0	0	0	0
Totals	3	5	5	4	5	22	100

The response with the next highest frequency for most difficult was "lack of time," (for preparation, teaching, and activities) with four (23%) reporting this factor. "Lack of student interest," and, "class size" were both named with the next highest frequency, with each area responded to by two (9%) of the instructors. Worthy of note, the two respondents to class size as the most difficult factor were the schools reporting the largest class size, with 32 and 26 students respectively.

Of the factors which helped the most in teaching, the "teacher's own interest" was named the most frequently, with nine (40%) so indicating. The next most frequent response was "prepared curriculum," with six (30%) reporting. "Student interest" was named next most frequently, as four (15%) reported thus. Under "other," "materials obtained from SCS," "contests in the course," as well as, "requested materials" were each named by one (5%) teacher.

Table XVII contains the information received from instructors to two questions which asked which unit was taught the most effectively, and which was taught the least effectively. The top-ranked unit for most effective was "Wildlife Management," with 12, or 55%, reporting such. There were no responses to least effective in the Wildlife unit. "Land Management" was the next most frequent response for most effective, with

TABLE XVII

SUMMARY OF INSTRUCTORS' VIEWS OF UNITS WHICH WERE TAUGHT MOST EFFECTIVELY, AND TAUGHT LEAST EFFECTIVELY

Unit	Frequency By District										Totals			
	NW		SW		C		NE		SE		ME		LE	
	* ME-	** LE	ME-	LE	ME-	LE	ME-	LE	ME-	LE	N	%	N	%
Wildlife Mgt.	0	0	3	0	3	0	3	0	3	0	12	55	0	0
Land Mgt.	2	0	2	0	1	0	1	0	1	1	7	32	1	4
Water Mgt.	1	0	0	1	0	0	0	0	1	0	2	9	1	4
Intro.to NR	0	0	0	0	1	0	0	0	0	0	1	4	0	0
Outdoor Rec.	0	0	0	1	0	0	0	0	0	0	0	0	1	4
Habitat Mgt.	0	1	0	0	0	1	0	0	0	0	0	0	2	9
Energy Res.	0	0	0	0	0	1	0	1	0	2	0	0	4	18
Forestry	0	2	0	1	0	1	0	1	0	1	0	0	6	27
Air Mgt.	0	0	0	2	0	2	0	2	0	1	0	0	7	32
Totals	3	3	5	5	5	5	4	4	5	5	22	100	22	100

* ME- Unit taught most effectively

** LE- Unit taught least effectively

seven (32%) reporting, and with one (4%) placing it in the least effective area. "Water Resource Management" was named with next highest frequency for most effective, with two (9%) reporting, and one (4%) reporting it in the least effective area. "Introduction to Natural Resources" was the next most frequently responded to as most effective with one (4%) reporting thusly, and with no least effective responses. The ranking of the units was based on net difference between most and least effective responses.

"Habitat Management," had two (9%) least effective ballots, and none assigned most effective. "Outdoor Recreation" had one response (4%) in the least effective area, and no responses in the most effective. "Energy Resources" was next, with four responses (18%) as least effective, and none to most effective. "Forestry" was next with six (27%) least effective responses, and one (4%) reporting most effective. "Air Resource Management" with seven (32%) was most-named as least effective.

Table XVIII is the summary of the responses to two questions from the teacher questionnaire, which asked in which unit the students were most interested, and which unit they were the least interested in. The responses were ranked in order of net difference in interest.

"Wildlife Management" was named as the unit the students were most interested in, with 14, or 64% of the teachers reporting it, with none reporting it as the least interesting unit. "Outdoor Recreation" had three (14%)

TABLE XVIII

SUMMARY OF INSTRUCTORS' VIEWS OF UNITS WHICH WERE MOST INTERESTING AND LEAST INTERESTING TO STUDENTS

Unit	Frequency by Supervisory District										Totals			
	NW		SW		C		NE		SE		MI		LI	
	* MI	** LI	MI	LI	MI	LI	MI	LI	MI	LI	N	%	N	%
Wildlife	2	0	3	0	3	0	3	0	3	0	14	64	0	0
Outdoor Rec	1	0	0	0	1	0	1	0	0	0	3	14	0	0
Land Mgt	0	0	1	0	1	1	0	2	0	1	2	9	4	18
Habitat Mgt	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intro to NR	0	1	0	1	0	0	0	0	0	0	0	0	2	9
Air Mgt	0	1	0	1	0	0	0	0	0	1	0	0	3	14
Water Mgt	0	0	1	2	0	1	0	1	0	0	1	4	4	18
Energy Res	0	1	0	0	0	1	0	0	1	2	1	4	4	18
Forestry	0	0	0	1	0	2	0	1	1	1	1	4	5	23
Totals	3	3	5	5	5	5	4	4	5	5	22	100	22	100

* MI=Unit the students were most interested in

** LI=Unit the students were least interested in

replies as most and none for least. "Land Management" was reported by two (9%) as most interesting, but four (18%) reported it as the least interesting area. "Habitat Management" had no responses in either area. "Introduction" received two (9%) responses as least interesting, and no most interesting responses. "Air Resource Management" had three (14%) reporting least interesting, and none reporting most interesting. "Water Resource Management," and "Energy Resources," were each named by four (18%) as being least interesting, and by one (4%) each, as the most interesting unit. "Forestry" received one (4%) response as most interesting, but had five (23%) naming it least interesting.

Table XIX represents the responses to a question regarding which units were not covered in the course. To preface discussion to Table XIX, it should be noted that nine of the instructors, or 41%, reported that they had covered all nine units of the curriculum on Natural Resources, indicating that 13 instructors did not cover all units. Units not taught by the 13 teachers, (18) when divided by the number of units possible, (198) indicate that only 9.1% of the total possible units were not taught.

"Introduction to Natural Resources" was reported not taught by one (4%) instructor. Next ranked, with two (9%) was "Habitat Management." "Air Resource Management" was reported by four (18%) of the instructors as having not been taught. "Forestry" was reported not taught by five

TABLE XIX

SUMMARY OF UNITS REPORTED AS NOT TAUGHT

	Distribution By District					Totals	
Units*	NW	SW	C	NE	SE	N	%
Intro to NR	0	0	0	0	1	1	5
Habitat Mgt.	0	2	0	0	0	2	9
Air Mgt.	1	2	0	1	0	4	18
Forestry	0	2	1	2	0	5	23
Energy	1	3	1	0	1	6	27
Totals	2	9	2	3	2	18	NA
Possible Total	27	45	45	36	45	198	
% Not Taught	7.4	20	4.4	8.3	4.4		9.1%

* More than one unit was reported by several teachers

(23%) of the instructors. The unit that was reported not taught-most frequently, was Energy Resources, so reported by six, or 27% of the instructors. The units on Forestry, Water Resource Management, and Energy Resources, seem to indicate relative importance as area-indigenous, and were reportedly taught more in the districts that the resources, and related management problems were more commonly found.

Student Views of the Curriculum

Determining how the students felt about the prepared curriculum and related concerns was an objective of the study. Several items on the student questionnaire asked for the students' reactions to the curriculum by: the "grade" they would give the core curriculum, how they would describe the level of the curriculum, and reporting how many other reference books, besides the curriculum, were used in the course.

Question items linked to the objective, but which did not mention the curriculum directly, included asking students to comment on: which unit was the most interesting, which units the class spent the most and the least time on, and which unit, or units, were not covered in the course. These question items also parallel questions asked of the teachers, and offer interesting comparisons in perspectives of the two groups.

The data received that is applicable to the "grades" students gave the curriculum are presented in Table XX, to follow. Table XX represents the compilation of grades given the curriculum from the data collected from the students. The computations involved adding the total scores, as assigned to the "grades," and then dividing by the number of responses; to determine district means and the state mean. The grand mean was 3.64, in the B range.

TABLE XX

SUMMARY OF THE "GRADES" STUDENTS GAVE THE NATURAL RESOURCES PREPARED CURRICULUM

	Frequency By Educational District					Totals	
Grades*	NW	SW	C	NE	SE	N	%
B, Good	4	17	20	16	16	73	46
C, Average	3	12	2	7	11	35	22
A, Excellent	2	5	8	4	7	26	17
E, Failing	0	2	0	10	0	12	8
D, Passing	0	0	0	8	3	11	7
Total Students	9	36	30	45	37	157	100
Scores	35	131	126	142	138	572	
Means	3.9	3.64	4.2	3.15	3.73	3.64=B	
Letter Grade	B	B	B	C	B		

* Real limits of selected "grades": A= 5.0-4.5, B= 4.49-3.50, C= 3.49-2.5, D= 2.49-1.5, and E=1.49-1.0.

Table XXI represents the student responses to the question asking their opinion of the difficulty level of the course. To facilitate comparisons, a procedure was developed to calculate and classify mean responses. Each difficulty level was assigned a numerical value, then these were multiplied by the number of responses.

TABLE XXI

SUMMARY OF THE STUDENT PERCEPTIONS OF THE DIFFICULTY LEVEL OF THE CURRICULUM

	Frequency by Supervisory District					Totals	
Difficulty level*	NW	SW	C	NE	SE	N	%
About Right	7	16	23	31	35	112	71
Easy	2	17	6	9	2	36	23
Hard	0	3	1	5	0	9	6
Totals	9	36	30	45	37	157	100
Scores	16	58	55	86	71	286	
Means	1.78	1.61	1.83	1.91	1.92	1.82	

* Real limits of level ranges: Easy = 1.0-1.49, About Right = 1.50-2.49, and Hard = 2.50-3.0.

The computations for the means were accomplished by adding the total scores of the assigned levels, and then dividing by the total responses, revealing the means of each district, as well as an overall state grand mean. These numerical means were classified by using the real limits scheme footnoted in the table. It was found the state grand mean was 1.82, or "About Right." The number of responses in the "About Right" category were the most frequent, with 112, or 71% of students reporting. only nine (6%) students perceived the curriculum to be "Hard", while 36 (23%) responded that it was "Easy."

Table XXII presents the data received in response to a question from the student questionnaire, which called for recollections of how many other reference books, besides the curriculum, were used. The responses are reported in ranked order of frequency in the table.

The response with the outstanding majority, was "1-4" extra books used, with 105, or 67% of the students reporting such. Next, in order of frequency, interestingly, was "none," with 25 (16%) students reporting this. The response next most frequently entered was "5-7," with 21 (13%) reporting thusly. The two categories, each with the fewest entries, (three-2%), were "7-10," and "more than ten."

Table XXIII depicts the data compiled from the student responses as to what was the most interesting unit. The responses are ranked in order of frequency and may be compared to Table XX, that reports the teachers' perspectives. The most frequently named by the students, as well as the teachers, as most interesting was "Wildlife Management," with 68 (43%) of the students reporting it, and as earlier reported, 14, or 64% of the teachers also. From this point the two groups' views diverge. The next most frequent response was "Outdoor Recreation," with 46 (29%) of the students so reporting. However, only three, or 14% of the instructors indicated it as the most interesting. "Land Management," and "Habitat Management" were the next most frequently responded to, with each unit

TABLE XXII

SUMMARY OF STUDENT RECOLLECTIONS OF THE NUMBER OF REFERENCE BOOKS USED IN NATURAL RESOURCES CLASS

Number of extra books	Frequency by Supervisory District					Totals	
	NW	SW	C	NE	SE	N	%
1 to 4	5	32	14	31	23	105	67
None	1	3	5	4	12	25	16
5 to 7	3	1	7	9	1	21	13
7 to 10	0	0	2	1	0	3	2
More than 10	0	0	2	0	1	3	2
Totals	9	36	30	45	37	157	100

reported by nine (6%) of the students. Teachers ranked this as the second most interesting. "Water Resource Management," and "Forestry" were the units named with the next highest frequency, with eight (5%) of the students reporting each area. From the teachers' perspective, "Forestry was rated lowest, and "Water Management," second from lowest. The units with the fewest responses among the students were "Energy Resources," and "Air Resource Management," each with two (1%) of the students reporting in the category.

Students were asked to convey their perceptions as to which units they spent the most, and the least time on.

TABLE XXIII

SUMMARY OF STUDENT VIEWS OF THE CURRICULUM UNIT THAT WAS CONSIDERED THE MOST INTERESTING

	Frequency by Supervisory District					Totals	
Unit	NW	SW	C	NE	SE	N	%
Wildlife mgt.	2	18	12	19	17	68	43
Outdoor rec.	5	10	10	11	10	46	29
Land mgt.	0	1	2	3	3	9	6
Habitat mgt.	0	2	0	6	1	9	6
Water mgt.	1	4	2	0	1	8	5
Forestry	0	1	0	3	4	8	5
Intro to NR	1	0	1	2	1	5	3
Air mgt.	0	0	2	0	0	2	1
Energy	0	0	1	1	0	2	1
Totals	9	36	30	45	37	157	100

The data collected are summarized in Table XXIV and are ordered such that at the top of the frequency distribution, the responses to most time spent are more prevalent, and toward the bottom, the responses with least time spent are more frequent.

"Wildlife Management" ranked highest, with 39 responses (25%) as the unit on which the most time was spent, and five (3%) as the unit of the least time spent.

TABLE XXIV

SUMMARY OF STUDENT PERCEPTIONS OF UNITS THAT THE CLASS SPENT THE MOST AND THE LEAST TIME ON

Units	Frequency by Supervisory District										Totals			
	NW		SW		C		NE		SE		MT		LT	
	* MT	** LT	MT	LT	MT	LT	MT	LT	MT	LT	N	%	N	%
Wildlife	5	0	5	5	10	0	12	0	7	0	39	25	5	3
Land	2	0	10	0	10	0	6	7	4	2	32	20	9	6
Water	1	0	1	2	5	0	3	4	5	1	15	10	7	4
Intro	1	0	3	1	2	10	5	4	4	2	15	10	17	11
Energy	0	0	1	1	0	2	8	4	2	7	11	7	14	9
Habitat	0	1	3	3	2	0	1	8	1	4	7	4	16	10
Outdoor	0	1	1	4	0	2	4	6	2	7	7	4	20	13
Air	0	0	10	1	1	7	3	8	2	12	16	10	28	18
Forestry	0	7	2	19	0	9	3	4	10	2	15	10	41	26
Totals	9	9	36	36	30	30	45	45	37	37	157	100	157	100

* MT = most time spent

** LT = least time spent.

"Land Management" was the next highest, with 32 (20%) of the students reporting it as unit of most time, and nine (6%) reporting it as least-time unit. "Water Resource Management" had 15 (10%) responses as most-time unit, and seven (4%) as least-time unit. "Introduction to Natural Resources" was named the most-time unit by 15 (10%), and

least-time by 17 (11%). "Energy Resources" was registered by 11 (7%) of the students as the most-time unit, and by 14 (9%) as least-time. "Habitat Management" was declared by seven (4%) as most-time, but by 16 (10%) as least-time unit. "Outdoor Recreation" was entered also by seven (4%) as most-time, and 20 (13%) as least-time unit. "Air Resource Management" was cited by 16 (10%) of the students as most-time unit, but by 28 (18%) as least. "Forestry" had 15 (10%) most, and 41 (26%) least-time.

Table XXV presents the students' recollections of units of the curriculum that were not covered in the Natural Resources class.

Because a similar question was asked of the teachers, it was possible to make comparisons between the students perceptions of units not taught, to those of the teachers. However, the overall percentages of units reported not taught are in close accord with each other.

The unit reported not covered with the most frequency, in both groups, was "Energy Resources," with 48 (31%) of the students reporting, and five (23%) of the instructors. The next most frequent response for both groups, was "Forestry," with 32 (20%) of the students, and five (23%) of the instructors reporting it as not covered. The next highest ranked unit response was "Air Resource Management," for both groups, with 22 (14%) of students, and three (14%) of the instructors so reporting. The

TABLE XXV

SUMMARY OF STUDENT RECOLLECTIONS OF WHICH UNITS OF THE CURRICULUM WERE NOT COVERED

	Frequency by Supervisory District					Totals	
Units	NW	SW	C	NE	SE	N	%
Energy Resources	1	19	8	4	16	48	31
Forestry	2	7	2	18	3	32	20
Air Resource Mgt.	4	2	7	6	3	22	14
Water Management	0	2	0	2	3	7	4
Outdoor Rec.	2	0	0	0	5	7	4
Wildlife Mgt.	0	4	0	0	1	5	3
Land Management	0	0	0	2	2	4	2
Intro to NR	0	0	0	2	2	4	2
Habitat Mgt.	0	1	0	0	1	2	1
Totals	9	33	17	34	36	129	82

units on Forestry, Air Resource Management, and Energy Resource Management, were responded to by the students with similar response rates, by percentages, as those of responses of the instructors, as presented earlier in Table XIX. Land Management, Water Management, Outdoor Recreation, and Wildlife Management were not responded to by instructors, but several students mentioned each. The

"Wildlife Management" unit was reported not taught by five (3%) of the students. "Land management," and "Introduction," were each named by four (2%), and "Habitat Management" by 2 (1%), as not taught.

Views of Supportive Activities

Instructors' Perspectives on Activities

One of the instructor-specific objectives was to ask teachers to record activities that they thought were effective. Teacher questionnaire items were fashioned to determine: to what degree they felt that the addition of extra contests, awards, recognition events and activities in the general area of Natural Resources, would create more student interest, and what specific related award activities, if any, they would like to have added to already existing events.

Other questions solicited responses to determine: specific interesting in-class activities related to natural resource use and conservation that made learning fun and effective for the students; and what changes, in the way of activities, will be made in next year's classes.

Instructors' responses as to their opinions concerning the amount of interest in the Natural Resources course that would be generated by inclusion of related awards and recognition events are presented in Table XXVI.

Regarding the amount of increase in student interest

TABLE XXVI

SUMMARY OF INSTRUCTORS' VIEWS ON THE AMOUNT OF INCREASE IN STUDENT INTEREST THAT WOULD COME FROM THE ADDITION OF RESOURCE-RELATED AWARDS AND EVENTS

	Frequency by Supervisory District					Totals	
Amount of increase	NW	SW	C	NE	SE	N	%
3. some	0	3	2	0	1	6	27
4. quite a bit	2	0	1	1	2	6	27
5. a lot	0	1	2	1	0	4	18
2. very little	0	1	0	2	1	4	18
1. none	1	0	0	0	1	2	10
Totals	3	5	5	4	5	22	100

which would result from adding awards and events, responses most frequently registered were "some," and "quite a bit," each with six (27%) of the instructors reporting such. "A lot," and "very little," each had four (18%) entries recorded. In quantifying the data, the previously described procedure was employed, with each amount assigned numbers and real limits, the overall mean response for amount of interest which would be created overall was 3.38, placing it in the "some" range.

Instructors' responses as to the specific awards and events they would like to add are presented in Table XXVII.

TABLE XXVII

SUMMARY OF INSTRUCTORS' RESPONSES REGARDING RESOURCE RELATED AWARDS AND EVENTS THEY WOULD LIKE TO HAVE, IN ADDITION TO ALREADY EXISTING ACTIVITIES

	Frequency by District					Totals	
Activities, Awards desired	NW	SW	C	NE	SE	N	%
No activities listed	1	2	1	2	3	9	41.0
Interscholastics(generic)	1	1	0	1	1	4	18.0
FFA NR Speech Division	0	0	1	1	0	2	9.0
Star Farmer-type Award	0	2	0	0	0	2	9.0
Interscholastics(specific)							
a. written NR test	1	0	0	0	0	1	4.6
b. awareness problems	0	0	1	0	0	1	4.6
c. specimen ID contest	0	0	0	0	1	1	4.6
Fishing tournament	0	0	1	0	0	1	4.6
Archery-Trap shooting	0	0	1	0	0	1	4.6
Totals	3	5	5	4	5	22	100.0

As reported in Table XXVII, the most frequent response to this open-ended question item was no response at all, with nine, or 41% of the instructors listing no activities. One of the nine replied, "None needed", and went on to elucidate with, "We put too much emphasis on contests and awards. Soon, we'll have to call Ag classes, Awards 101!"

The teachers who would like to have various awards and events added amounted to 13, or 59% of respondents. "Interscholastic Contests in Natural Resources," (generic) were named by four, or 18% of the instructors as activities they would like to have added. Under specific "Interscholastics contests," three entries were suggested by one respondent each: (1) a "written test over Natural Resources," (2) "environmental awareness issues problem-solving contest," and (3) "a specimen identification contest." "An FFA Natural Resources Speech Division," and "an award in Natural Resources similar to the Star Farmer," were each reported by two, or (9%) of the instructors. A contest involving "a fishing tournament" was named by one (4.6%) instructor. A contest involving "archery and/or trap-skeet shooting" was also named by one (4.6%) teacher.

Similar in intent, and parallel to the awards and events item, the teachers were asked to name activities used in class that were interesting and helpful for the students. These findings are recorded in Table XXVIII.

The most numerous responses were "field trips," without specification (generic) as to the nature of the outings, with eight (36%) of the instructors so reporting. Specifically-named "field trips" were reported by 18 (81%) of the instructors as interesting and helpful. Of the specific field trips, "tours of game refuges-preserves" were reported by three

TABLE XXVIII

SUMMARY OF ACTIVITIES RELATED TO NATURAL RESOURCE AND CONSERVATION USED BY INSTRUCTORS TO MAKE LEARNING FUN AND EFFECTIVE FOR THE STUDENTS

	Frequency by District					Totals	
Activities*	NW	SW	C	NE	SE	N	%
Field trips (generic)	1	2	4	0	1	8	36
Field trips (specific)							
a. Game preserve/refuge	0	1	1	1	0	3	14
b. Recycling centers	1	0	0	1	0	2	9
c. Leaf collection	0	0	0	1	1	2	9
d. Testing area fish	0	0	1	0	1	2	9
e. Testing area water	0	0	1	0	1	2	9
f. Testing area soils	1	0	0	0	1	1	5
g. Landfill tour	0	0	0	1	0	1	5
h. Nuclear power plant	0	0	0	1	0	1	5
i. Ostrich farm	0	0	0	1	0	1	5
j. Game bird release	0	1	0	0	0	1	5
k. Forestry contests	0	0	0	0	1	1	5
l. Fishing tournament	0	0	1	0	0	1	5
Classroom activities							
a. NR problem-solving	1	2	0	0	0	3	14
b. NR VCR tapes	0	1	1	0	0	2	9
c. Hunter safety course	0	0	2	0	0	2	9

TABLE XXVIII (continued)

Activities*	Frequency by District					Totals	
	NW	SW	C	NE	SE	N	%
Classroom activities (continued)							
d. Guest speakers	0	1	0	0	1	2	9
e. Oral reports	0	0	0	1	0	1	5
f. Building NR projects	0	1	0	0	0	1	5
g. Taxidermy	0	0	0	0	1	1	5
h. Making NR posters	0	0	0	0	1	1	5
Totals**	4	9	11	7	8	39	NA

* Responses were grouped according to commonalities

** More than one response was given by some instructors

(14%) of the instructors. "Tours of recycling centers" were named by two (9%) instructors. Leaf identification and collection outings," "trips to collect and check parasites and chemicals in area fish," and "water testing of area lakes and streams," were each reported by two (9%) of the instructors. Many different activities were named by one (5%) instructor in the specific field trip category. They were as follows: "testing soils of the area farms," "trips to landfills," "a tour of a nuclear generating plant," " tour of an ostrich farm operation,"

"involvement with raising and release of quail," "forestry contests of identification and practices to employ," and "a fishing tournament for students of Natural Resources."

In the classroom activity category, "Natural Resource problem-solving exercises" were ranked highest, with three (14%) of the instructors naming such activities. "VCR tapes concerning Natural Resources," "hunter safety courses," and "guest speakers," were reported with the next highest frequency, each by two (9%) of the instructors. "Wildlife research and oral reports given over the findings," "building shop projects related to natural resources, (bird houses, wildlife feeders, and observation stands)," "taxidermy in a class laboratory setting," and, "making posters about Natural Resources and putting them up around the school," were all written-in responses by one (5%) of the instructors reporting each.

Student Views Of Activities

Objective 2 of the student-specific objectives was to record activities they thought were interesting, informative, or helpful in understanding the lessons in Natural Resources. Specific items were placed in the student questionnaire to determine: which types of resource persons had given presentations in the classes, how many VCR tapes on Natural Resources were watched in class, how much of the time was the Natural Resources class held outdoors, and some specific, interesting, or fun activities that

helped them understand Natural Resources and conservation.

The resultant data of the students' recollections of the number of resource personnel that gave presentations in the Natural Resources course are presented in Table XXIX.

The grand total of recollected presentations by resource personnel was 167. The most frequently named guest speaker types were "Fish and Wildlife Service personnel," with 63, or 40% of the students reporting thusly. "Soil Conservation Service personnel" were reported by 46 (29%) of the students. "Water Management personnel" were reported as giving presentations by 26, or 17% of the students polled. "Forest Service personnel" were named by 18,(11%) of the students. In this category, again the region-specific differences became evident. The areas of the state in which there are Forest Service personnel more commonly, (NE and SE) were the districts which had presentations given in class. "Environmental Protection Agency persons" were reported by 12, or 8% of the students responding. Under the "other" response, the written-in response of "none," "no one," or "no guest speakers," was reported most often, with 44, or 28% of the students reporting. Under the "other" response of the "Oklahoma Highway Patrol, giving gun safety and control demonstrations," was the response, by two (1%) of the students.

TABLE XXIX

SUMMARY OF STUDENT RECOLLECTIONS OF THE RESOURCE PERSONNEL THAT GAVE PRESENTATIONS IN THE CLASS

	Frequency by District					Totals	
Resource Personnel	NW	SW	C	NE	SE	N	%
Fish and Wildlife Service	7	9	23	18	6	63	40
SCS Personnel	2	9	1	30	4	46	29
Water Management persons	7	2	11	2	4	26	17
Forest Service personnel	0	0	0	5	13	18	11
EPA Personnel	0	1	2	7	2	12	8
Other							
a. No guest speakers	0	16	4	3	21	44	28
b. OK Highway Patrol	0	0	0	0	2	2	1
Totals	16	37	41	65	52	211*	NA

* More than one response was given by some students

There were six (4%) of the students who wrote in that "the teacher was the only resource person" giving presentations in the Natural Resources class.

Table XXX is a compilation of the students' recollections of how many video tapes were viewed in Natural Resources class. Computations of the means were made by; (a) individual scores, (b) by each school's weighted mean scores, and (c) by districts' weighted mean scores.

TABLE XXX

SUMMARY OF STUDENT RECOLLECTIONS OF THE NUMBER OF NATURAL RESOURCES VIDEO TAPES VIEWED IN THE CLASS

Frequency of Responses and Mean Tapes Viewed											Totals	
NW		SW		C		NE		SE			
*n	m**	n	m	n	m	n	m	n	m	N	M
2	3.0	13	11.0	10	9.8	21	11.1	4	4.0	50	9.9
7	3.7	6	6.5	16	1.4	14	4.9	7	3.3	50	3.6
0	0	6	2.8	4	19.0	10	7.9	26	8.2	46	8.6
0	0	1	5.0	0	0	0	0	0	0	1	5.0
0	0	10	10.0	0	0	0	0	0	0	10	10
Totals 9		36		30		45		37		157	7.5
Overall Means 3.6			8.4		6.6		8.5		6.8		7.5

* n = frequency of responses

** m = mean of video tapes per school

Each of the three methods yielded a grand mean of 7.5, or that overall, the students reported viewing an average of 7.5 video tapes in their Natural Resources classes.

Table XXXI presents data received from students concerning their perceptions of the amount of time the Natural Resources class was held outdoors, or outside the classroom.

TABLE XXXI

SUMMARY OF STUDENTS VIEWS OF THE AMOUNT OF TIME THE NATURAL RESOURCES CLASS WAS HELD OUTDOORS

Amount of Time Spent Outdoors	Frequency by Supervisory District					Totals	
	NW	SW	C	NE	SE	N	%
less than 10%	3	11	10	9	16	49	31
20-30%	2	15	8	6	8	39	25
more than 30%	2	10	11	5	0	28	18
10-20%	1	0	1	14	9	25	16
never	1	0	0	11	4	16	10
Totals	9	36	30	45	37	157	100

Inspection of Table XXXI discloses that the most frequent response to the question regarding how much time was spent outdoors in the Natural Resources course was "less than 10%," with 49 students (31%) reporting such. The next most frequent response with 39 (25%) reporting was "20-30%. "More than 30%" was reported by 28 (18%), and "10-20%" was reported by 25 (16%) of the the students. Only 16 (10%) of the students reported the class was "never" held outdoors.

Table XXXII summarizes the ranked responses to an item which asked the respondents to list specific, fun

TABLE XXXII

SUMMARY OF ACTIVITIES THE STUDENTS FELT WERE INTERESTING, FUN, OR HELPFUL IN UNDERSTANDING RESOURCE USE

Activities	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
Land judging activities	2	11	2	7	1	23	15
Field trips (generic)	4	8	2	5	2	21	13
Field trips (specific)							
a. Fishing trips	2	4	11	2	3	22	14
b. ID and collection	0	3	3	2	8	16	10
c. "Outdoors study"	0	1	12	1	0	14	9
d. Hunting and camping	1	7	0	0	0	8	5
f. Studying fish	0	2	2	0	3	7	4
e. Game preserve	0	0	0	6	0	6	4
g. Forestry activities	0	1	0	0	3	4	3
h. Water sampling	0	1	0	0	3	4	3
i. Nature walking talks	0	1	1	2	0	4	3
j. Wildlife observation	0	1	1	0	1	3	2
k. SCS contest	2	0	0	0	0	2	1
l. Kerr Arboretum	0	0	0	0	2	2	1
m. Mapping habitat	0	0	0	2	0	2	1
n. State Park	0	1	0	0	0	1	.6

TABLE XXXII (Continued)

Activities	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
o. Strip mine	0	0	0	0	1	1	.6
p. Nuclear power plant	0	0	0	1	0	1	.6
q. Recycling center	0	0	0	1	0	1	.6
r. Shooting range	0	0	1	0	0	1	.6
Classroom activities							
a. Nature VCR tapes	1	1	4	3	2	11	7
b. Oral wildlife reports	0	0	1	7	0	8	5
c. Class discussions	0	4	0	0	0	4	3
d. Live animals in class	0	1	0	2	0	3	2
e. Building NR projects	0	0	2	1	0	3	2
f. Predator-prey game	0	0	0	2	0	2	1
g. Guest speakers	0	0	1	1	0	2	1
h. Taxidermy	0	0	0	0	2	2	1
i. Hunter safety course	1	0	1	0	0	2	1
No interesting activities	0	1	0	1	5	7	4
Active preservation work	0	1	0	0	0	1	.6
Hands-on experiences	0	0	0	1	0	1	.6
Totals	13	49	44	47	36	189*	NA

* More than one response was given by some students

or interesting activities done in conjunction with the Natural Resources class, that helped them to better understand natural resources and conservation. The responses of the students verified that many different, useful activities were engaged-in throughout the classes, with a total of 31 different activities named.

The most frequent response was "land judging activities," with 23 students (15%) reporting this. One of the responses included with this category, was exercises in "leasing land and minerals," with one (.6%) student reporting it. "Generic field trips," without specification, were next most frequently named, with 21 students (13%) reporting such. Under "specific field trips," a total of 100 (64%) students responded. Specific types of field trips are reported both in the table and in the following discussion. "Fishing trips" ranked the highest, with 22 (14%) of the students reporting these activities. "Grass identification and leaf collection" responses were grouped together, and were ranked next, with 16 (10%) of the respondents so reporting. The next ranked response-type was "outdoor studies," with 14 (9%) reporting that being outdoors for class was helpful.

"Hunting and camping activities," were ranked next, with eight (5%) of the students reporting them. The practice of "studying fish," was the next highest response, with seven (4%) reporting thusly. "Study of parasites and

chemical residues found in area fish" was reported by two of the seven students.

The next highest frequency response was "tours of game preserves, zoos, and specialty animal production facilities." These were grouped accordingly under "game preserves-etc.," with seven (4%) included in the general category. "Forestry" was the next most frequent response, with four (3%) reporting in the category, with three of the four from the SE district. "Water sampling" was named by four students (3%) also, as a helpful activity. A unique activity, "Nature Walking Talks," were named by students from several different schools, also with a total of four (3%) reporting. The format of the walks was a step by step observation with explanation, along a trail with abundant wildlife. "Wildlife observations," was a related activity with an additional three (2%) reporting in this general section. The next three responses each were reported by two (1%) of the students, and they were: "a soil conservation contest put on by the Soil Conservation Service," "a tour of the Kerr Arboretum," and exercises in "mapping wildlife habitat," with numbers, densities, and pressures included.

Several environmental educational experiential excursions were mentioned by one student, or .6% of those polled. The activities included: "a trip to Robbers' Cave State Park," "a tour of a strip mine," "a tour of a nuclear generating

plant," "a recycling center," and "a trip to a shooting range."

The other main division of the activities named was in the realm of indoor, or "classroom activities." The top-ranked response of this general area was "watching Natural Resource video tapes," with 11 (7%) so reporting. "Wildlife research" and "oral class presentations of the findings" were reported by eight (5%) of the students as helpful activities. Several students, four (3%), reported that "in-class discussions over Nature and resource issues" were considered helpful activities. "Live, wild animals observed in class" were reported by three (2%) as an interesting activity. Also with three (2%) reporting, was "building wildlife projects." Some of the specific projects reported included "bird houses, wildlife feeders, and observation stands." The next most frequent responses, with two (1%) each were: "the predator-prey board game," "resource persons giving presentations," and "taxidermy in the laboratory setting." "The hunter safety course" was also mentioned by two (1%) students as an interesting activity undertaken in the Natural Resources class.

The responses which recounted that there were "no interesting or informative activities in the course" numbered seven, or (4%) of the total student group. One miscellaneous response was interesting that stated, "We actually did something to preserve the environment." One

other student (.6%) reported "hands-on experience" as interesting and helpful.

Instructor Perceptions of Teaching Methods

One of the instructor-specific objectives was to determine what teaching methods and materials they thought were effective. There were seven items on the teacher questionnaire directed toward the objective. The items sought to determine: if the teachers used the prepared tests, their own, or a combination; to what degree they taught the Natural Resources class outdoors; the approximate times required to complete the various units of the Natural Resources curriculum; which teaching method (a) the instructor used most often in the Natural Resources class, (b) which teaching method the teacher thought was most effective in the class, and (c) what method the instructor thought was least effective; (d) if they would teach the course the next year, and; (e) what changes that they would make. Data from the responses of the instructors concerning the methods of evaluating the students in the course are presented in Table XXXIII.

The most frequent response as to the testing method most often used was "a combination of the prepared tests from the curriculum and teacher-constructed exams," with 16 of the 22 (73%) teachers so indicating. The next most frequent response was that they used "the tests provided with the curriculum," with four of the 22, or 18%.

TABLE XXXIII

SUMMARY OF METHODS OF TESTING THE INSTRUCTORS USED FOR STUDENT EVALUATION IN NATURAL RESOURCES

Method of Testing	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
A Combination	2	4	2	4	4	16	73
The Prepared Tests	0	1	2	0	1	4	18
Own Tests	1	0	1	0	0	2	9
Totals	3	5	5	4	5	22	100

reporting in that category. The response registered with the least frequency was "the teachers' own prepared exams," with two, or 9% of the teachers reporting in this manner.

Table XXXIV includes data as to the amount of time the class was taught outdoors, and teacher responses regarding access to outdoor teaching facilities in their program. The most frequent response to the percentage of instructors reported teaching the Natural Resources class outdoors was "less than 10% of the time," with nine of 22, or 41% so reporting. Of those nine, six, or 27% of all the instructors, reported that they had access to outdoor teaching facilities in their program. The response reported with the next highest frequency was "10-20%," with six (27%) reporting, with all six (27%) also

TABLE XXXIV

SUMMARY OF THE AMOUNT OF TIME THE INSTRUCTORS TAUGHT THE NATURAL RESOURCES CLASS OUTDOORS, AND IF THEY HAD OUTDOOR TEACHING FACILITIES

Amount Taught Outdoors	Frequency and Facilities by District										Totals			
	NW		SW		C		NE		SE		N		%	
	*n	f**	n	f	n	f	n	f	n	f	N	F	N	F
less than 10%	2	1	1	0	3	3	1	1	2	1	9	6	41	27
10-20%	1	1	2	2	1	1	1	1	1	1	6	6	27	27
20-30%	0	0	1	1	1	1	1	1	0	0	3	3	14	14
more than 30%	0	0	1	1	0	0	1	1	1	1	3	3	14	14
none	0	0	0	0	0	0	1	0	0	0	1	0	4	0
Totals	3	2	5	4	5	5	5	4	4	3	22	18	100	82

* n (N)indicates the number of instructors responding

** f (F)indicates number of schools with outdoor facilities

reporting outdoor teaching facilities. The two categories, each with the next most frequent response rate, were "20-30%," and "more than 30%," both with three (14%) respondents in the category, and with all three (14%) of each group reporting access to outdoor facilities also.

The least frequent response was "none," with only one (4%) teacher reporting in the category, and no outdoor teaching facilities being reported with the entry. The total number of responses that indicated that "more than

10% of the time" was spent outdoors teaching the class was 12, or 55%. Programs that were reported to have access to outdoor teaching facilities totaled 18, or 82%.

Teachers were asked in their questionnaire to categorize the amount of time they spent teaching each of the units of the curriculum. Their responses are charted, and mean times spent per unit are presented in Table XXXV. The number of instructors responding to time spent on each unit was 22. The responses gathered from them were summarized to determine the overall patterns of time spent teaching the respective units.

As can be seen from the table, and as might be expected, less time was spent on the Introductory unit, with 11 teachers reporting spending just "1-3 days," while an additional nine devoted "3-8 days" to this unit. The Water Management Unit was taught from "3-8 days" by 11 teachers; "2-3 weeks" by six teachers; and "one month" by three teachers.

For the unit on Land, ten teachers indicated they spent from "2-3 weeks" in teaching this area, with three spending "one month." Eight teachers devoted "3-8 days," with the remaining one responding that just "1-3 days" was spent.

Judging from the time devoted to it, the Wildlife Unit was a popular component of the course. Eight teachers taught this unit for "one month" and another 11

TABLE XXXV

SUMMARY OF INSTRUCTORS' ACCOUNTING OF TIME SPENT IN TEACHING EACH OF THE UNITS OF THE CURRICULUM

Unit	Responses by Frequency Taught by District																							
	NW				SW				C				NE				SE				Totals			
	*a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d
Intro	2	1	-	-	2	2	1	-	3	1	1	-	2	2	-	-	2	3	-	-	11	9	2	0
Water	-	1	-	2	1	3	1	-	-	1	3	1	1	3	-	-	-	3	2	-	2	11	6	3
Land	-	-	2	1	-	2	3	-	-	2	1	2	1	1	2	-	-	3	2	-	1	8	10	3
Wildlife	-	1	-	2	-	-	4	1	-	-	4	1	-	-	2	2	-	2	1	2	0	3	11	8
Habitat	-	1	2	-	1	1	2	1	-	1	4	-	-	-	2	2	-	3	2	-	1	6	12	3
Recreation	-	1	1	1	-	2	3	-	-	3	1	1	-	3	1	-	-	4	1	-	0	13	7	2
Forestry	-	3	-	-	1	3	1	-	2	3	-	-	1	2	-	1	-	2	1	2	4	13	2	3
Energy	-	2	1	-	1	2	2	-	1	1	2	1	-	4	-	-	-	3	1	1	2	12	6	2

* The responses as to time spent in each unit are divided into four categories; a = 1-3 days, b = 3-8 days, c = 2-3 weeks, and d = 1 month

concentrated on this topic for "2-3 weeks." The other three teachers indicated this occupied from "3-8 days" of total teaching time.

The study of Habitat was apparently an important topic as indicated by the 12 teachers who spent "2-3 weeks" and the three who spent "one month" teaching in this unit. A period of "3-8 days" was reported by another six, and one teacher taught this unit only "1-3 days."

The study of Recreation also received considerable attention, as evidenced by the 13 teachers who used "3-8 days" for such instruction, coupled with the seven who spent "2-3 weeks" on this area. It was reported from two departments that "one month" was taken up by recreation studies.

Forestry instruction accounted for a "2-3 weeks" span of time in the classes of 13 teachers, with two and three teachers asserting they spent "2-3 weeks" and "one month" respectively, in teaching this subject. Not surprisingly, only three teachers in the Northwest District taught Forestry for "3-8 days."

The teaching of the Energy Unit encompassed "3-8 days" in 12 of the responding departments. Six teachers responded that they devoted "2-3 weeks" to Energy, with two each reporting teaching it for "1-3 days" and "one month" periods.

To assess teacher perceptions of teaching methods and materials used in the course, Table XXXVI was compiled. It is a depiction of the teacher responses to questions which asked, which teaching method they used the "most often," which method they thought was the "most effective," and which method they thought was the "least effective" in Natural Resources instruction.

"Discussion" was the highest ranking, used most often method, with 10 teachers (46%), citing it as such. Two teachers (9%) reported that it was the most effective, and one (5%) response classified it as least effective. "Lecture" was reported as being used next most often, with seven teachers (32%) reporting. There were no responses to lecture being the most effective method, but it did garner the largest frequency of least effective methods responses, 14 (64%). "Demonstrations" were reported used most often by three teachers (14%), as most effective by five of the group (23%), and as least effective by two (9%). "Experimental discovery/problem solving" was reported as used most often by one respondent (5%), as most effective by four (18%) and as least effective by three. "Field trips" were cited as used most often by only one teacher (5%), but was the highest ranking response as most effective method, with eight (37%) so reporting, and drawing no least effective responses. "Guest speakers" had no responses for most

TABLE XXXVI

SUMMARY OF INSTRUCTOR RATINGS OF SELECTED TEACHING METHODS IN TERMS OF FREQUENCY OF USE AND LEVEL OF EFFECTIVENESS

Method	Response Frequency on Use and Effectiveness															Totals					
	NW			SW			C			NE			SE			O*		M**		L***	
	o	m	l	o	m	l	o	m	l	o	m	l	o	m	l	N	%	N	%	N	%
Discussion	1	0	1	2	0	0	1	0	0	3	1	0	3	1	0	10	46	2	9	1	5
Lecture	1	0	2	2	0	2	2	0	3	1	0	3	1	0	4	7	32	0	0	14	64
Demonstration	1	2	0	0	0	0	1	2	2	0	0	0	1	1	0	3	14	5	23	2	9
Experiments	0	1	0	1	1	3	0	0	0	0	1	0	0	1	0	1	5	4	18	3	14
Field Trips	0	0	0	0	4	0	1	2	0	0	1	0	0	1	0	1	5	8	37	0	0
Resource Personnel	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	2	9	2	9
VCR Tapes	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	5	0	0

* O (o) = method used most often

** M (m) = method considered most effective

*** L (l) = method considered least effective

often used, but two teachers (9%) each reported it most and least effective. "VCR tapes" had but one teacher (5%), rating the teaching method as most effective.

In a related area, the teachers were asked to indicate if they would teach the course the next year, SY 1991-92, and if so, what changes they would make in regard to methods, materials, and activities. The data are summarized in Table XXXVII.

Inspection of the recorded responses reveal that 18 of the teachers, or 82% of those responding, reported they would teach it next year, and only four, or 18%, stated they would not teach Natural Resources next year. However, of the latter, three of stated that the course was to be offered every other year, meaning only one had plans not to teach the course again.

Of the changes to be made next year, the most frequent response was "to make changes to the curriculum content" (mainly concerning updating, expanding, and adding outside references to the curriculum), with 10, or 46% of the instructors so responding. The next most frequent response was "to acquire more skills through in-service type training," with five (23%) instructors reporting. "To have more outdoor study, trips, and activities, and have them better organized" was named by four (18%). "More research and experimentation was named by three(14%). "More resource persons/guest speakers," "more wildlife studies,"

TABLE XXXVII

SUMMARY OF INSTRUCTORS' REPORTED INTENTIONS TO TEACH THE COURSE NEXT YEAR, AND CHANGES THEY WILL MAKE

	Frequency By District					Totals	
Responses	NW	SW	C	NE	SE	N	%
Will teach NR next year	2	5	4	4	3	18	82
Teach it every other yr.	1	0	1	0	1	3	14
Will not teach it again	0	0	0	0	1	1	5
Changes to curriculum content	1	1	3	4	1	10	46
more NR in-service(ing)	1	1	0	2	1	5	23
more outdoor activities	0	2	0	1	1	4	18
more experimentation	0	1	0	0	2	3	14
more resource persons	0	1	0	0	1	2	9
more wildlife studies	0	1	1	0	0	2	9
limit class size	0	0	0	0	2	2	9
hunter certification	0	0	2	0	0	2	9
Ag I prerequisite	0	0	0	0	1	1	5
more, better VCR tapes	1	0	0	0	0	1	5
Total intended changes	3	7	6	7	9	32*	NA

* More than one response was given by some teachers

"limiting the class size," and "incorporating a hunter safety certification course," were each entered by two (9%). "Insisting on Ag I as a prerequisite," and "more and better video tapes to supplement with," were entered by one (5%) instructor each.

Student Assessment of Program Significance

Objective 3 of the student-specific objectives was to determine what they considered to be significant of what they had learned in the course. To gather data related to this, on their questionnaires, students were asked to indicate: their "grade" ratings of the course, the importance of various concepts and activities, and their views of what the best thing and the worst thing about the class were, and whether or not they would recommend the course to their friends and why they would or would not.

Table XXXVIII was constructed to provide a summary of the "grade" ratings students gave the Natural Resources course. The same procedure was used in calculating mean "grade" ratings as was employed in earlier sections of this chapter. The real limits range footnoted on the table was used to interpret these means.

The grand mean "grade" rating given by all students to the course was 3.73, placing it in the B, or "good" range. The mean "grades" given to the course by the students from

TABLE XXXVIII

SUMMARY OF "GRADES" THE STUDENTS GAVE THE COURSE IN NATURAL RESOURCES

	Frequency by Supervisory District					Totals	
"Grades"	NW	SW	C	NE	SE	N	%
B, Good	8	24	18	22	19	91	58
A, Excellent	1	6	9	11	6	33	21
C, Average	0	5	3	11	10	29	18
D, Passing	0	1	0	1	2	4	3
E, Failing	0	0	0	0	0	0	0
Totals	9	36	30	45	37	157	100
Scores(summed)	37	102	130	177	140	586	
Means*	4.11	2.83	4.33	3.93	3.78	3.73	= B

* Real limits of grades- A=5.0-4.5, B=4.49-3.5, C=3.49-2.5, D=2.49-1.5, E=1.49-1.0.

each district ranged from the high of 4.33, Good, given by the Central district, to 2.38, Average, given by the SW district students. Most responses were in the good range, with none in the failing range.

To determine the students' views of certain aspects of the course, they were asked to assign importance ratings to the following concepts:

(1) "Learning to identify trees; (2) "study of local resource issues;" (3) "the inter-relationships in Nature;" (4) "learning how to plant trees;" (5) "hunter safety courses;" (6) developing collection, sampling, and analysis skills;" (7) "development of communications skills;" (8) "wildlife identification skills;" (9) "learning how to preserve wildlife;" (10) "developing skills to prevent resource problems;" (11) "studying economic factors of conservation;" (12) "study of sustainable agriculture;" (13) "learning methods of conserving water;" (14) "learning about resource-related occupations;" (15) "the education of everyone concerning wise resource use;" (16) developing fishing skills;" and (17) "learning about what is and is not recyclable."

The data compiled from responses to the concept questions of student questionnaires are presented in ranked order of importance ratings assigned by students in Table XXXIX. The ratings came from computations of student responses to a five-point Likert-type scale, for each selected item. The total responses to each importance category were multiplied by the value assigned the category. These products were summed and divided by the number of respondents. The mean scores thus derived were interpreted according to a real limits scale. Category values and ranges used were:

TABLE XXXIX

SUMMARY OF STUDENTS' VIEWS OF THE IMPORTANCE OF SELECTED CONCEPTS IN THE STUDY OF NATURAL RESOURCES

Concepts	Mean Importance Rating by District					Totals	
	NW n=9 x*	SW n=36 x	C n=30 x	NE n=45 x	SE n=37 x	N=157 C**	X***
Preserve wildlife	4.33	3.84	4.38	4.14	3.83	635	4.04
Prevent resource problems	4.42	3.78	4.07	3.50	4.33	616	3.92
Hunter safety courses	3.73	3.88	4.07	3.75	3.79	611	3.89
Wildlife identification	3.57	3.88	3.67	4.07	3.67	606	3.86
Conserving water	4.33	3.75	4.25	3.19	4.00	597	3.80
Local resource issues	3.67	3.56	4.38	3.38	3.75	590	3.76
Resource-related occupations	3.75	3.38	3.88	4.00	3.63	585	3.73
Recycling	3.67	3.88	3.88	3.13	4.07	580	3.69
Education in resource use	3.57	3.67	4.00	3.19	3.75	573	3.65
Interrelationships in Nature	3.00	3.33	3.88	3.00	3.38	528	3.36
Economics of conservation	3.13	3.38	3.43	2.88	3.63	519	3.31
Sustainable agriculture	3.33	3.33	3.63	2.75	3.50	513	3.27
Fishing skills	3.19	3.75	3.13	2.33	3.33	490	3.12
Planting trees	3.33	3.19	3.08	3.11	2.88	489	3.11
Collection and analysis skills	3.13	3.19	3.50	2.63	3.33	488	3.11
Communication skills	2.88	3.33	3.19	2.75	3.00	475	3.03
Indentification of trees	2.83	2.88	2.92	2.88	3.19	471	3.00

* x = district means
** C = overall cumulative scores
*** X = overall mean score

1 = no importance, with real limits from 1.0-1.49; 2 = little importance, with real limits of 1.50-2.49; 3 = some importance, with real limits of 2.50-3.49; 4 = quite a bit of importance, with real limits of 3.50-4.49; and, 5 = extreme importance, with real limits of 4.50 to 5.0.

There were nine responding students in the Northwest, 36 in the Southwest, 30 in the Central, 45 in the Northeast, and and 37 in the Southeast educational district. Top-ranked, with a mean of 4.04 and standard deviation (SD) of 1.13 was; "Learning to preserve wildlife habitat." "Developing skills to prevent resource problems," was next- ranked, with a mean of 3.92 and SD of 1.14. "Offering hunter safety and sportsmanship courses," was next with a mean of 3.89 and SD of 1.22. "Skills in identifying wildlife, was next, with a mean of 3.86 and SD of 1.04.

"Learning methods of conserving water" was ranked next, with 3.80 for a mean and 1.04 SD. The next highest ranking belonged to; "The study of local resources and environmental issues," with a mean of 3.76 and .99 SD. "Learning about occupations in the Natural Resources field," was next-ranked, with a mean of 3.73, and a SD of .92. The students put "Learning what is and is not recyclable" next, with a mean of 3.69 and a SD of 1.08. "Educating every one concerning wise resource-use" was next-ranked, with a mean of 3.65 and a SD of 1.01.

Ratings of all the foregoing concepts placed them in the "Quite a Bit of Importance" category. The next most highly rated concept as to importance was "The study of inter-relationships in all areas of Nature," with a mean of 3.36 and SD of 1.12. "Study of economic factors of conservation" was next, with a mean of 3.31 and a SD of .92. Next was; "Study of sustainable agricultural practices," with a mean of 3.27 and SD of .94. "Developing piscatorial skills (fishing)," was next, earning a mean of 3.12 and a SD of 1.08. "Learning how to plant trees" was next, with a 3.11 mean and SD of 1.21. The next-ranked was; "Developing collecting, sampling, and analysis skills," with a 3.11 mean also, and a SD of .98. "Using communications media skills in environmental issues" scored a 3.03 mean and SD of 1.03. "Learning how to identify trees" was lowest-ranked, with a mean of 3.00 and a SD of .76. The mean importance ratings of this latter group of concepts were at levels which placed them in the "Some Importance" category. The total list of concepts was considered to be of "Some," or "Quite a Bit of Importance" by the students.

The responses to what the students considered the best and the worst things in the course were collected by means of open-ended questions. These were consolidated and recorded in Table XXXX, in as detailed a manner as possible.

TABLE XXXX

SUMMARY OF STUDENT COMMENTS OF WHAT THEY CONSIDERED BEST, AND WORST ABOUT THE NATURAL RESOURCES COURSE

	Frequency By District					Totals	
Student Comments	NW	SW	C	NE	SE	N	%
Best things about NR:							
a.Holding class outdoors	4	2	9	8	1	24	15
b.Interesting learning	1	3	2	9	0	15	10
c.Wildlife study and mgt.	0	7	2	1	5	15	10
d.Going on field trips	0	6	0	5	2	13	8
1.Collecting specimens	0	2	4	0	0	6	4
2.Visiting school farm	0	0	5	0	0	5	3
3.Fishing trips	0	0	0	0	3	3	2
4.Land judging activity	0	3	0	0	0	3	2
5.Catfish raising	0	0	0	0	2	2	1
e.Environmental learning	2	0	3	4	3	12	8
1.Protection skills	1	0	2	0	7	10	6
2.Area resources-issues	1	0	0	3	5	9	5
3.Environmental projects	0	0	0	3	1	4	3
4.Improvement skills	0	0	2	1	1	4	3
5.Resource awareness	0	1	1	0	0	2	1
6.Being part of Nature	0	1	1	0	0	2	1

TABLE XXXX (Continued)

Student Comments	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
Best things (continued)							
f.Fun classtime activities	0	5	0	1	0	6	4
1.An easy course	0	2	0	0	3	5	3
2.The teacher was best	0	0	0	4	0	4	3
3.The Nature VCR's	0	3	0	0	0	3	2
4.NR issue discussions	0	0	1	1	1	3	2
5.Taxidermy in class	0	0	0	1	2	3	2
6.Water management unit	0	1	1	0	0	2	1
7.Self-expression skills	0	0	0	2	0	2	1
8.Close to lunchroom	0	2	0	0	0	2	1
g.Nothing good about NR	0	1	0	1	0	2	1
Worst things about NR:							
a.Not enough time outdoors	3	9	7	5	11	35	22
b.The classroom activities	0	2	11	8	7	28	18
1.Curriculum-materials	2	2	1	8	0	13	8
2.Taking notes-tests	1	3	2	3	2	11	7

TABLE XXXX (Continued)

Student Comments	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
Worst things (continued)							
3.Boring classwork	1	4	0	3	0	8	5
4.Some of the people	0	0	0	5	1	6	4
5.Didn't cover material	0	3	0	0	0	3	2
6.Cleaning classroom	0	0	0	2	0	2	1
7.The forestry unit	0	2	0	0	0	2	1
8.Discussion of films	0	2	0	0	0	2	1
9.Air Resource Mgt. unit	0	1	1	0	0	2	1
10.Smell of dead animals	0	0	0	0	2	2	1
11.Energy Resources unit	0	0	0	1	1	2	1
12.Can't sleep in class	0	0	0	0	1	1	.6
c.Some of the field trips	0	0	3	1	0	4	3
1.Classifying leaves	0	2	1	0	3	6	4
2.Working w/poison ivy	0	0	0	0	3	3	2
d.Learn of harm we've done	1	0	0	1	3	5	3
e.Nothing bad in NR course	1	5	2	3	8	19	12

* Some students gave more than 1 response-some gave none

Within "the best things about the Natural Resources class" category, the most often cited was; "having classes outdoors," with 24, or 15% of the total reports. The next most frequent type of response was "the interesting things that were learned," being indicated by 15 students (10%). "Wildlife study and management skills" were next on the list, also with 15 (10%) of the students entering such. "Going on field trips," in general, was the next most frequent "best thing," with 13 students (8%) reporting thus. In addition to field trips in general, five specific types of field trip responses were grouped under "going on field trips." The highest-ranking field trip was for "collecting specimens of leaves, grass, water, and soil," with six (4%) reporting. "Visiting the school farm" was the next field trip category, with five (3%) reporting. "Fishing trips" were named by three (2%) of the students. "Land judging and range management activities" were also named by three (2%) of the students. "Catfish production outings" were named by two (1%) of the students, as the "best thing about the class," under field trip-type activities. "Learning about the environment was mentioned by 12 (8%) of the students.

Several items related to this area were listed, but in a more specific manner. Heading these latter items was;

"Learning environmental protection skills," reported by 10 (6%) of the students. "Learning about local area resources and the issues" was named by nine (5%) of the students as the "best thing." "Building environment projects" was reported by four (2.6%) of the students, with bird feeders and observation stands, along with planting grain plots for wildlife being mentioned as examples. "Learning to improve the environment" was also reported by four (2.6%) of the students as the "best thing." "Developing awareness about resource use" was mentioned by two (1%) of the students. "Becoming a part of Nature" was also reported by two (1%) students. "Fun class time activities" was reported by six (4%) of the students. Related to this were several more specific activities, the first of which was, "it was an easy class," reported by five (3.2%) of the students. "The teacher was the best thing," was named by four (2.6%)."The VCR tapes viewed about Nature" were named by three (2%) of the students as the "best thing" under class time. "Class discussions about Natural Resources and issues" was mentioned by three (2%) of the students also. "Doing taxidermy" was also named the best thing by three (2%). "The unit on water resource management" was named by two (1%) of the students as the "best thing." "Learning how to express feelings about resource-related issues," was named by two (1%) of the students.

Two students (1%) also reported that the "best thing about the class" was the fact that the "classroom was close to the lunch room." Two students (1%) reported, "there was nothing good about the Natural Resources course." All totaled, 25 "best things" were named by the students.

The "worst thing" named by the most students, and is the corollary of the most-named best thing was; "not enough time for class was spent outdoors," with 35, or 22% of the students so reporting. "The classroom activities" were mentioned by 28 (18%) of the students as the "worst thing." Some specific classroom activities were singled out and included, "The curriculum books and materials," cited by 13 (8%) of the students as "worst thing." "Taking notes, studying, and taking tests" were named by 11 (7%) of the students as "worst thing(s)" about the Natural Resources class. "Boring classroom activities" were named by eight (5%) of the students as the "worst thing." "Some of the people in class" was a response of six (4%) of the students. "All of the material did not get covered" was entered by three (2%) of the students. "Cleaning the classroom" was the reply of two (1%) students as "the worst thing." The unit of the curriculum concerning "forestry," the "class discussion over video tapes that had been watched," the "unit on air resource management," "the smell of dead animals in the taxidermy lab,"

and the "energy resources unit," were each reported by two (1%) of the students as "worst thing." "Couldn't sleep in class." was cited by one (.6%) student as worst. "Some of the field trips, (when it was cold or raining)," were named by four (2.6%) of the students. Field trips for "Classifying leaves and grass" was named by six (4%) of the students as "worst thing." "Working with poison ivy at the rodeo grounds" was named by three (2%) of the students. A thoughtful "worst thing," was reported by five (3.2%) students who stated that it was, "learning about the harm we've done to the environment," and, "we should have been required to learn it a lot sooner." "There was nothing bad in the course" was entered by 19, or 12% of the students.

Whether or not students would recommend the course to a friend, and why they would, or would not, was considered to be another valuable indicator of how the course had been received. Also, any additional comments the students might have concerning the Natural Resources Course could be useful for assessing the course. Data compiled concerning these two measures of student reaction to the course, are presented in Table XXXXI.

Because these questions required written response, several of the students did not respond with a recommendation, (14 of the 157, or 9%) or comment about the course (23, or 15%).

Whether or not students would recommend the course to a friend, and why they would, or would not, was considered to be another valuable indicator of how the course had been received. Also, any additional comments the students might have concerning the Natural Resources Course could be useful for assessing the course. Data compiled concerning these two measures are presented in Table XXXXI.

The vast majority of the responding students (143, or 91%) stated that they "would recommend the course to their friends." Of the specific recommendations, the highest ranking response was; "It was a fun course," with 36, or 23% of the students so responding. "It was an interesting course," was the second-ranked response, with 33 (21%) of the students entering this response. "It is an important area that everyone should learn about," was the response with the next highest frequency, with 23, or 15% so responding. "We learned a lot in the class," was next most often reported, with 17 (11%) of the students reporting such. "It was an easy class," was ranked next, with ten (6%) of the students so indicating. "We get to learn about the environment" was cited by seven (5%) of the students polled. "Holding class outdoors" was named with the next highest frequency, with five (3%) of the students reporting in this category. "We get to be in FFA," was named by three (2%) of the students in recommendation to their friends. "It was a very educational class," "the class isn't just Ag as usual," "we learned a lot about

TABLE XXXXI

SUMMARY OF WHETHER OR NOT STUDENTS WOULD RECOMMEND THE COURSE TO FRIENDS, REASONS FOR RECOMMENDATION, AND ADDITIONAL REPORTED COMMENTS

Recommendations and Reasons; Additional Comments	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
	n=9	n=36	n=30	n=45	n=37	157	
Yes - Recommendations:							
a. It was a fun course	3	5	4	16	8	36	23
b. An interesting course	4	2	13	8	6	33	21
c. Important for everyone	1	7	1	6	8	23	15
d. Learned a lot	0	10	1	2	4	17	11
e. An easy class	0	5	0	3	2	10	6
f. Learn about environment	0	1	0	2	4	7	5
g. Classes outdoors	0	4	1	0	0	5	3
h. Get to be in FFA	0	0	0	3	0	3	2
i. Very educational class	0	0	1	0	1	2	1
j. Not just Ag as usual	0	0	1	1	0	2	1
k. Learn about wildlife	0	1	0	1	0	2	1
l. A good teacher	0	0	0	2	0	2	1
m. Nature teaches well	0	0	1	0	0	1	.6
Totals-Yes Recommendations	8	35	23	44	33	143*	91
No - Recommendations:							
a. Friends not interested	0	0	0	1	2	3	2
b. A boring class	0	1	0	0	1	2	1

TABLE XXXXI (Continued)

Recommendations and Reasons; Additional Comments	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
	n=9	n=36	n=30	n=45	n=37	157	
No-Recommendations (cont.)							
c. Don't learn much	0	0	2	0	0	2	1
Totals- No-Recommendations	0	1	2	1	3	7*	5
Positive-Additional comments							
a. Great class	0	1	1	1	1	4	3
b. Good class	1	0	0	0	2	3	2
c. Fun class	0	1	1	0	0	2	1
d. Interesting class	0	1	0	0	1	2	1
e. Everyone needs it	0	1	0	0	1	2	1
f. We need to save Nature	0	0	0	0	1	1	.6
g. Pretty cool class	0	0	0	1	0	1	.6
h. Should keep the course	0	0	0	0	1	1	.6
Totals-Positive Comments	1	4	2	2	7	16*	10
Critical-Additional Comments							
a. Need more outdoor time	0	0	0	1	2	3	2
b. Curriculum needs work	1	0	2	0	0	3	2
c. Should drop the course	0	1	0	0	0	1	.6
Totals-Critical Comments	1	1	2	1	2	7*	5

* Many students entered no response

wildlife," and "the teacher is good," were each named by two, or 1% of the students as their recommendation to friends. "Nature teaches us well about the problems we face," was a related response, given by one (.6%), as a recommendation for the course. The total of yes recommendations was 143, or 91% of students polled.

A total of seven, or 5% of the students indicated they would give "No- Recommendations," to their friends. The reasons the students would not recommend the course were also provided. The most frequent response was; "My friends are not interested in this area," was given by three (2%) of the students. "It was a boring class," was the summation of two (1%) of the students. Also reported by two (1%) of the students was; "You don't learn much in the class."

The additional comments from students were divided into "positive comments," and "critical comments," and headed as such in the table. The top-ranked positive comment was; "It was a great class," with four (2.5%) of the students reporting such. "It was a good class," was reported by three (2%) of the students. "It was a fun class," "it was an interesting class," and "everyone needs to have this class," were all named by two (1%) of the students as positive additional comments. "We all need to do our part to help save the environment and Nature," "It was a pretty cool class," and "the school should keep the

Natural Resources class," were each entered by one (.6%) student as positive comments.

The critical comments were headed by a response echoing a common theme found throughout the study; that of; "we need more of the outdoor study and activities," with three (2%) of the students so indicating. "The curriculum needs to be edited and revised," was an equally-ranked critical comment, with three (2%) reporting such. One student (.6%) remarked, "The course should be dropped." The total for critical additional comments was seven, or 5% of the students. The total of all additional comments rendered was 23, or 15% of the students in the study.

Overall Instructor Views

One of the study's overall objectives was to determine the instructors' perceptions of the Natural Resources Program overall. In addition to the various items of the teacher questionnaire, it was deemed appropriate to include the following question items to elicit teachers' responses toward the overall objective. Items were entered to determine: what were teachers' perceptions of school administrators' reactions to the Natural Resources course, and what one factor did teachers feel would most affect the future success off the Natural Resources course in Oklahoma.

The presentation of data, and in regard to perceptions of administrators' reactions are presented in Table XXXXII.

TABLE XXXXII

SUMMARY OF TEACHER PERCEPTIONS OF SCHOOL ADMINISTRATORS' REACTIONS TO THE NATURAL RESOUCES COURSE

Perceived Reactions	Frequency by Supervisory District					Totals	
	NW	SW	C	NE	SE	N	%
Positive	2	4	5	3	3	17	77
Neutral	1	1	0	1	2	5	23
Negative	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Totals	3	5	5	4	5	22	100

By far, the most reported perceived administrator reaction was "Positive," with 17, or 77% of the instructors so indicating. The response reported with the next high frequency was a "Neutral" administrator reaction, with five (23%) of the instructors reporting in this category. There were no responses recorded in the "Negative" reaction area of the administrators, or in the "Other" category.

Table XXXXIII contains data concerning instructor views on factors they felt would most influence the future success of the Natural Resources course in Oklahoma.

According to 11, or 50% of the instructors, "Teacher Interest, Training, and Preparation," will most influence

TABLE XXXXIII

SUMMARY OF INSTRUCTORS' VIEWS ON FACTORS WHICH WILL MOST INFLUENCE FUTURE SUCCESS OF THE NATURAL RESOURCES COURSE IN OKLAHOMA

Factors	Frequency By District					Totals	
	NW	SW	C	NE	SE	N	%
Teacher Interest/Training	2	3	2	2	2	11	50
Curriculum Improvement	1	0	1	1	3	6	27
Student Interest/Enrollment	0	1	2	1	0	4	18
Continued State Funding	0	1	0	0	0	1	5
Public Interest/Support	0	0	0	0	0	0	0
Totals	3	5	5	4	5	22	100

the future success of the Natural Resources course. "Curriculum Enhancement, and/or Improvement" was considered by six, or 27% of the instructors to be the next most influential future success factor. The factor ranked next was "Student Interest, and/or Enrollment," with four teachers, or 18% so responding. "Continued State Funding" was ranked next, with only one teacher, or 4.6% reporting such. "Public Interest and Support," was not entered by the instructors as a factor that would most influence future success of the program.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The Introduction to Natural Resources program of instruction was added to the secondary Agricultural Education curriculum in Oklahoma in the Fall of 1990. This study was undertaken in the Spring of 1991, to assess, evaluate, and report the reactions of the principal participants to the workings of the newly implemented course.

The intent of this chapter is to present a digest of the purpose, objectives, basis, design, scope, and ascendant, relevant findings of the study. The major findings, along with related conclusions and recommendations, are also included in this chapter.

Purpose

The purpose of this study was to ascertain the perceptions held by selected students and instructors of the Introduction to Natural Resources program of instruction.

Objectives

To effect the purpose, a three-tiered system of objectives was formulated. The first level consisted of the following overall objectives:

1. To facilitate the teacher-evaluation of student perceptions of the Natural Resources course; and

2. To determine the instructors' perceptions of the Natural Resources program of instruction overall.

Instructor-specific objectives were the second level and provided impetus:

1. To describe instructor demographics, orientation, and background information;

2. To relate their views on teaching the curriculum;

3. To report activities they thought were effective;

4. To determine what teaching methods and materials they thought were useful and productive, and;

5. To determine the purposes for adopting the course.

Finally, a set of student-specific objectives were developed as follows:

1. To describe certain relevant demographic and background information about the students;

2. To relate their reactions to the curriculum;

3. To report activities they thought were interesting, or helpful in understanding the lessons;

4. To determine what they considered significant, of what was learned in the course, and;

5. To designate their purposes for taking the course.

Basis of the Study

The basis of the study was, that in considering the newly installed Natural Resources component of Agricultural Education in Oklahoma, three main areas of program-related contention were noted. These were deemed critical factors to be considered. The three areas are listed as follows:

1. Conflicting reports concerning how well, or how poorly the program was supplying the students with essential knowledge, attitudes, and skills in environmental realms.

2. No other formal evaluative efforts to determine perceptions of this important area of instruction, had hitherto been extended.

3. There had been expressed concerns, statewide, relating to the need for information concerning instructional methods, prepared curriculum materials, background preparation, employed practices, and selected activities included in course instruction.

Therefore, this study was undertaken to address the issues named above, and whether or not effective instruction was being offered to the students enrolled in the course. As well, details were sought regarding procedures and practices associated with the teaching of the new Natural Resources Program in Oklahoma.

Design of the Study

The design of the study was as a descriptive survey of a group of randomly selected schools, with the data compiled from responses of the instructors, and students of schools selected. The review of literature revealed that evaluative research concerning agriculturally-oriented natural resource and conservation education was limited, at best. Therefore, adaption of environmental education designs and methodology seemed to be the most practical avenue of procedure, toward the fulfillment of the purpose and objectives of the study.

It was determined, through extensive literature review, and discussion with the advisory committee, that to best obtain meaningful data for the preliminary evaluation of the new Natural Resources program, the parties most involved should be the principal sources. The perceptions of the involved parties of both groups, were assessed through the use of two specifically designed questionnaires. The questionnaires were both constructed so as to elicit responses that would lend to achieving the overall, as well as the instructor-specific and student-specific objectives sought in the study. Most of the question items were of the forced-choice type, with some open-ended items that required written-in responses. The data were analyzed through the use of descriptive statistical treatment, displayed in frequency distribution tables, and/or presented in a narrative format.

Scope and Population of the Study

The scope of this study encompassed 37 randomly selected schools selected from 260 schools that had incorporated the Natural Resources program into their Agricultural Education course offerings for the 1990-91 school year. There were two separate and distinct populations in the study. The instructors comprised one population, and in accordance with selected schools, totaled 37. Of the number originally selected, there were 22 respondents, or 59.5%. The corresponding potential student population was 475, however, the schools responding provided 157 student participants, or 33% of potential.

All five educational districts were represented in the sampling. Five departments were selected from the Northwest, but only three responded. Seven programs were selected from the Southwest district, with five responding. Eight others were selected from both the Central and Northeast districts, with five responding from the Central, and four from the Northeast. Nine schools were randomly selected the Southeast district, with five responding.

A possible explanation of the relatively low response rate was that questionnaires were sent the second week of May, which is generally the last week of school. Many of the schools that did not respond were having finals, and Senior Skip Days, and the like, when the mailed-out questionnaires arrived. Some schools had already dismissed for the summer.

Major Findings of the Study

The presentation of the major findings of the study was made in accordance with the division of the two population groups, the instructors and the students, and in alignment with the tandem system of objectives. The format and sequence of the respective questionnaires directed the order in which the findings were reported.

Demographic and Background Information

General Population Characteristics

Several general characteristics of the population were determined. A summary of these is presented below.

1. There were 37 schools randomly selected from 260 in Oklahoma which had expressed intentions to teach the Natural Resources course for SY 1990-1991. Of the 260, the Northwest district had 50 (19.2%), the Southwest-53 (20.4%), the Central-41 (15.8%), the Northeast-53 (20.4%), and the Southeast district had 63 (24.2%).

2. Of the 37 schools originally selected, three, or 8.1% reported the course had not been taught. Another two instructors, or 5.4% of the total, indicated they would not participate in the study. One (2.7%) other instructor polled, reported school was already out. Fortunately, six alternate choices had been randomly selected at the same time as the original 37. Therefore, these were substituted for the six non-participating schools mentioned

in the original sample. Of the 37 schools finally selected five were from the Northwest district, seven from the Southwest, eight from both the Central and Northeast, and nine came from the Southeast district.

3. The populations yielded by the 37 schools selected were: 37 instructors, and 475 students. These figures reveal a mean student/teacher ratio of 12.84 to 1.

Instructor Characteristics

In order to characterize the instructors who responded, a summary of several items of data are presented.

1. The mean age of the 22 responding instructors was 35.95 years. The median age was 34.5 years, with bimodal ages of 36 and 41, each reported twice. The range in age was from 24 to 52 years. The standard deviation was 7.58, and the variance was 57.41.

2. The mean years of teaching experience for the 22 instructors was 11.23. The median for years teaching was 11.0. The range was from one year to 31 years of teaching. The standard deviation was 6.97, with a variance of 48.63.

3. Of the 22 respondent instructors, three were from the Northwest, five from the Southwest, five from the Central, four from the Northeast, and five from the Southeast.

4. Of the 22 responding instructors, 15, or 68.2% reported they farmed or ranched, at least part-time.

5. Eleven of the twenty-two (50%) reported they hunted regularly, in season.

6. A slightly larger number of the instructors, 13, (59.1%) reported they fished regularly.

7. Of the respondents, 16, or 72.7% indicated they were involved with gardening activities.

8. In reporting representative of the schools, 18 (81.8%) indicated they had access to outdoor teaching facilities.

9. Adult AgEd Programs were reported by 11 (50%) of the instructors.

10. Of those 11 instructors which reported having an Adult Program, three, or 13.6% of all the respondents, reported including instruction in Natural Resources in their Adult Education Programs.

11. When asked what their Agricultural Education program was most noted for, 14, or 63.6% reported that theirs was a well-rounded program. Exhibition activities were selected by four (18.2%) of the instructors. Judging activities were reported by three (13.6%) of the instructors. Academic achievement was cited as the strong area of the program, by one, or 4.6%. None of the instructors indicated their program was best known for Leadership Activities.

12. In reporting the various types of special

training that the instructors had received in regard to teaching Natural Resources; 18, or 81.8%, stated that they had received training via the 1990 Summer In-Service Workshop. Ten, or 45.5% reported receiving relevant training through college production-type courses. Eight, or 36.4%, mentioned experience in the general area of resource management. Specific courses concerning Natural Resources were reported by two, or 9.1%. Extension Service, or Soil Conservation Service seminars and workshops were also named by two (9.1%); and one (4.6%) reported watching Nature programs on OETA public television, as special training for the course.

Student Characteristics.

The investigation yielded a number of characteristics of the student respondents. These are presented in summary form below.

1. The mean age of the 157 students in the study was 16.93 years. The median age was 17.0 years. The range was from 14 to 19 years, with a standard deviation of 1.1, and a variance of 1.21.

2. The mean years in FFA was 2.44. The median number of years in FFA was 3.0, with a range from zero to five years of FFA involvement. The standard deviation was 1.26, and the variance was 1.59.

3. Of the 157 students, 5, or 3.2%, were Freshmen; 24, or 15.3%, were Sophomores; 53, or 33.8%, were Juniors.

The Seniors numbered 75, or 47.8% of enrolled students.

4. Of the 157 student respondents, 47, or 29.9% were female, and 110, or 70.1% were male.

5. Of the 157 students polled, 118, or 75.2%, had taken Ag I prior to taking the Natural Resources course.

6. There were 98 of the 157 students, or 62.4%, that reported a Supervised Agricultural Experience Program. Of those, 86, or 54.8% of the 157, reported traditional SAEP's, while 12, or 7.6%, reported SAEP's related to Natural Resources or Conservation.

7. Of the 157 respondent students, 134, or 85.4% reported participation in FFA activities, leaving 23, or 14.6% not reporting involvement. Activities reported in ranked order of response frequency were: help with activities-134 (85.4%), show livestock-89 (56.7%), judge livestock-66 (42%), soils-land judging-59 (37.6%), leadership training-48 (30.6%), chapter officer-47 (29.9%), public speaking-33 (21%), State Degrees-Awards-26 (16.6%), parliamentary procedure contests-19 (12.1%), plants-crops judging-14 (8.9%). Under the other category, each of the entries were reported by one student, or .6% of the total. Those activities reported were: meats judging, dairy foods, ag mechanics, farm business management, and a State Sweetheart candidate. Five of the students, or 3.2%, reported involvement in all eleven categories listed.

8. Of the 157 students polled; 56, or 35.7%, reported that there was no reaction by their parents to the Natural Resources course; 54, or 34.4%, reported their parents as interested and supportive; 31, or 19.8%, reported their parents thought it was okay; 14, or 8.9%, indicated their parents would probably like it, if they were told about it; and two, or 1.3%, reported their parents seemed not to like it much.

9. The students reported the sources from which they felt they had learned the most about Natural Resources and the environment, with the following division frequencies: through the Natural Resources course-67 (42.7%); through books, magazines, and television shows-42 (26.8%); by camping and other outdoor experiences-29 (18.4%); from their teachers-14 (8.9%); and five, or 3.2% reported they learned the most from parents.

Implementation of the Natural Resources Course

Instructors' Views of Course

Reasons for Adding. The 22 responding instructors entered the following data in response to the main reason for adding the Natural Resources course. The highest ranking response, with eight, or 36.4%, was the instructor's personal interest. Public interest was ranked next, with five, or 22.7% of the instructors reporting it. There were three categories tied, each with 3, or 13.6%.

The three categories which three instructors reported in each were: Student interest, financial incentives, and under Other. Each of the three entries under Other were concerning the updating process of the curriculum, and the resultant change in course offerings. The response choice; supervisor's suggestion, was not applied.

Perceptions of Purpose and Effectiveness of Course. The instructors' perceptions of the main purpose of the course, and their perceived effectiveness toward achieving the stated purposes were reported as follows: The purpose indicated with the most frequency was; to develop awareness concerning the environment, with 11, or 50%, so responding, giving themselves an "average" grade, C in achieving the purpose. To inform students about Natural Resources use, was the response with the next highest frequency, with six, or 27.3% reporting the purpose, and giving themselves "good," or B for a grade. The development of environmental responsibility, was the next ranked purpose response, with five, or 22.7% of the instructors responding, and also giving themselves "good," or B for a grade. The responses; to develop skills in solving environmental issues, to develop Natural Resource occupational competencies, and responses under other; were not chosen. The overall mean grade given for effectiveness to achieving the stated purpose was 3.36, "average," or a C.

Students' Views of Course

Reasons for Enrolling. The responses given by the students as to their main reason for taking the course are as follows: "Sounded interesting" was the highest frequency response, with 85, or 54.1% of the students indicating it as the main reason. "Needed another class" was next ranked, with 37, or 23.6% reporting. "Teacher's suggestion" was next highest, with 20, or 12.7% entering the response. "Friends taking it" was the next ranked response, with 13, or 8.3% reporting this as the main reason. "Publicity concerning environmental issues" and, "My brother told me to take it.", were each reported by one, or .64% of the students.

Perceptions of Main Purpose of Course. The 157 students perceptions as to the main purpose of the Natural Resources course are reported as follows: The top-ranked perceived purpose reported by the students was, "To inform students about Natural Resource use" with 51, or 32.5%. "To develop awareness concerning the environment" was next ranked, with 50 (31.8%) of the students so responding. "Development of environmental responsibility" was the response given with the next highest frequency, with 26 (16.6%) reporting thus. "To develop skills in solving environmental issues" was next ranked, with 15 (9.6%) so responding. "To develop related occupational competencies" was next, reported by seven, or 4.5% of the students.

Under the Other category, two groups of similar responses were written-in, "All of the above", with five, or 3.2% of the students registering in the category. "To update," or "To make Ag classes better", was written-in by three, or 1.9% of the students as the main purpose of the course.

Views of the Curriculum

Instructors' Views

Ratings of Curriculum. The 22 instructors rated (graded) the Natural Resources curriculum with the following frequencies and corresponding grades: The grade of "average," C, was selected by nine, or 40.9% of the instructors. "Good," or B, was reported by six (27.3%). "Passing," or D, was the mark given by four (18.2%) of the instructors polled. "Failing," E, was entered by two, or 9.1% of the instructors. "Excellent," A, was the response of one, or 4.6% of the instructors. The overall mean score was 3.0, yielding a rating of average, or a C.

Grade Level. The instructors views on what grade level the curriculum was best suited for, are summarized as follows: The tenth grade, was selected by 11, or 50% of the instructors. The 11th grade, was chosen by five (22.7%) of the instructors. The eighth grade, was picked by three (13.6%) of the instructors. The ninth grade, was the choice of two (9.1%) of the teachers, as the optimum grade. The 12th grade, was reported by only one, or 4.6% of the instructors, as the grade the curriculum was best suited

for. The overall mean score was 2.86, placing the mean grade level of the instructors polled, at the tenth grade.

Difficult and Helpful Factors in Teaching the Course. As a part of the assessment of instructors' views of the curriculum, they were asked to indicate factors which made it the most difficult to teach the course. Those factors presenting the greatest problems, listed in order by the distribution of choices by the instructors are as follows: Lack of Materials (seven-31.8%); Lack of Training in the Field (six-27.3%); Lack of Time for Preparation, Teaching, and Activities (five-22.7%); Lack of Student Interest (two-9.1%); and Class Size (2-9.1%).

The instructors were also asked to name factors which were helpful for teaching the course. The helpful factors, also listed in order by distribution of choices of the teachers were: The Teacher's Own Interest (nine-40.9%); The Prepared Curriculum (six-27.3%); Student Interest (four-18.2%); Other, including Materials Obtained from SCS and Contests Associated with the Course (one each-4.5%); Listed Resources (one-4.5%); and Requested Materials (one-4.5%).

Effectiveness in Teaching Units. The 22 instructors were asked to indicate their perceptions of the effectiveness with which they taught the units of the curriculum. Those with which they had been most effective, arranged in order by distribution of responses, were as follows:

Wildlife Management 12-56.4%); Land Management (seven-31.8%); Water Resource Management (two-9.1%); and Introduction to Natural Resources (one-4.6%). Units which received no most effective ratings from teachers included: Habitat Management, Outdoor Recreation, Energy Resource Management, Forestry, and Air Resource Management.

Those units with which instructors felt they were least effective, again presented in order by distribution of responses were: Air Resource Management (seven-31.8%); Forestry (six-27.3%); Energy Resource Management (four-18.2%); Habitat Management (two-9.1%); and Outdoor Recreation, Water Resource Management, and Land Management, each receiving one (4.6%) response.

Level of Interest of Units to Students. The instructors' assessments of the units of the curriculum which were of most and least interest were collected. A summation of the data regarding units of most interest to students, arranged by distribution of instructor responses, is as follows: Wildlife Management (14-63.6%); Outdoor Recreation (three-13.6%); Land Management (two-9.1%); and Water Resource Management, Energy Resources, and Forestry, each was rated of most interest to students by one teacher (4.6%).

The units which the instructors felt students were least interested, again ordered by the distribution of responses, were: Forestry (five-22.7%); Energy Resources,

Land Management, and Water Resource Management, were each designated by four instructors (18.2%); Air Resource Management (three-13.6%); and Introduction to Natural Resources (two-9.1%). Receiving no responses were the units of Wildlife Management, and Outdoor Recreation.

Units Not Taught. The instructors were asked to indicate which units were not taught. These are reported as follows: Of the nine units of the curriculum, the unit reported not taught with the most frequent response rate, was Energy Resources, with six (27.3%) thus reporting. Forestry, was reported with the next highest rate, with five (22.7%). Air Resource Management, was reported not taught by four, or 18.2% of the instructors. Habitat Management, was the response of two (9.1%) of the instructors. Introduction to Natural Resources unit, was reported not taught by one (4.6%) of the instructors. None of the instructors reported not teaching the units on Water Resource Management, Land Management, Wildlife Management, and Outdoor Recreation. Eight (36.4%) instructors reported they taught all nine units.

Students' Views

Ratings of Curriculum. The "grades" the students gave the curriculum are reported as follows: The response with the highest frequency was, "Good," or B, with 73 (46.5%). "Average," or C, was given by the next largest number, with 35 (22.3%) giving it. "Excellent," or A, was

next highest frequency grade, with 26 (16.6%) reporting. Failing grades, were next, with 12, or 7.6% so grading. "Passing, was the least reported grade, with 11 (7.0%) with 11, or 7.0% reporting it. The overall mean grade score was 3.64, placing it in the Good, or B range.

Level of Difficulty of Curriculum. The student perceptions of the difficulty level of the curriculum are summarized as follows: The largest segment of the student population, or 112 (71.3%), reported the level as; "About right." The response with the next highest frequency was "Easy," with 36 (22.9%) reporting it as such. "Hard" was reported by 12, or 7.6% of the students. The overall mean score for the level of student perceived difficulty of the curriculum was 1.8, in the "About Right" range.

Extra References Used. The student recollections of the number of reference books used in the course, in addition to the curriculum, are reported as follows: The largest segment of the respondents, or 105 (66.9%) indicated "1 to 4" extra reference books were used. The response with the next highest frequency was, "None," and was reported by 25, or 15.9%. The response with the next highest frequency was "5 to 7," with 21 (13.4%) reporting in the range. The two responses reported with the least frequency were; "7 to 10," and "more than 10," with each reported by three, or 1.9% of the students.

Most Interesting Unit. The students' views of the unit in the curriculum that was the most interesting were solicited. Wildlife Management, was the highest ranking response, with 68 (43.3%) of the students so indicating. Outdoor Recreation, was next ranked, with 46 (29.3%). Land Management, and, Habitat Management, were each responded to with the next highest frequency, of nine, or 5.7%. Water Resource Management, and, Forestry, were each responded to by eight (5.1%) of the students. Introduction to Natural Resources was picked by five, or 3.2% of the students. Air Resource Management, and, Energy Resources, were each responded to by two (1.3%).

Perceptions of Time Spent on Units. The students were asked to indicate which units of the curriculum they spent the most, and the least time on in the class. The responses reporting the units students felt the most time was spent in covering, are listed in order by the distribution of choices and are presented as follows: Wildlife Management (39-24.8%); Land Management (32-20.4%); Air Resource Management (16-10.2%); Water Resource Management (15-9.6%); Introduction to Natural Resources (15-9.6%); Forestry (15-9.6%); Energy Resources (11-7.0%); Habitat Management (seven-4.5%); and Outdoor Recreation (seven-4.5%).

The units which the students felt the least time was spent covering are also listed in order by distribution of choices and were: Forestry (41-26.1%); Air Resource Management (28-17.8%); Outdoor Recreation (20-12.7%); Introduction to Natural Resources (17-10.8%); Habitat Management (16-10.2%); Energy Resources (14-8.9%); Land Management (nine-5.7%); Water Resource Management (seven-4.5%); and Wildlife Management (five-3.2%).

Units Not Covered. Student recollections of units of curriculum that were not covered were compiled. As a result, it was found that Energy Resources was named most frequently as a unit not covered, with 48 (30.6%) of the students so responding. Forestry was reported not covered by 32 (20.4%) of the students. Air Resource Management was reported by 22 (14.0%) of the students. Water Resource Management was reported by seven (4.5%). Outdoor Recreation was also reported as not covered by seven, or 4.5%. Wildlife Management was reported not taught by five (3.2%) of the students. Land Management and Introduction to Natural Resources, were each reported by four, or 2.6% of the students. Habitat Management, was reported not taught by two (1.3%) of the responding students.

Perceptions of Activities

Instructors' Views

Increased Student Interest from More Awards and Events. The instructors were asked for their views on the amount of increase in student interest, that would come from adding more resource-related awards and events. "Some" and "Quite a Bit" were each reported with the highest frequency with six (27.3%) of the instructors responding. "A lot" and "Very little" were also reported by the same proportion of teachers, four (18.2%). "None" was the response of two (9.1%) of the instructors.

Preferred Awards and Events. The instructors' expressed preferences for additional resource-related awards and activities were investigated. The response with the highest frequency was "no activities" with nine (40.9%) of the instructors so indicating. "Interscholastic type activities" was reported by four (18.2%). "An FFA Natural Resources Speech Division," and "an award similar to the Star Farmer in Natural Resources," were each suggested by two (9.1%) of the instructors. Three specific areas of an Interscholastic-type competition were each named by one (4.6%): "a written Natural Resources test," "Certain types of issue awareness problems," and, "a varied specimen identification contest." "A fishing tournament" and, "Archery and/or Trap shooting contests," were each suggested by one, or 4.6% of the responding instructors.

Interesting and Helpful Activities. The instructors' views of activities employed in the course that were interesting and helpful to the students were analyzed. The response with the highest frequency was "Field trips," (in general) with eight (36.4%) of the instructors writing-in this type of activity. The specifically named types of field trips, listed in ranked order, were: "Game preserves and refuges," mentioned by three (13.6%) teachers. "Trips to a Recycling center," "Leaf collection outings," "Testing area fish for residues and parasites," and "Water testing of area lakes and streams," were each reported by two (9.1%) of the instructors. "Testing area soils," "trips to a landfill," "a tour of a Nuclear generating plant," "a trip to an Ostrich farm," "Game bird raising and release," "Forestry contests," and, "a Fishing tournament," were each mentioned by one (4.6%) teacher.

Under the classroom activities heading, "Natural Resources problem-solving exercises," were reported by three, or 13.6%. " VCR tapes about Nature," "a Hunter safety course," and "guest speakers," were each named by two (9.1%) of the instructors. "Oral reports on wildlife research," "building projects, such as bird feeders and houses and observation stands," "taxidermy in class," and "making Natural Resource awareness Posters," were each named by one (4.6%) of the instructors.

Student Views

Resource Persons in the Class. Student recollections of resource personnel giving presentations in class were collected. Fish and Wildlife Service personnel, were named with the most frequency, with 63 (40.1%) of the students reporting them. Soil Conservation Service personnel were named with the next highest frequency, with 46 (29.3%) reporting such. Water Management personnel were named by 26 (16.6%) of the students. Forest Service personnel were reported by 18 (11.5%). Environmental Protection Agency personnel were named by 12 (7.6%). Under the "other" category, there were two entries, one was, "No guest speakers," with 44 (28.0%) reporting such, and "the Oklahoma Highway Patrol Gun Safety Course," with two (1.3%) of the responding students reporting in the category. The grand total of recollected presentations by resource persons was 211.

Video Tapes Used. The student recollections of the number of video tapes (VCR's) watched in the Natural Resources class, when compiled, and computed, disclosed that on the average, 7.5 tapes were viewed in class during the year.

Outdoors Class Time. The student perceptions of the amount of time the Natural Resources class was held outside were compiled. "Less than 10%" of the time, was the most frequent response given, with 49 (31.2%) of the students

reporting such. The next most frequent response was, "20 to 30%" of the time, with 39 (24.8%) reporting that. "More than 30%" of the time, was reported by 28, or 17.8%. The next most frequent response was "10 to 20%" of the time, with 25 (15.9%) so indicating. Only 16 (10.2%) of the students reported that the class "Never" met outdoors.

Interesting or Fun Activities. Students were surveyed to determine their recollections of interesting or fun activities that helped them to better understand Natural Resources and conservation. The types and magnitude of their responses are as follows: "Land Judging activities" (23-14.7%); "Field trips," in general, (21-13.4%); Specific field trips, including "Fishing trips" (22-14.0%); "Collection and identification outings" (16-10.2%); "Outdoor Studies" (14-8.9%); "Hunting and camping trips" (eight-5.1%); "Studying area fish" (seven-4.5%); "Visiting a Game Preserve/Refuge" (six-3.8%); "Forestry activities," "Water sampling," and "Nature Walking Talks" each (four-2.6%); "Wildlife observation" (three-1.9%); "A Soil Conservation Service contest," "a tour of the Kerr Arboretum," and, "Mapping wildlife habitat areas" each (two-1.3%); "A trip to a State Park," "a tour of a Strip mine," "a tour of Nuclear generating plant," "a trip to a recycling center," and "excursions to a Shooting range" each (one-.6%).

Under the heading of classroom activities, "VCR tapes about Nature," were the most frequent student responses, with 11 (7.0%) reporting them. "Oral reports on wildlife research" were named by eight (5.1%). "Class Discussion" was named by four (2.6%). "Having live animals in class," and "Building Nature projects" were each reported by three (1.9%). "Resource personnel giving presentations," "Taxidermy in class," and "a Hunter safety certification course" were each named by two, or 1.3% of the students, as interesting, helpful activities. "No interesting activities" was the entry of seven (4.5%). "We actually got to do something to help preserve Nature," and "I thought the hands-on experiences were helpful," were also responses of one (.6%) student each. All together, there were 31 different activities named in 189 responses.

Teaching Methods and Materials

Instructors' Views

Methods of Testing. The responses of the 22 instructors in regard to the methods of student evaluation used in the course, were registered, A combination of "prepared tests" taken from the curriculum, and "teacher-constructed exams" were reported with the most frequency, 16 (72.7%) of the instructors. "Prepared tests" only, were reported used by four (18.2%) of the instructors. "Teacher-constructed exams" only, were reported used by two (9.1%).

Outdoor Class Time. The instructors' estimates of the amount of time they held the Natural Resources class outdoors and whether or not they had access to outdoor teaching facilities, were collected. "Less than 10%" of the time was spent teaching the course outdoors was the most frequent response, with nine (40.9%) of the instructors so indicating. Of those nine, six (27.3% of all the teachers) reported outdoor teaching facilities. The next most frequent response was, "10 to 20%" of the time," with six (27.3%) reporting such, with six (27.3%) of these reporting outdoor facilities. From "20 to 30%" of the time was reported by three (13.6%), with all three reporting having access to outdoor facilities. "More than 30%" of the time was also reported by three (13.6%) of the instructors, and all three (13.6%) also reported having outdoor facilities. Only one (4.6%) of the instructors, reported "Never" teaching outdoors, and also reported not to have access to outdoor teaching facilities. The total number of instructors who reported holding class outdoors, more than 10% of the time was 12, or 54.5%. Those reporting, less than 10% of the time numbered ten, or 45.5%. The number of schools with outdoor teaching facilities was 18, or 81.8%.

Time Spent Teaching Units. The instructors' accounts of the amount of time spent teaching each of the units were compiled.

The Introduction to Natural Resources unit, was typically taught from "3 to 8 days." The unit on Water resources management, was also generally taught for "3 to 8 days." The Land management unit was typically taught for "2 to 3 weeks." Wildlife management, on the average was also taught for "2 to 3 weeks." Habitat management, was also most prevalently reported taught for "2 to 3 weeks." Outdoor recreation, Forestry, Air resource management, and, Energy resources, were all typically taught for "3 to 8 days."

Teaching Methods and Effectiveness. Data were collected regarding the frequency of teaching methods used and which of these were considered by instructors to be most effective and least effective. "Discussion" was the method reported used most often, by the most instructors, ten (45.5%), considered most effective by two (9.1%), and least effective by one (4.6%). "Lecture" was reported used most often by seven (31.8%), considered most effective by none, and least effective by 14 (64%). "Demonstrations" were reported used most often by three, (13.6%) most effective by five, (22.7%) and least effective by two (9.1%). "Experimental discovery and problem-solving" was reported used most often by one (4.6%), most effective by four (18.2%), and least effective by three (13.6%) of the instructors. Field trips, were reportedly used most often by only

one (4.6%), were considered most effective in Natural Resources instruction by eight (36.4%), and with none considering it the least effective method. "Guest speakers" were reported used most often by none, as most effective by two (9.1%), and least effective also by two. "VCR tapes" were written-in under other, and were reported used most often by none, considered most effective by one (4.6%), and least effective by none.

Continuation of the Course. The reported intentions of the instructors to teach the Natural Resources course next year, and the proposed changes they will make, were compiled. Of the 22 responding instructors, 18, or 81.8% indicated that they will teach the Natural Resources course next year. Four, or 18.2% indicated they would not teach Natural Resources next year. However, three of these four teachers reported the course was only offered every other year.

The changes to be made were headed by, "Changes to the curriculum," with ten, or 45.5% of the instructors reporting in the category. Specific changes mentioned were; "to add more outside reference material," "to update the material," "to upgrade the material," and "to make it more age-appropriate." "More In-Service training is necessary.", was the response of five, or 22.7% of the instructors. "Planning more outdoor activities, and organizing them better.", was reported by four (18.2%).

"More experimentation and research," was the intent of three (13.6%) of the instructors. "Involving more Resource Persons", "more Wildlife studies", "Need to limit the size of the class.", and, "Adding a hunter certification and safety course.", were each reported by two (9.1%) of the instructors. "To insist that the students all have Ag I before this class," and "More and better VCR tapes," were each reported by one (4.6%) of the instructors.

Significance of Subject Matter

Student Views

Importance of Concepts. Perceptions of the responding students as to the significance of selected concepts related to the field of Natural Resources were collected from their responses to a five-point scale. The highest rated concepts were classified in the "Quite a Bit of Importance" category and included the following: "Learning how to preserve wildlife habitat" (4.04); "Developing skills to help prevent resource problems" (3.91); "Offering hunter safety and sportsmanship courses" (3.90); "Developing skills in identifying wildlife" (3.87); "Learning methods of conserving water" (3.79); "The study of local resources and environmental issues" (3.76); "Learning about occupations in the Natural Resource field" (3.75); "Learning what is and is not recyclable" (3.71); and "Educating everyone concerning wise resource use" (3.67).

The remainder of the concepts were rated "Some Importance" and encompassed the following: "The study of inter-relationships in all areas of Nature" (3.38); "The study of economic factors in conservation" (3.33); "Study of sustainable agricultural production practices" (3.28); "Developing piscatorial skills (fishing)" (3.12); "Learning how to plant trees" (3.11); "Developing collecting, sampling, and analysis skills" (3.11); "Skills in using communications media in environmental issues" (3.05); and "Learning how to identify trees" (3.01).

Student Comments. The written-in commentary views of the students concerning the "best thing," and "the worst thing" about the Natural Resource course, were grouped and recorded by commonality of response, due to the rather lengthy list and in order to expedite summarization.

A summary of the "best things" (those provided by nine or more of the students surveyed) was developed. This summary, along with the respective response rates is presented as follows: "Holding class outdoors" (24-15.3%); "The interesting things we learned" (15- 9.6%); "Wildlife study and management" (15-9.6%); "Going on field trips" in general, (13-8.3%); specific field trips mentioned, all totaled (19-12%); "Learning about the environment" (12-7.6%); "Learning environmental protection skills" (10-6.4%); and "Learning about area resource problems" (9-5.7%). Two students (1.3%) commented there

was "Nothing good about the class." In total, 151 "best thing" comments were gathered and were grouped into 25 different categories.

The major "worst things" inputs from the students (provided by eight or more) were summarized. These are included on the following list, ordered by the response rate for each: "Not enough time spent outdoors" (35-22.3%); "The classroom activities" (28-17.8%); "The curriculum books and materials) (13-8.3%); "Taking notes, Studying, and Taking tests" (11-7.0%) and "Boring classroom work" (8-5.1%). It was interesting to note that 19 students (12.1%) took advantage of the opportunity to indicate there was "Nothing bad in the Natural Resources Course." The students provided a total of 124 "worst thing" comments about the course. The researcher grouped these into 18 categories.

Overall Perspectives

Instructor Views

Perceptions of Administrators' Reactions. The instructors' views concerning the school administrators' reaction to the course, were compiled. Of the 22 instructors, 17 (77.3%) reported the perception that their administrator's reaction to the Natural Resources course was Positive. Five (22.7%) of the instructors, stated their administrator's reaction was Neutral. There were no reports of negative administrator reactions to the course.

Future Success Factors. The views of the instructors concerning the factors which will most influence the future success of the Natural Resources program, were summarized. These influences listed in order by the magnitude of the responses are as follows: Teacher Interest, Training, and Preparation to Teach the Course (11-50%); Curriculum Improvement and Enhancement (six-27.3%); Student Interest and Enrollment (4-10.2%); and Continued State Funding (one-4.6%). Public Interest and Support, surprisingly, was not perceived to be a factor influencing future success.

Student Views

Overall Grades. Students were asked to "grade" the course in Natural Resources. From their responses, mean grades were computed. The response entered with the highest frequency was; "Good," or B, with 84 (53.5%) of of the students so indicating. "Excellent," or A, was the next ranked response with 33 (21.0%) reporting such. "Average," or C, was given by 29 (18.5%) of the students. "Passing," or D, was assigned the course by only four, or 2.6% of the students, and no "Failing grades" were given. The overall mean "grade" given the Natural Resources course by the students was 3.72, "Good," or a B.

Recommendation of the Course to Friends. The willingness of students to recommend the course to their friends and their reasons for doing so were determined. While

some students did not respond, only seven (4.5%) indicated they would not recommend the course. A total of 143 students (91.0%) expressed that they would provide a positive recommendation. Their reasons for this, in order of the rates of response are as follows: "Yes, because it was a fun course" (34-21.7%); "Yes, it was an interesting class" (31-9.8%); "Yes, because it is important for everyone to know about it" (23-14.7%); "Yes, I learned a lot" (19-12.1%); "Yes, it was an easy class" (ten-6.4%); "Yes, we learned about the environment" (seven-4.5%); "Yes, because we had classes outdoors" (six-3.8%); "Yes, we learned about wildlife" (four-2.6%); "Yes, you get to be in FFA" (three-1.9%); "Yes, it is a very educational class," "Yes, it isn't just Ag as usual," and "Yes, he is good (looking) teacher" each by (two-1.3%); "Yes, because Nature teaches well" (One-.6%); Four students chose not to respond to the question item, in either the yes or no categories.

Only three types of non-recommendation responses were received. These, in ranked order are: "No, my friends aren't interested in this field" (three-1.9%); "No, it was a boring class" (two-1.3%); and "No, we didn't learn much" (two-1.3%).

Additional Comments. A few students provided comments at the end of their questionnaire. Those comments judged to be of a positive nature included: "It was a great

class"; "It was a good class"; "It was a fun class"; "It was an interesting class"; "Everyone needs to take the class"; "We all need to try and save Nature"; "We should keep the course"; and "It was a pretty cool class."

The critical comments included: "We need more time outdoors"; "The curriculum needs some work, to make it more interesting"; and "The course should be dropped." Considering the responses, the investigator regarded five of the six as actually constructive criticism, leaving only one truly negative comment.

Conclusions

Rawson and Miner(1986) recounted Henri Poincare's memorable quote and printed, "Science is built of facts the way a house is built of bricks; but an accumulation of facts is no more science than a pile of bricks is a house." It is the sincere hope of the researcher that the accumulated facts of this study have been assembled more in the fashion of a house, or more correctly, a foundation, than the described "pile of bricks."

It is the purpose of this segment of the chapter to "mix the mortar, affix the string line, and to assemble the bricks into beneficial form." The data collected and assembled, when analyzed and assessed, yielded the findings, upon which the following conclusions were based, and the researcher felt justified in presenting.

The conclusions rendered are presented by order of the trinal system of objectives for the study.

Instructor-Specific Conclusions

1. Agricultural Education instructors who taught the Natural Resources Course were in the relative middle period of their teaching careers, were regularly involved in a variety of outdoor activities, and they were interested in natural resources/conservation. While they were interested in teaching the course, they did not utilize all of the resources available to them to do so. Further, they were not well-prepared to teach the course as most had completed only a single one-week workshop prior to initiating the course.

2. The Agricultural Education instructors considered the prepared curriculum to be an adequate basic guide in terms of content and quality. However, in order for it to be optimally effective, relevant supplemental materials must be added and additional in-service training is needed. Disproportional emphasis was placed upon the units within the prepared curriculum, with some being taught little, if any at all. Even with its perceived shortcomings, the prepared curriculum was judged to be among the most helpful resources for the course.

3. Opportunities for students to observe and/or gain first hand experiences by means of filed trips and similar activities were considered by instructors to be most effec-

tive in teaching the course. Incorporation of more outdoor activities and the addition of awards and activities would increase the effectiveness of the course and heighten student interest.

4. Teaching methods perceived as less effective by instructors (e.g., lecture) were used to a greater extent than were those methods judged to be more effective (e.g., outdoor instruction and field trips). Had this not been the case, the overall effectiveness and impact of the course might have been perceived more positively.

5. The levels of interest of teachers, school patrons and students were the primary determinants relating to installation of the course within the schools studied. Perceived positive reactions from school administrators also contributed in this regard.

6. All factors considered, instructors viewed the course in a positive manner and considered it to be a valuable addition to their total offering. However, they do acknowledge the need to improve in several areas of the course.

Student-Specific Conclusions

1. Based upon students' previous membership in FFA, previous enrollment in other Agricultural Education courses, showing of livestock and type of SAE programs, the Natural Resources Course was not successful in attracting non traditional students to the respective Agricultural

Education departments. The bulk of enrollees were students who had been previously enrolled in the more traditional programs.

2. Students had positive feelings toward the prepared curriculum in terms of content, quality, and level of difficulty. Also, they had spent the greatest amount of time on those units of the curriculum they considered to be most interesting.

3. Activities which provided students opportunities for observation or hands on experiences were those considered most beneficial. However, too little time was devoted to these activities.

4. Students enrolled in the Natural Resources Course because of a genuine interest in the subject. Because of this and what they learned from the course, they will serve as advocates of the course among their peers. They view the major purposes of the course to be providing information regarding natural resource use and developing awareness concerning the environment.

5. Student perceptions and ratings of the various components and activities of the course constitute a valuable base of information for instructors to utilize in determining improvements in content and procedures for the course for the future.

Recommendations

After analyzing the data collected, the researcher

felt certain recommendations were justified. These are presented under two headings, General Recommendations and Recommendations for Future Research.

General Recommendations

1. An accurate assessment of the number of schools that are actually offering the course, and the corresponding number of students being served should be undertaken in the state.

2. Concerted efforts need to be undertaken soon to identify and make available appropriate supplemental materials for use in the Natural Resources Course.

3. Information concerning the new program should be made available on a broad scale, so as to better enlist support of the communities and the general public.

4. The instructors should plan more high-quality environmental experiential educative excursions, and should include more interesting, relevant classroom methods and activities. The instruction should generally include more resource personnel from the area resources field, giving presentations and supplemental information.

5. Of those instructors which have access to outdoor teaching facilities, more time should be spent teaching the Natural Resources class in these settings. Those without such facilities as a part of the school plant should exert special efforts to locate areas in close proximity to the schools where outdoor study might

might be conducted.

6. Coursework in Natural Resources and the new related areas, should be required of new Agricultural Education teacher candidates. Customized courses should be identified/designed to fit the needs of the instructors already engaged in teaching. Also, more in-service training seminars and workshops concerning teaching the Natural Resources Course are warranted more often and in more locations.

7. Contests and competitive events relating to Natural Resources and conservation on a local, regional, or state level, should be implemented to assist in amplifying student interest and thus the effectiveness of the program.

8. Instructors should endeavor to design a program that holds relevancy for a variety of students enrolled, with regard given to agricultural background, gender, and other differences.

9. Instructors should limit the use of the lecture method of instruction, increase the number of well-planned and organized field trips, and include more in-class experiential activities and quality video tapes in the teaching of the program.

10. Former students should be enlisted to aid in the recruitment of prospective students into the Natural Resources Course.

11. The units included in the prepared curriculum should be evaluated for relevancy, practicality, and appropriateness in order to promote more teaching in some of the units.

The factor which will most influence the future success of the Natural Resources program, is the interest and motivation of its teachers. Therefore, the summative recommendation and challenge of the researcher to the instructors is; to continue to guide the program toward ever more effective instruction in this important area, and to include the highest possible quality time and lessons, in, with, and about Nature.

The students that have taken the course, should feel encouraged in the fact that they are now better informed and more aware in the field of Natural Resources than are many others. They should also now recognize that they have the base upon which to build and have it in their power to change things for the better. The summative recommendation to the students is; to continue to learn about the environment, so as to Sustain.

Recommendations for Future Research

Throughout the study, several circumstances were noted that could possibly inspire heuristic sensitization

in other potential researchers. It is for that reason the following recommendations are offered:

1. Research concerning the types, number, and degree of utilization of outdoor teaching facilities should be conducted.

2. Research should be conducted as to how to best incorporate Natural Resources instruction and presentation, into Adult Agricultural Education programs.

3. There should be an effort to determine the impact he Natural Resources course has had on Agricultural Education in terms of levels of enrollment, types of students enrolling, factors prompting them to enroll, parent reactions, and other concerns.

4. An in-depth study of exemplary programs seems warranted. This could involve pre- and post-course assessments to determine the changes in attitude, behavior, knowledge and skills acquired, perspectives on natural resources and/or environmental issues, and other impacts of the course.

5. An in-depth analysis of teaching methods, along with a listing of successful activities and materials utilized in conjunction with the program and their effectiveness would have value for improving the course offering.

6. The receptiveness of students and teachers to a set of competitive events, awards programs, or other

incentives which focus on natural resources and environmental issues and might promote participation in the program should be investigated.

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APPENDIXES

APPENDIX A

SOLICITATION PHONE CALL

SCRIPT OF SOLICITATION PHONE CALL

Hello, is this Mr. Instructor? This is Mick Bessire, in Stillwater. I'm a graduate student at OSU in Agricultural Education and I'm doing a thesis study on how you folks in the field have felt about teaching the new natural resources course. Various activities and reactions to the new curriculum are also included in the study. Your school was one of 37 randomly selected from the 262 schools that have placed the new course into operation this year. We were wondering if you would be interested in assisting with the study.

Mr. Instructor's reply:_____

In addition to a questionnaire prepared for the study of the instructors' reactions to the new course, we have also prepared a student evaluation instrument to assess their views on the new course. The results of the student questionnaire are mainly for your use, to have a method of evaluating the instruction in the course, but if returned to us we can incorporate the findings into a state-wide evaluation of students' reactions, as well as the instructors'. Would you like to have us send the student questionnaires along with yours?

Mr. Instructor's reply:_____

How many students do you have in the natural resources class?

Mr. Instructor's reply:_____

I'll send you _____ copies of the student questionnaire, along with an instructor's questionnaire for you. Included in the packet will be a self-addressed stamped envelope to be sent back to me, in care of the OSU AgEd department.

The entire process of completing the questionnaires will take approximately 10-15 minutes. Do you think you can fit this evaluation in before your school lets out?

Mr. Instructor's reply:_____

Your name and the name of your school will be kept in strict confidence throughout the study, by number coding that only I will have access to, so as to invite your open, frank, and candid responses about the new course and curriculum. The involved students' names will be remain entirely anonymous.

Your involvement in the study should be completely voluntary, and if you want to stop at any point, feel free to do so. It should be considered that the students should also have the free-choice to be involved in the evaluation or not.

Do you have any questions about the study?

Mr. Instructor's questions:_____

If you have any questions after you have received the packet, you may call collect at the 405 743-1607 number, or to the number listed for the OSU AgEd Department, although not collect to them. You will receive a summary of the study.

I appreciate your willingness to assist in the study, and we hope that through the state-wide evaluation, the new program can be made better and more relevant to student needs. Thanks, and I will send you the teacher-student packet immediately. Goodbye.

APPENDIX B

TEACHER'S LETTER

May 8, 1991

«Instructor»
«High School»
«Address»
«City», «State» «Zip»

Dear Mr. «Last Name»:

Thank you for agreeing to assist in the study of the Natural Resources course. By being involved, it may be possible for your program to benefit also by the evaluation of the way the students have reacted to the course. Your program was one of thirty-seven programs selected from the 262 schools which are teaching the Natural Resources course this year. In our phone conversation, you indicated that it was possible for you to fit in the time necessary to administer, collect, and send back the questionnaires before your school session ends.

The questionnaires are fairly straightforward and self explanatory, but you may want to look them over for areas that might be confusing and explain the format to the students. Most items on both the instructor, and the student questionnaires are multiple choice or completion type. Responses may be entered by circling the letter of the most appropriate response. Both the instructor and student questionnaires have a few comment-type questions that ask for a brief written response. However, the total time for the whole procedure should only take 15 minutes.

The student questionnaire is primarily for you to evaluate the teaching and learning in the course, so you may want to look them over in some detail before placing them in the self-addressed-stamped envelope and sending them back. At the completion of the study, you will be sent a summary of the project results. Your school name, the teachers, and the students will not be identified with responses.

You are to be congratulated for choosing and successfully negotiating the new class this year. Thank you once again for your participation and valuable assistance in this study, and if you have any questions, please call.

Sincerely,

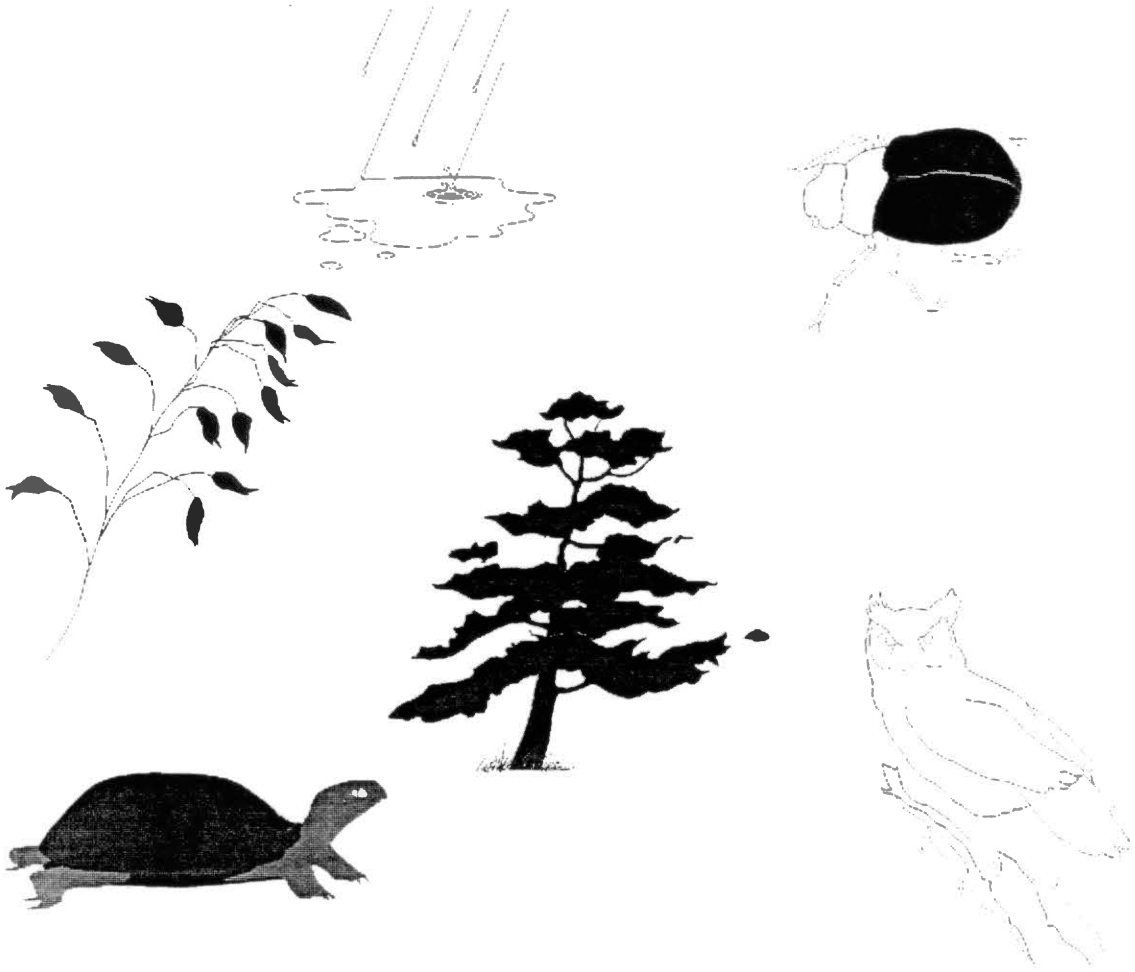
Mick Bessire
Project Coordinator

Bob Terry
Head, and Professor

APPENDIX C

STUDENT QUESTIONNAIRE

NATURAL RESOURCES COURSE EVALUATION



STUDENT QUESTIONNAIRE

Please circle the answer which most nearly reflects your views. If you feel an answer is not included in the list, please write one in. On some of the questions you will need to fill in the blanks.

Age:_____ Grade:_____ Sex: **M F** Years in FFA:____ Have you taken Ag I? **YES NO**

What is your Supervised Agricultural Experience Program? (SAE) _____

_____

1. Which of the following FFA activities have you participated in? (you may circle several answers)

   a. help with activities
   b. public speaking contests
   c. showing livestock
   d. parliamentary procedure contests
   e. judging livestock
   f. leadership training
   g. soils-land judging
   h. chapter officer
   i. plants-crops judging
   j. State degrees, awards
   k. other (please list)_____

2. What was the main reason you took Natural Resources?

   a. friends taking it
   b. needed another class
   c. teacher's suggestion
   d. sounded interesting
   e. publicity concerning environmental issues
   f. other (please list)_____

3. What is the main purpose the Natural Resources course was added in your school?

   a. to inform students about natural resource use
   b. to develop awareness concerning the environment
   c. to develop skills for solving environmental issues
   d. to develop environmental-related occupational skills
   e. to develop attitudes of environmental responsibility
   f. other (please list)_____

4. What has been your parents' reaction to you taking the Natural Resources course?

   a. no reaction at all
   b. they seemed not to like it much
   c. they seemed to think it was okay
   d. they seemed interested and supportive
   e. they would probably like it if told about it
   f. other (please list)_____

5. Where have you learned the most about natural resources and the environment?

   a. books, magazines, and television programs
   b. camping and other outdoor experiences
   c. your parents
   d. your teachers
   e. this course in Natural Resources
   f. other (please list)_____

6. Which of the following types of resource persons gave a presentation in your Natural Resources class? (you may circle more than one answer)

   a. Soil Conservation Service personnel
   b. Fish and Wildlife Service personnel
   c. Environmental Protection Agency personnel
   d. Forest Service personnel
   e. Water Management personnel
   f. Other (please list)_____

7. What grade would you give the core curriculum in Natural Resources? (the Natural Resources manual)
   a. excellent b. good c. average d. passing e. failing

8. How would you describe the level of the Natural Resources Curriculum?
   a. easy b. about right c. hard

9. About how many other reference books, besides the curriculum, did you use?
   a. none b. 1-4 c. 5-7 d. 7-10 e. more than 10

10. About how many VCR tapes about natural resources did you watch in this class? _____

11. About how much of the time did you have Natural Resources class outdoors?
   a. never b. less than 10% c. 10-20% d. 20-30% 3. 30%+

12. Overall, what grade would you give the course in Natural Resources?
   a. excellent b. good c. average d. passing e. failing

In the following questions, please rate the area named as to your idea of its importance in the study of natural resources and the environment. 1 - no importance, 2 - little importance, 3 - some importance, 4 - quite a bit of importance, 5 - extreme importance.

13. Learning how to identify trees?	1	2	3	4	5
14. The study of **local** resources and environmental issues?	1	2	3	4	5
15. The study of inter-relationships in all areas of Nature?	1	2	3	4	5
16. Learning how to plant trees?	1	2	3	4	5
17. Offering hunter safety and sportsmanship courses?	1	2	3	4	5
18. Developing collecting, sampling, and analysis skills?	1	2	3	4	5
19. Skills in using communications media in environmental issues?	1	2	3	4	5
20. Developing skills in identifying wildlife?	1	2	3	4	5
21. Learning how to help preserve wildlife habitat?	1	2	3	4	5
22. Developing skills that can help **prevent** resource problems?	1	2	3	4	5
23. Study of the economic factors of conservation?	1	2	3	4	5
24. Study of sustainable agricultural production practices?	1	2	3	4	5
25. Learning methods of conserving water?	1	2	3	4	5
26. Learning about occupations in the natural resource field?	1	2	3	4	5
27. Educating everyone concerning wise resource-use?	1	2	3	4	5
28. Developing piscatorial skills? (fishing)	1	2	3	4	5
29. Learning what is and is not recyclable?	1	2	3	4	5

In the next 4 questions, on the blank provided, please answer by writing in the correct letter from the following list.

a. introduction to natural resources
b. water resource management
c. land management
d. air resource management
e. wildlife management
f. habitat management
g. outdoor recreation
h. forestry
i. energy resources

30. ____Which unit in the natural Resources curriculum was the **most interesting** to you?

31. ____Which unit of the Natural Resources curriculum did your class spend the **most time** on?

32. ____Which unit of the Natural Resources curriculum did your class spend the **least time** on?

33. ____Which unit, or units of the curriculum, did you **not** cover? (you may use more than one letter)

Please write a brief comment about the following:

What has been the BEST thing about the Natural Resources class?

_____

_____

_____

What has been the WORST thing about the Natural Resources class?

_____

_____

_____

What specific interesting, or fun activities helped you to understand natural resources and conservation better? (please list)

_____

_____

_____

Would your recommend the Natural Resources course to a friend? Why, or why not?

_____

_____

Thank you for your assistance in this study. Any additional comments concerning the Natural Resource class are welcomed.

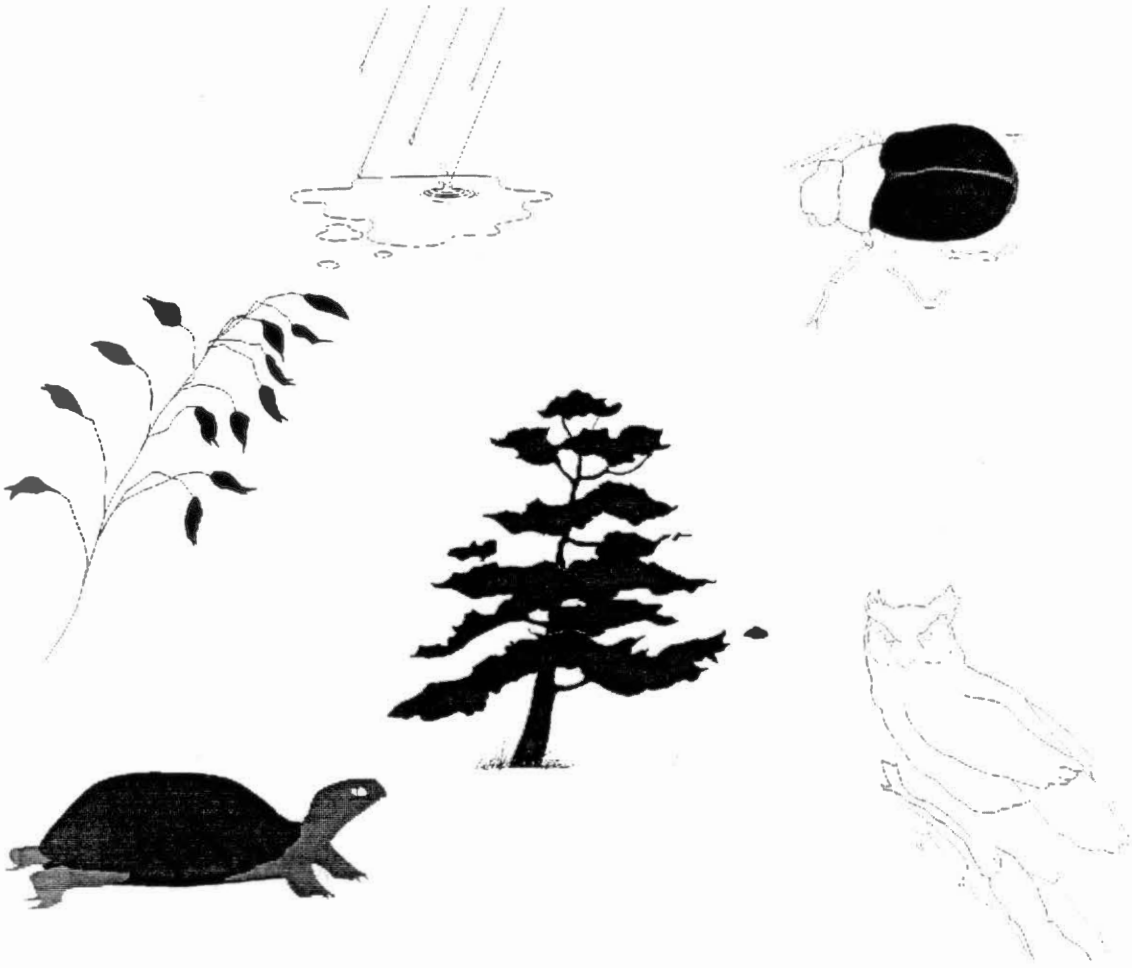
_____

_____

APPENDIX D

TEACHER QUESTIONNAIRE

NATURAL RESOURCES COURSE EVALUATION



TEACHER QUESTIONNAIRE

Please circle the most appropriate response. If an appropriate response is not included in the list, please feel free to write one in. Any other additional relevant comments are welcomed.

Age:_____ Years Teaching:_____ Ag Ed District: NW SW C NE SE

Do you farm or ranch part-time? .....YES NO
Do you hunt regularly?.....YES NO
Do you fish regularly?.....YES NO
Do you garden?.....YES NO
Do you have access to outdoor teaching facilities?.....YES NO
Do you have an adult education program? .....YES NO
If YES, is there instruction in natural resources?.....YES NO

1. In your opinion, what is your school's agricultural education program most noted for?
   a. academic achievement
   b. leadership activities
   c. exhibition activities
   d. judging activities
   e. well-rounded program
   f. other (Please list)_____
2. What was the **main reason** for adding the Natural Resources course?
   a. public interest and support
   b. student interest
   c. personal interest
   d. supervisor's suggestion
   e. financial incentives
   f. other (please list)_____
3. What is the **main purpose** of the Natural Resources course?
   a. to inform students about natural resource use
   b. to develop awareness concerning the environment
   c. to develop skills in solving environmental issues
   d. to develop related occupational competencies
   e. development of environmental responsibility
   f. other (please list)_____
4. How effective were you in achieving the main purpose mentioned above?
   a. excellent b. good c. average d. passing e. failing
5. What special training do you have in natural resources? (circle all answers that apply)
   a. experience in the field
   b. summer In-service
   c. soil/range/crops/wildlife college courses
   d. Extension or Soil Conservation Service short-courses
   e. specific natural resource management courses
   f. other (please list)_____
6. How would you rate the Natural Resources Core Curriculum?
   a. excellent b. good c. average d. passing e. failing
7. In your estimation, for what grade level is the Natural Resources course best suited?
   a. 8th b. 9th c. 10th d. 11th e. 12th

8. What **one** factor has made it the **most difficult** to teach the class in natural resources?

   a. lack of student interest
   b. lack of training
   c. class size
   d. lack of materials
   e. lack of time (preparation/teaching/activities)
   f. other (please list)_____

9. What **one** factor has **helped you the most** in teaching the class in natural resources?

   a. the prepared curriculum
   b. the listed resources
   c. student interest
   d. your own interest
   e. the requested materials (VCR tapes, Charts, etc.)
   f. other (please list)_____

10. Did you use:

    a. the prepared tests b. your own tests c. a combination

11. Do any of your students have SAE's related to Natural Resources? **YES NO**
    If YES, what are they? (please list)

    _____

    _____

12. To what degree did you teach the Natural Resources class outdoors?

    a. none b. less than 10% c. 10-20% d. 20-30% e. 30%+

13. To what degree would extra contests, awards, and recognition events and activities in the general area of natural resources, create more student interest?

    a. none b. very little c. some d. quite a bit e. a lot

14. What has been your school administrator's reaction to the Natural Resources course?

    a. negative b. neutral c. positive d. other (list)_____

15. What specific, related, award activities would you like to have added to the already existing events?

    (please list)_____

    _____

16. Please indicate with an (X) in the appropriate space, about how much class time was used to complete **each** of the units in the Natural Resources curriculum.

		1-3 days	3-8 days	2-3 weeks	1 month
a	INTRODUCTION	____	____	____	____
b.	WATER	____	____	____	____
c.	LAND	____	____	____	____
e.	WILDLIFE	____	____	____	____
f.	HABITAT	____	____	____	____
g.	RECREATION	____	____	____	____
h.	FORESTRY	____	____	____	____
i.	ENERGY	____	____	____	____

In the following 5 questions, use the letters of the following units of the curriculum in the spaces provided.

a. introduction to natural resources
b. water resource management
c. land management
d. air resource management
e. wildlife management
f. habitat management
g. outdoor recreation
h. forestry
i. energy resources

17. _____ Which unit did you teach the **most** effectively?

18. _____ Which unit did you teach the **least** effectively?

19. _____ Which unit were the students **most** interested in?

20. _____ Which unit were the students **least** interested in?

21. _____ Which units did you **not** cover?

In the following 3 questions, use the letters of the following teaching methods in the spaces provided.

a. lecture
b. discussion
c. demonstration
d. experimental discovery and problem-solving
e. field trips
f. guest speakers
g. other (please list)_____

22._____What teaching method did you **most often** use in the Natural Resources class?

23._____Which teaching method do you think is the **most** effective in Natural Resources instruction?

24._____Which teaching method do you think is the **least** effective in Natural Resources instruction?

25. What specific, interesting activities related to natural resource use and conservation, did you do with your class that made learning fun and effective for the students? (please list)

_____

_____

26. What **one** factor will most influence the future success of the Natural Resources course in Oklahoma?

a. public interest/support
b. student interest/enrollment
c. teacher interest/training/preparation
d. continued state funding
e. curriculum enhancement/improvement
f. other (please list)_____

27. Will you teach the natural Resources course next year? **YES NO**

If YES, what changes will you make? (please list)

_____

_____

Thank you for your participation in this study.

APPENDIX E

FOLLOW-UP POSTCARD

Dear Ag Instructor: 6/7/91

This is not a bill- just a reminder about sending in the Natural Resources course evaluation questionnaires. I apologize for the delay in getting the packets sent, but even if you did not get the students questionnaires completed, the completed teacher questionnaires sent in will still be of great assistance in the study. I would encourage you to send in <u>whatever</u> you have, in order to help conclude the study and progress toward getting the results out. We hope that the information gathered will be of benefit to all AgEd instructors teaching the course.

Thank you for your prompt attention to this matter.

Mick Bessire, AgEd-OSU

VITA 2

Roy G. Bessire, Jr.

Candidate for the Degree of

Master of Science

Thesis: PERCEPTIONS OF SELECTED TEACHERS AND STUDENTS ON THE NATURAL RESOURCES PROGRAM OF AGRICULTURAL EDUCATION IN OKLAHOMA

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Lakin, Kansas, November 14, 1946, son of Roy and Fern Bessire.

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