AN INVESTIGATION OF PERCEPTIONS, CONCERNS, AND AWARENESS OF ENVIRONMENTAL ISSUES AMONG AMERICAN INDIANS

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PREFACE

This study is an investigation of perceptions, concerns, and awareness on environmental issues among American Indian, within the boundaries of Oklahoma. Environmental quality/conditions, justice/injustice, and barriers that prevent program delivery and technical assistant were identified. Awareness of environmental education, legislation, programs, justice, and environmental issues were examined. Differences between the indigenous grassroots and environmental professional's respondents were made. This study provided valuable information that can be utilized to implement strategies to address the environmental issues identified in this study.

My deepest thanks and appreciation is extended to all participants, tribal leaders, elders, festival committees, Pow Wow directors, cultural resource and environmental professionals of the tribes in Oklahoma. I want to thank my advisor Dr. Mike Smolen for his continuous support and guidance. I am especially grateful to Dr. Lowell Caneday, who continually encouraged me and gave his time to assist with the data analysis portion of this study. Dr. Christine Moseley for her input on environmental education and Dr. Tom Shriver for his assistance and expertise in the area of environmental justice. Darrel Dominick, Jasper Parker, and Roylene Rides at the Door Waln, for their support and the working opportunities their agency (Natural Resources Conservation Service)

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CHAPTER I

INTRODUCTION

American Indians have been perceived as being devoted to protecting the environment and preserving it for future generations. Martinez stated,

> “Western intellectuals have long adopted the images or perceptions of Native Americans as a function of social and historic events; few have lived among indigenous communities or tapped the vast Indian cultural resources, particularly with regard to environmental stewardship (Martinez, 1996, Pg.1).

On Earth Day, 1971, a television commercial featured an American Indian canoeing down a garbage-choked river, seeing smokestacks belching smog into the air and other sources of pollution all around him. As the camera panned to his face, a single tear rolled down his cheek and the narrator's tagline, "People start pollution” and “People can stop it" made a profound impression on millions, including American Indians (Los Angeles (AP), 1999). The "Keep America Beautiful" commercial ran from 1971 into the 1980s and was credited for drawing America's attention to an ever-growing pollution problem (Variety, 1999; America Remembers, retrieved January 27, 2002).

Grace Thorpe stated, “Iron Eyes Cody, the Crying Indian became a powerful symbol for promoting anti-pollution campaign in the United States and

an eye-opener for the indigenous grassroots people" (Thorpe, personal communication March 9, 2001). He projected the image of Indians being inherently close to nature. Yet by the late 20th century, many tribes had traded a clean environment for short-term profit. According to Grace Thorpe;

> "In the 1950s tribes were not exercising their rights to function as independent states, just the need for funds. It was also because people didn't know that the stuff could hurt them. People did not associate risk with the nuclear activities" (America Remembers, retrieved January 27, 2002).

Grace Thorpe is an important figure in Indian activism. She has lectured on "No Nuclear Waste on Indian Lands" and at her urging, during the last decade, thirty tribes and over seventy reservations have created Nuclear Free Zones. Her life experience includes; serving in World War II, founder and past president of National Environmental Coalition of Native Americans (NECONA), served on the National Congress of American Indians, U. S. Sub-Committee on Indian Affairs, Greenpeace American Indian Advisory Council, Health Commissioner and Tribal Court judge for Sac and Fox Nation, and Presidential Delegate to the 1995 White House Conference on Aging. She is the daughter of the legendary Olympian, Jim Thorpe (Rogers 1996).

Under-served populations, such as American Indians, have been subject to environmental risks due to such activities as nuclear releases, uranium mining, nuclear testing, and lead and zinc mining. Environmental risks have been well documented among a minority for this population (Bauerlein, 1991, EPA, 1983,

Stoffle and Evan, 1988, Wolf and Free, 1984, Nickens 1992, Lynch et al, 2000, Lehtinen, 1997, Thorpe, 1997, and Malcoe et al 2002). Russell reported that environmental conditions such as radioactive waste dumped on Indian land pose severe public problems (Russell 1989). Lewis stated, “Radioactive pollution may be the most serious threat to the long-term welfare of Native peoples (Lewis 1995, Pg. 7).

For example, since the 1970s there has been an increase in awareness of Indian lands being used for nuclear waste dumping grounds. Two nuclear power reactors commenced operation at Prairie Island, Minnesota, in 1973 and 1974, only a few hundred yards from the homes and childcare center of the Prairie Island Mdewankanton Sioux. To make the situation worse, the nuclear facility was on the site of the ancient Indian village and burial mound, dating back at least 2,000 years. A 27-minute release of radiation from the plants occurred on October 2, 1979. The release forced evacuation of the facility, but the tribe was not notified until several days later (Thorpe 1997, Bauerlein 1991). The Mdewankanton Sioux were forced to dig an 800-foot deep well and construct a new water tower in 1993 because radioactive tritium was detected in the drinking water from existing sources. These tribal members had been exposed to six times the cancer risk deemed acceptable by the Minnesota Department of Health (Bauerlein 1991). Willie Hardacker, attorney for Mdewankanton Sioux Community stated, “There has been a history of taking advantage of reservation communities for dangerous activities like nuclear plants, mining, toxic dumps, and so on” (Bauerlein 1991).

According to Lehtinen (1997), “for decades, the United States has mined Native American lands for uranium and has tested nuclear weapons on them.” All uranium mined between 1978 and 1983 come from American Indian lands. Wolf and Free reported that 80% of all uranium reserves in the United States are on Indian reservations (Wolf and Free 1984). The largest percent of the mining was conducted on the tribal lands of the Navajo, Ute, Hopi, Pueblos, Sioux, and Spokane. Accordingly, the Women of All Red Nations reported, “Dangers of uranium mining have been ignored by the government although rates of miscarriage on the reservations have doubled the national average. High rates of bone and reproductive organ cancer were also reported” (Wolf and Free 1984).

Lehtinen (1997) reported that minority nuclear testing within the United States has been carried out on native lands. Native American children are now playing on radioactive waste from the mines simply left where it was piled. Some of the waste has been used to build houses or schools. In many mining areas, the death rate among children is higher than among the miners (Lehtinen 1997).

A century of lead and zinc mining has deeply wounded the land, water, and air in the northeast corner of Oklahoma, in Ottawa County. The area described is the Tar Creek superfund site, where 70% of the land in the superfund site is Indian owned land. Lead poisoning has taken its toll on many of the children in Ottawa County (Environmental Protection Agency, 2000). The Environmental Protection Agency (EPA) reported that 25% of the children living on the site have elevated blood level concentrations of lead. Over 50 million tons of waste is still present today. These piles are as high as 200 feet and residential

communities are located among these piles. Over 1600 residential yards have been identified to have unsafe levels of lead and five public wells fail to meet secondary drinking water standards. Air emissions from the dust on the roads pose an air quality hazard (Environmental Protection Agency, 2000).

Lynch (et al 2000) identified multiple sources of lead in the Tar Creek Superfund site and surrounding communities and their respective contribution to elevated blood levels in children (Lynch et al, 2000). Samples were taken from 245 residences. Lynch (et al 2000) reported; 10% of the residences had lead in floor dust that exceeded the U.S. Housing and Urban Development standards and 50% had lead-based paint. Soil samples indicated 20% of the yards exceeded the Environmental Protection Agency standards (Lynch et al, 2000).

Environmental issues in Indian Country are not always the result of nuclear release, uranium mining, or nuclear testing. The Navajo tribe is embarking on a long-term cleanup of an open dump on their tribal land (Donovan 1997). For generations, tribes have dumped trash on the open land. In the past it was organic waste that posed no environmental hazard. Today, their habit of open dumping has continued; but the products have changed to disposable diapers, metal, glass and plastic (Donovan 1997). Basile reported that Rosebud Reservation, in South Dakota, signed agreements to allow hog farming on tribal trust land. The environmental issue is not just the pig waste produced, equal to a city of 2 million people without a sewage treatment plant, but that tribal members were not consulted (Basile, retrieved November 6, 2002). For two decades, tribal members had been successful in fighting off the construction of a chicken

factory, a nuclear waste storage site and a dumpsite for New Jersey garbage. Today, they are battling a hog industry they believe threatens their health, their culture, and their sovereignty (Basile, retrieved November 6, 2002).

These environmental issues have led to significant change in how the indigenous grassroots people perceived environmental risk to their health and safety, degradation of land and sacred places that hold cultural or religious importance. The Mohawk tribe mounted a response to environmental degradation of their lands and waters by promoting research projects to propose a holistic approach for assessing the sociocultural implications of exposure to contaminants among American Indians (Arquette et al 2002). Russell stated, “Grass-roots minority groups are springing up nationwide to fight diverse forms of pollution in their communities” (Russell 1989, Pg 22).

Tribal leaders have taken initiatives to form networks and organizations committed to protect their land, culture, and people. For example, the Indigenous Environmental Network (IEN) is an alliance of grassroots indigenous peoples whose mission is to, " protect the sacredness of Mother Earth from contamination and exploitation by strengthening, maintaining and respecting the traditional teachings and the natural laws" (Indigenous Environmental Network, 2002). The IEN is one of several such environmental networks that have been established to address environmental concerns and issues among American Indians. LaDuke reported that even though the Exxon Valdez oil spill in Alaska occurred fourteen years ago, Alaskan Natives are still dealing with environmental and culture impacts. They have formed grassroots community groups to promote

zero discharge, to protect their natural resources crucial to their culture (LaDuke 2003).

The National Tribal Environmental Council (NTEC), formed in 1991, has 108 member tribes dedicated to promoting the development of tribal environmental management capacity in a manner that respects each tribe's priorities and values. Its mission is to enhance each tribe's ability to protect, preserve and promote the wise management of air, land and water for the benefit of current and future generations. It promotes the protection of public health and natural resources as an obligation and the inherent right of each Tribal Nation (National Tribal Environmental Council, retrieved on January 30, 2002).

Over the last few decades there has been an enormous number of Federal Acts, Executive Orders, and environmental laws and mandates issued to indicate that it is apparent that State and Federal agencies are moving in the right direction to address environmental issues in Indian county. These actions indicate they are moving toward openness and consultation, initiatives and strategies to delivery funding, mandates and laws to ensure education and accessibility, and promoting environmental awareness to address the environmental issues among this population (Appendix A).

The National Environmental Policy Act (NEPA) was enacted by the Senate and House of Representatives of the United States and signed into law in January 1970. As related to Tribal lands, NEPA encompasses any Federal action that might affect the environment and specially directs the solicitation of input from affected tribes (Environmental Protection Agency, 2000, pub. L 91-190, 42

U.S.C. 4321-4347). The National Historic Preservation Act, 1955, and eleven other legislated acts and Executive orders are in place to address American Indian cultural resources (Appendix A). President Clinton signed the White House Memorandum for the Heads of Executive Departments and Agencies, April 29, 1994, Government-to-Government Relations with Native American Tribal Government. The memorandum stated that all executive departments and agencies undertaking activities affecting Native American tribal rights or trust resources must be guided by implementation in a knowledgeable, sensitive manner respectful of tribal sovereignty (Environmental Protection Agency, 2001, *Federal Register*; vol. 59, no. 85) (Appendix A).

On February 11, 1994, President Clinton issued Executive Order 12898 entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This order mandates that federal agencies develop strategies for implementing environmental justice initiatives. These initiatives should be developed to ensure all populations have the opportunity to voice their opinions prior to the implementation of programs and activities that may affect their natural environment and health. This Executive Order advocated programs and education that promote environmental protection for minorities and low-income populations. It allocated monies to federal agencies and state governments to assist communities in developing strategies to identify and address local environmental problems (Environmental Protection Agency, 0120 executive, order 12898, *Federal Register*, vol. 59, no. 7629) (Appendix A).

Regardless of the mechanisms that have caused environmental issues and disproportionate burdens among this population, it was clear that attention must be given to those communities that are at risk. To address these issues and burdens the government has passed various actions to promote environmental equity. Between 1993 and 1994, over 15 different environmental equity bills were introduced in various states to further promote environmental equity (Hacker 1994). The federal government instituted policies to address health issues, environmental exposures, and mandates requiring outreach and education programs with their organizations for underserved populations (Claudio 1997).

The EPA has implemented programs, grants, technical assistance, and guidance to tribal governments to aid them in addressing environmental issues within their tribal communities. They established an American Indian Environmental Office and funding for tribes to establish their own environmental department to address environmental issues among their populations (Environmental Protection Agency, 2003).

However, it is not apparent that an investigation and an evaluation have been conducted to assess the effectiveness of all initiatives that have been implemented.

Statement of the Problem

Studies have been conducted on environmental risks receiving media coverage, such as nuclear dumping, public health and safety, water rights, mining, federal military activities, environmental justice, and sacred lands. Federal agencies and academic institutions have conducted studies among this population on health issues and even whether a nuclear facility should be placed

on tribal land. Some research has been conducted to assess the environmental conditions (issues/problems) in Indian country by surveying the perception of Tribal council members (National Tribal Environmental Council, 2002). Little research has been conducted, however, to assess the perception, awareness, and concerns on environmental issues among the indigenous grassroots people of this population. Limited research has also been conducted to assess the perception of tribal environmental staff on their perception, awareness, and concerns on environmental issues within their tribal boundaries. This research uses Oklahoma tribal populations and their tribal environmental departments as subjects to provide information regarding existing environmental issues, awareness and concerns among this population.

Purpose and Scope

The purpose of this research investigation is to assess the perception, awareness, and concerns on environmental issues among indigenous grassroots people and the tribal environmental professionals within the boundaries of Oklahoma. This research focused on identifying this populations' environmental issues, awareness of environmental education, legislation, justice and injustice, and activities posing a threat to this populations' cultural resources, values and land, barriers that may prevent delivery of programs and assistance and how this population would rate delivery of programs and assistance within their communities. It further identifies differences between the perception, awareness, and concerns on environmental issues among indigenous grassroots respondents of large and small tribes. In addition, this investigation identified differences between the perception, awareness, and concerns on environmental

issues among the indigenous grassroots people and the environmental departments of their tribes.

The scope of the study included the indigenous grassroots people of six large and six small tribes within the boundaries of Oklahoma. The environmental departments of the same six large and six small tribes also participated in the study. The self-administered surveys for the indigenous grassroots people were conducted during traditional tribal celebrations, homecomings, festivals, and Pow Wows. Self-administered surveys for the tribal environmental departmental staffs were conducted at their tribal complex.

Research Objectives

The research objectives of this study were developed after review of literature, discussion with tribal environmental staffs, and preliminary telephone surveys with tribal leaders, tribal elders, and members of the indigenous grassroots people. The research objectives of this study:

Objective 1: To determine how this population would rank pre-selected issues of concern (quality of life) and environmental issues within the communities in which they live.

Objective 2: To determine how this population would rank the environmental quality/conditions within the communities in which they live and identify any differences in how the small and large grassroots tribes rank the environmental quality/conditions in their communities.

Objective 3: To identify if this population had received environmental education on identified environmental issues and problems in their communities, if the environmental education is assisting in addressing the environmental issues, who is providing the environmental education on the identified issues and problems, and if they are aware of environmental education programs being offered on any other environmental concerns in their communities.

Objective 4: To determine how this population would rate the level of environmental education in their communities and identify any differences in how the grassroots tribes rated environmental education in their communities.

Objective 5: To determine if this population is aware of industrial, government, recreational, or agricultural activities that pose a threat to their cultural resources.

Objective 6: To determine if this population is aware of the environmental laws, Federal Acts and Orders, and mandates that have been issued or enacted to ensure their quality of life and protect their cultural resources.

Objective 7: To determine if this population perceived that laws and regulations are being sufficiently enforced and are adequate to protect their cultural resources, values, sacred sites, and tribal lands.

Objective 8: To determine if this population is aware of the term environmental justice.

Objective 9: To determine if this population perceives that environmental injustice is occurring within the communities in which they live.

Objective 10: To determine how this population would rate the level of awareness of environmental and conservation programs in their communities and identify if differences exist within and between the indigenous grassroots respondents of the small and large tribes regarding their awareness of environmental and conservation programs within the communities in which they live.

Objective 11: To determine what agencies this population utilizes for programs and how the grassroots and tribal respondents rated the delivery of programs and assistance in their communities.

Objective 12 To determine this populations' perception of barriers preventing delivery of programs and assistance from federal, state, local and tribal agencies.

Rationale for the Study

Over the past decades, environmental risks have been well documented and measures have been taken to ensure a quality environment exists for American Indians. Legislation has been passed, networks and organizations have been formed, and tribes have established environmental departments to ensure that a quality environment exists for this population. If protecting and conserving the environment for this population and its future generations is the

goal, it is important to assess the effectiveness of the initiatives implemented to ensure a quality environment. It is imperative that this population be actively participating in the following areas; identifying environmental issues in their communities, receiving environmental education, receiving information on legislation passed to protect their land, culture, and people, and identifying environmental injustices and barriers that might prevent delivery of programs and assistance designed to ensure a quality environment.

A real need exists to assess the current environmental issues, awareness, and concerns among the indigenous grassroots people and their environmental departments. For example, in February 1993, NTEC launched an ambitious National Environmental Review that was designed to identify the environmental issues in Indian country. A ten-page questionnaire was mailed to the tribal council members of 536 federally recognized tribes (Appendix B). The responses suggested that Indian lands are subject to a broad range of environmental problems including surface and ground water contamination, illegal dumping, hazardous waste disposal, military threats, air pollution, mining wastes, habitat destruction and human health risks. Findings indicated that across the nation, water quality appeared to be the leading concern among tribes. The responses indicated that 51 percent of the tribes are experiencing some type of drinking water problem and a great percentage experiencing other sorts of water contamination (National Tribal Environmental Council, retrieved on January 30, 2002). The NTEC study targeted the tribal council members; it did

not include the indigenous grassroots people or the environmental departments of the tribes charged with the responsibility of ensuring a quality environment.

The indigenous grassroots people and tribal environmental departments within Oklahoma provided excellent subjects to assess the environmental issues, awareness, and concerns that currently exist among this population. Tribal enrollment figures for Oklahoma American Indians are 623,159 (Oklahoma Indian Affairs Commission, 2003). The American Indian population of Oklahoma represents 7.9 percent of the state's population (3,450,654) and 1.5 percent of the Nation's population (281,421,906) (US Census Bureau, 2000). Their traditional tribal celebrations, homecomings, festivals, and Pow Wows provided the perfect opportunity to reach the indigenous grassroots people. Their tribal celebrations were scheduled over a four-month period, which did not create a conflict with scheduling or random selection of tribes to participate in the study. Their tribal headquarters were logistically accessible to conduct the assessment of tribal environmental departments.

The results of this study will provide valuable information for tribes, state and federal agencies, university research and educational departments, and tribal networks and organizations to assess the current initiatives implemented to ensure a quality environment for this population. Information derived from this study will enable tribal leaders and their environmental departments to determine what reforms they need to make to ensure they are addressing the environmental issues in their communities. Tribes, state and federal agencies, and tribal networks and organizations will be able to determine barriers that may

be preventing the delivery of programs and assistance. All parties will benefit from the information gathered regarding the delivery of environmental education, their awareness/knowledge of legislation enacted to protect their environment, and environmental justice/injustices. Information from this study provides a strong foundation for all parties with interest to join together to form a task force to implement initiatives and strategies to address the environmental issues identified.

Definitions

For purpose of this study the definitions of the following terms are:

Environmental justice will simply be defined as the fair treatment of people of all races, cultures, and incomes, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (USEPA Environmental Justice Grants, retrieved January 26, 2002).

Environmental risk will be defined as risk to the natural environment, ecological risk, human health risk, social, and cultural risk (EPA 1993, Resource Management Act 1991).

Environmental education will be defined as the learning process that increases an individual's knowledge and awareness about the environment and challenges that the environment may pose on their quality of life. It provides enough knowledge about their environment so individuals can identify problems and be aware enough to solve the problem or conduct appropriate officials to address the environmental problem/issue in their own backyard (NEEAC, 1996).

Awareness will be defined as having enough knowledge or showing realization, and perception of environmental issues, education, laws, programs and justice within their community. Awareness is gained through experience, observation, training, and education.

Risk will be defined as a measure of chance that damage to life, health, property or the environment will occur (USEPA, 1996).

Quality of life issues will be defined as issues that influence the safe environmental conditions in which individuals live.

Tribal professional will be defined as professional(s) working for their tribal government in the departments of environmental education, offices of environmental health and safety, cultural and natural resources, and land realty.

Perception will be defined as the awareness of the elements of the environment through physical observation, hands on experience, or obtaining knowledge through discussion and training.

Indian Country will be defined as a geographic location that includes more territory than a "reservation." The term refers to land reserved by treaty, statute, or executive order (Executive Order 13007, 1996, 26771 *Federal Register*, vol. 61, sec. 1, (b) (i)). According to Wilkins (1954) Indian Country is an area within which Indian laws and customs and federal laws relating to Indians apply and land that has been defined by the United States government as set aside for Indians and their use. In addition, it includes all Indian reservations, various pueblos, and Indian lands in Oklahoma (Wilkins, 1954).

Indian tribe will be defined as "an Indian or Alaska Native tribe, band, nation, pueblo, village or community that the Secretary of the Interior acknowledges to exist as an Indian tribe pursuant to Public Law No. 103-454." It defines Indian as a member of such an Indian tribe (Executive Order 13007, 1996, 26771 *Federal Register*, vol. 61, sec. 1, (b) (ii)).

American Indian will be defined as an individual who is a member of a federally or non-federally recognized tribe (Cohen 1982). The term American Indian is used in this study because the indigenous grassroots people and tribal members refer to themselves as American Indians and not Native Americans (United Nations, 1977).

Councils, networks and organizations will be defined as American Indian networks and organization that have been organized or established to ensure a quality environment for American Indian tribes.

Indigenous grassroots people will be defined as American Indian people who are tribal members who may live within tribal boundaries and participate in educating and carrying on tribal traditions and culture for future generations.

National Priority List (NPL) will be defined as a listing of sites under Section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, where known or threatened release of hazardous substances have occurred and been identified as a priority for further evaluation.

Assumptions

For the purposes of this study the following assumptions are made:

1.) Respondents to the self-administered survey instrument followed proper procedures, answer honestly, and felt no pressure or threat.

2.) Respondents in the study were of American Indian descent or a staff member of a selected tribal environmental department.

3.) Respondents (environmental professionals and grassroots) of this study work and live in their communities; therefore, it is assumed they are aware of the environmental issues within their communities.

4.) Respondents in this study are aware of environmental laws, federal acts, executive orders and mandates that apply to all American Indians and tribes.

5.) Indigenous grassroots people, environmental departments, tribal council and government bodies, ceremonial, celebrations, festival, homecoming, and Pow Wow councils, and tribal elders would support their tribe's participation in the study.

Limitations

For the purposes of this study the following limitations were observed;

1.) The focus of this study was limited to indigenous grassroots people and environmental departmental staffs of tribes within the boundaries of Oklahoma.

2.) Cultural and traditional issues were assessed and treated with the utmost respect.

3.) Some tribes do not allow non-tribal members to attend their celebrations, ceremonial festivals, homecomings, or Pow Wows.

4.) Some of the indigenous grassroots people do not speak English; therefore, an interpreter was necessary.

5.) Some of the participants are not able to read; therefore, an interpreter was necessary.

CHAPTER II

LITERATURE REVIEW

The purpose of this chapter is to present background for this study. The literature review included the use of research studies, professional journals and periodicals, personal interviews and discussions, and books. The review of literature has been organized into the following sections:

1. Overview of American Indians in Oklahoma
2. Oklahoma Reservations and Tribal Lands
3. Overview of American Indians in the United States
4. American Indian Celebrations of Heritage and Culture
5. Overview of Executive Orders, Acts, Laws, and Policies pertaining to American Indians
6. Environmental Justice and Movements in Indian Country
7. Perception, Awareness, and Environmental Justice Studies among American Indians
8. Environmental Issues, Risks, and Concerns in Indian Country
9. Environmental Education
10. Survey Instruments

Overview of American Indians in Oklahoma

To many, when Oklahoma is mentioned, the first image that comes to mind will likely be of Indians. Oklahoma literally means "Red People" from the combination of two Choctaw Indian words, "okla" which means people and "humma" which means red. Oklahoma has one of the largest Indian populations of any state in the Union. The original Indian Territory in Oklahoma was home to 67 tribes, with descendants from these original tribes still live in Oklahoma. Thirty-five of the Indian tribes in Oklahoma have tribal headquarters in the state (Oklahoma Commerce 2000).

Prior to Oklahoma becoming Indian Territory, it was home to five tribes that are considered indigenous to Oklahoma. These tribes include the Osage, Caddo, Kiowa, Comanche, and Wichita. All other tribes were removed from their ancestral homelands to Oklahoma during the period referred to as the "Indian Removal" (Indian Removal Act, retrieved January 12, 2001). Tribes were removed from the southeastern United States by Federal troops between 1820 and 1856 (Indian Removal Act, retrieved January 12, 2001). The most noted removal was that involving the Cherokees. Under orders from President Jackson and in defiance of the U.S. Supreme Court, the U.S. Army began enforcement of the Removal Act. In the summer of 1838, more than 3,000 Cherokees were rounded up and loaded onto boats that traveled the Tennessee, Ohio, Mississippi and Arkansas Rivers into Indian Territory. Others were held in prison camps awaiting their fate. During this removal journey an estimated 4,000 died from hunger, exposure and disease. This period of time is referred to as an eternal memory as the "trail where they

cried" for the Cherokees and other removed tribes. Today, it is remembered as the "Trail of Tears" (Foreman 1966).

Oklahoma tribal governments contribute over $7.8 billion annually to Oklahoma's economy in the areas of business, housing, employment, education, health care, social services, and others. The contributions of these tribes have a direct economic impact in sixty-two of Oklahoma's seventy-seven counties (Oklahoma Indian Affairs Commission, retrieved January 1, 2002).
According to the Oklahoma Indian Affairs Commission (2002), Oklahoma is home to 39 tribal governments. The Oklahoma Tribal Conservation Advisory Council (OTCAC) has divided the tribes into 4 areas (Table 1 and Figure 1). Thirty-eight are federally recognized as sovereign nations and another has applied for federal recognition. There are two non-federally recognized tribes in Oklahoma, Cataba Tribal Association and the Yuchi Tribal Organization. The State of Oklahoma has recognized four tribal governments. According to the 2000 Census, enrollment in Oklahoma tribes is 623,159, and more than 380,000 tribal members reside in Oklahoma. The second largest tribe in the United States is the Cherokee Nation, located in Tahlequah, with 232,928 members. Oklahoma's smallest tribe is the Modoc Tribe, headquartered in Miami, which has an estimated membership of 160 (Oklahoma Indian Affairs 2003).

Table 1. Oklahoma Tribes by Area

Western Area	North Central Area	Northeastern Area	Southeastern Area
Apache Tribe	Delaware Tribe (Eastern)	Cherokee Nation	Absentee Shawnee Tribe
Caddo Tribe	Iowa Tribe	Eastern Shawnee Tribe	Alabama Quassarte Tribe
Cheyenne-Arapaho Tribe	Kaw Tribe	Miami Tribe	Citizen Potawatomi Nation
Comanche Nation	Osage Tribe	Modoc Tribe	Chickasaw Nation
Delaware Nation	Otoe-Missouria Tribe	Ottawa Tribe	Choctaw Nation
Fort Sill Apache Tribe	Pawnee Tribe	Peoria Tribe	Kickapoo Tribe
Kiowa Tribe	Ponca Tribe	Quapaw Tribe	Kialegee Tribal Town
Wichita & Affiliated Tribe	Sac & Fox Nation	Seneca-Cayuga Tribe	Muscogee (Creek) Nation
	Tonkawa Tribe	United Keetoowah	Thlopthlocco Tribal Town
		Wyandotte Tribe	Seminole Nation
		Shawnee Tribe	Yuchi (Euchee) Tribe

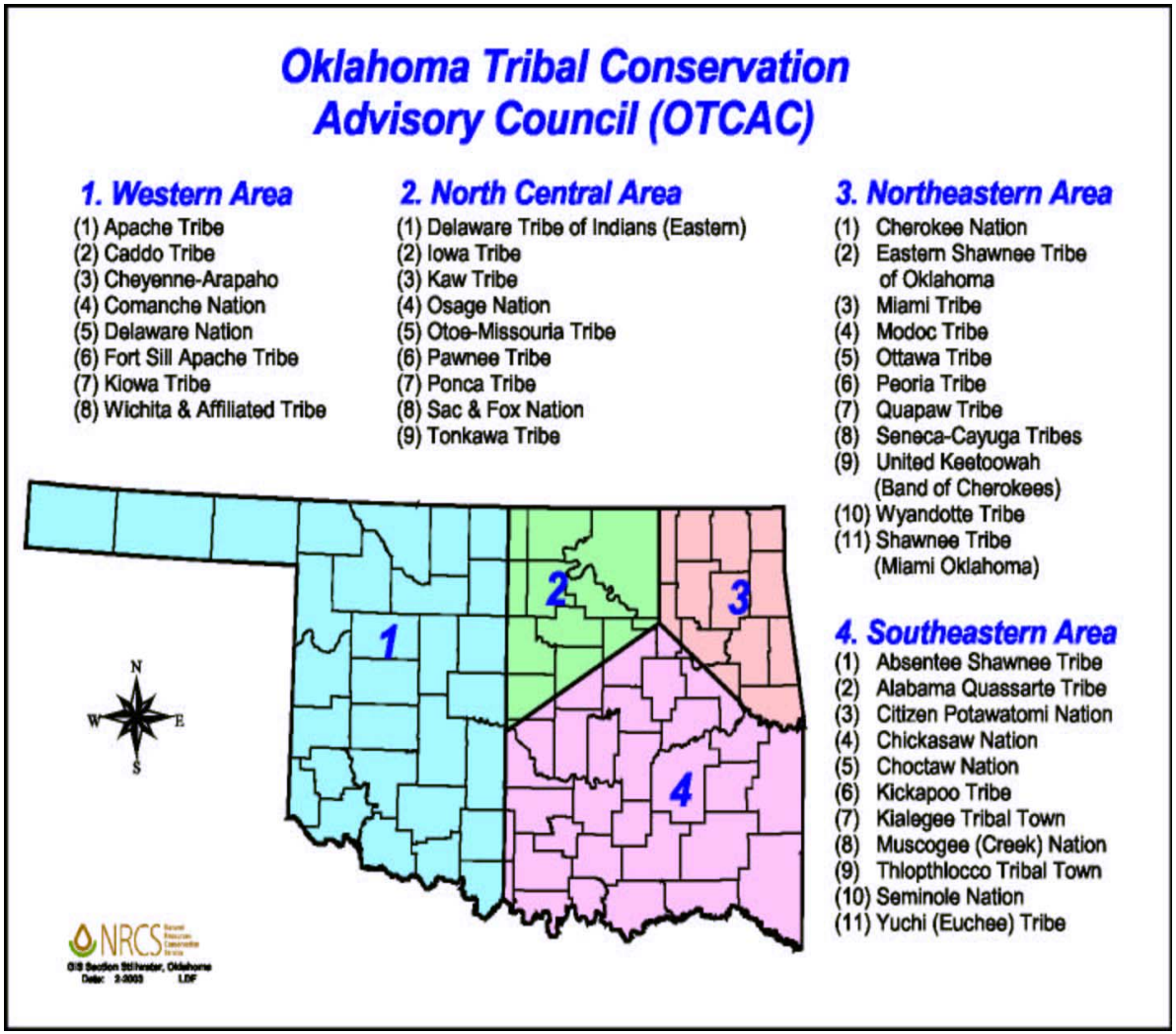

Figure 1. Oklahoma Tribal Area Map Source: Natural Resources Conservation Service, 2003

Oklahoma Reservations and Tribal Lands

The history of Oklahoma reservations and tribal lands began in 1540-1542 when Coronado came through Oklahoma from Mexico (Lambert, el al, 2000). The Spanish origin can be associated with some Oklahoma names such as: Santa Fe, Cimarron, and Canadian (Foreman 1966). At the same time Coronado was wandering through Oklahoma, the French were coming into Oklahoma up the Mississippi River to the Arkansas River to the present sites of Ft. Gibson and Muskogee. The French origin names such as: Fourche, Maline, Poteau, and Sallisaw became scattered throughout Oklahoma. Since they were both in Oklahoma, the Spanish and the French claimed what is now Oklahoma. In 1763, by the Treaty of Paris, France ceded all of the Louisiana territory to Spain, until 1800 when Spain ceded the Louisiana territory back to France (Channing 1926).

From 1803 until 1819 the United States and Spain disputed the boundary line between their respective possessions. Spain claimed they had possession of all sections located north and northwest of Mexico. This area included what is now Texas, New Mexico, Oklahoma, and a portion of Colorado, Arizona and California. This dispute was settled in a treaty signed in 1819 between the United States and Spain in which the Nations agreed that the Red River would constitute the boundary between their respective possessions.

In that same year, 1819, Congress created the Arkansas Territory, which included the states of Arkansas and Oklahoma. However, in 1820, Congress proceeded to make provisions to segregate various Indian Tribes. The purpose of

the segregation was an attempt to resolve conflicts between the Indians and the whites. Oklahoma had become a paradise for the French hunters and tradesmen.

In 1832 Congress appointed the Stokes Commission to deal with the Indians in this new territory and to negotiate treaties with them. The tribes represented in Oklahoma at the time were; Senecas, Choctaws, Cherokees, Creeks, Osages, Wichitas, Wacoes, Comanches, Kiowas, Delawares, Quapaws, Seminoles, Cheyennes, Arapahoes, Sac and Foxes, Pawnees, Iowas, Kickapoos, Shawnees, Potawatomis, Poncas, Sioux, Otoes and Missouris. Just prior to the appointment of the Stokes Commission, President Jackson had made a treaty with the Indians east of the Mississippi to be moved to Indian Territory (Lambert, el al, 2000). The treaty involved the Five Civilized Tribes, Cherokees, Choctaws, Chickasaws, Creeks and Seminoles. These tribes were to be moved to the Arkansas Territory, however, the situation changed when Arkansas was admitted as a state in 1836. Since Arkansas had become a state, what is now Oklahoma, became Indian Territory. In the treaty, this Indian Territory was to be set aside as strictly for the Indians and forbidden to whites. This removal process is referred to as the period called the "Trail of Tears" (Lambert, el al, 2000). The Five Civilized Tribes were forced to leave their homes in Tennessee, Kentucky, North Carolina, Alabama, Georgia, Mississippi and Florida. There are twenty-five Tribal boundaries, negotiated in treaties, in Oklahoma today (Lambert, el al, 2000) (Table 2 and Figure 2).

Table 2. Thirty-eight Oklahoma Tribal Boundaries shown in Figure 2.

Apache, Caddo, Delaware and Wichita	Miami-Ottawa
Absentee Shawnee and Pottawatomie	Modoc
Choctaw	Osage
Cherokee, United Keetoowah Loyal Shawnee, and Delaware East	Otoe-Missouria
Cheyenne-Arapaho	Pawnee
Chickasaw	Peoria
Kickapoo	Ponca
Comanche, Kiowa, Ft. Still Apache	Quapaw
Creek, Yuchi, Alabama, Kialegee, Thlopthlocco	Sac and Fox
Eastern Shawnee	Seminole
Iowa	Seneca-Cayuga
Kaw	Tonkawa

Source: Natural Resources Conservation Service (Oklahoma) 2001.

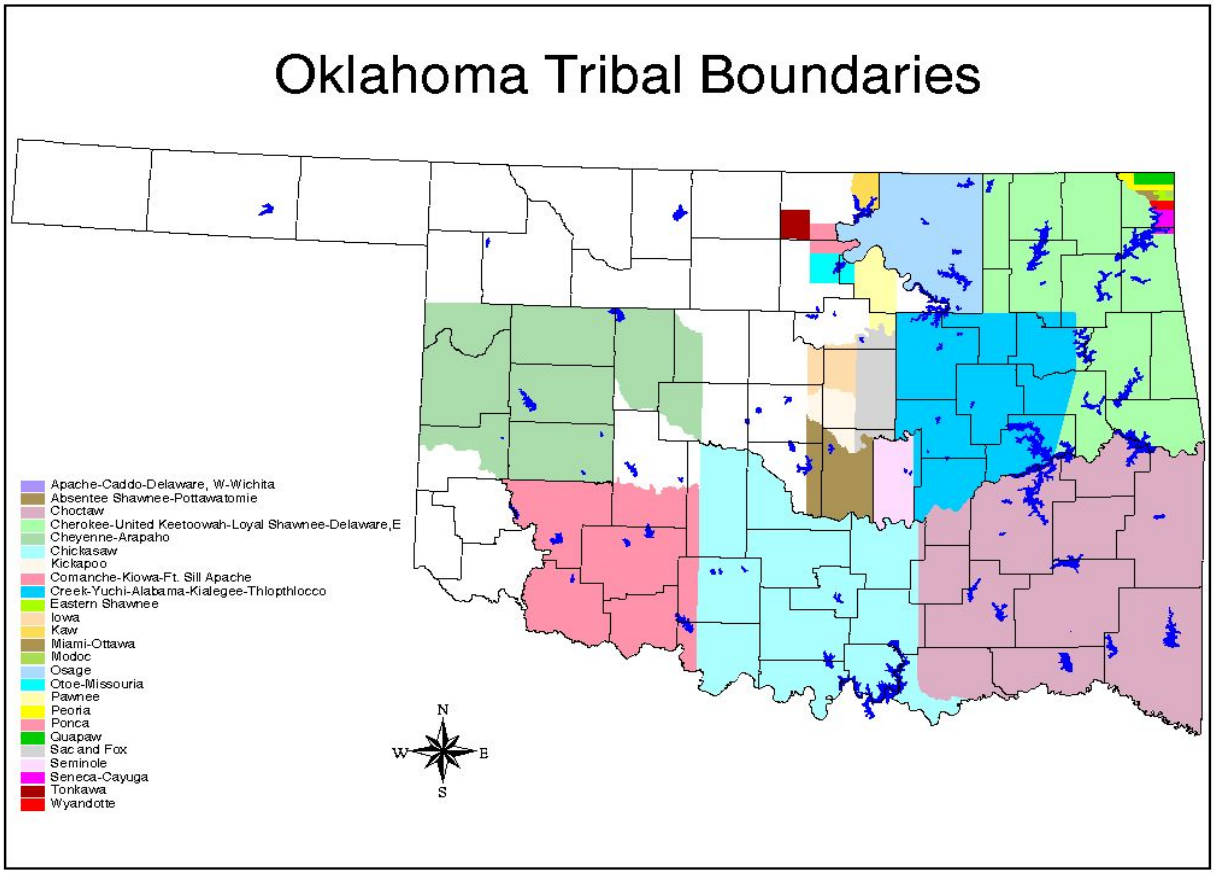

Figure 2. Oklahoma Tribal Boundaries. *Source: Natural Resources Conservation Service (Oklahoma) 2001.*

Overview of American Indians in the United States

According to the U.S. Census Bureau (2000), Census 2000 summary file, the United States population was 281.4 million on April 1, 2000. Of this population, 4 million or 1.5 percent, reported to be American Indian and Alaskan Native (Table 3). The census showed those individuals who only indicated American Indian, increased by 26 percent from the 1990 census to 2000 census.

Table 3. American Indian and Alaskan Native Population 2000

Race	Number	Percent of total Population
Total Population	281,412,906	100.0
American Indian and Alaska Native alone or in combination with one or more other races	4,119,301	1.5
American Indian and Alaska Native alone	2,475,956	0.9
American Indian and Alaska Native in combination with one or more other races	1,643,345	0.6
American Indian and Alaska Native; White	1,082,683	0.4
Not American Indian and Alaska Native alone or in combination with one or more other races	277,293,605	98.5

Source: U.S. Census Bureau, Census 2000 Summary File 1.

Over half of the people who reported being American Indians live in ten states, which include California, Oklahoma, Arizona, Texas, New Mexico, New York, Washington, North Carolina, Michigan, and Alaska.

American Indian Celebrations of Heritage and Culture

American Indian Pow Wows, festivals, homecoming and celebrations are held throughout the year to celebrate tribal traditions, heritage, and culture through dancing, art, music, and drama. The word “Pow Wow” actually began as a name. The term came from the Algonkian speaking Narragansett Indians. The word referred, not to a dance or celebration, but to a shaman or teacher, a dream or vision, or a council, or gathering. When Indian tribes met with the Englishmen or other tribes it was referred to as a Pow Wow. In Indian society, one may visit a Pow Wow because of his or her healing powers. Today, Pow Wow activities include: music and dancing (expressing cultural pride and practice), celebrations of identity, victories, and warriors (fallen and serving). It is time for Indian people to renew family ties with their culture and heritage and practice religious and spiritual ceremonies. It is a spiritual, cultural, ritual, social gathering of Indian people brought together in harmony and celebration.

Pow Wows are a very important part of American Indian cultures. A large percentage of tribal members attend these celebrations; it is a big part of their lives. According to Grace Thorpe, "Many American Indians refer to a Pow Wow as a “certain kind” of happiness that cannot be described" (Thorpe communication 2001). Others recognize it as a time where Nations band together, shake hands, smile, and enjoy and respect each other’s tradition and festivities. Just as importantly, a Pow Wow is a time to focus thoughts on the old ways and to preserve American Indian heritage. It is a social event, a chance to

affirm life and the dignity of a living culture, and get in touch with the heartbeat of the Earth (Oklahoma Tourism and Recreation Department 2000, Thorpe 2002).

The modern Pow Wow is a link to the American Indian's past. To non-Indians, the Pow Wow may be seen as entertainment, but the Pow Wow is a ceremonial legacy, treated with honor and respect. Visitors are welcome at Pow Wows and common courtesy dictates that all guests should remain watchful and respectful. However, there are some guidelines to keep in mind when attending a Pow Wow.

Oklahoma tribes hold annual celebrations, festivals, homecomings, and Pow Wows to honor their people and their heritage (Table 4).

Table 4. Indian Nations of Oklahoma Annual Indian Events and Pow Wows

January	July
Oklahoma City Pow Wow	Annual Tonkawa Tribal Dance Comanche
February	Kihekah Steh Pow Wow
Doctate Nevaquaya Southwestern Gala	Kiowa Gourd Clan Celebration
March	Quapaw Pow Wow
Oklahoma City Spring Pow Wow	Ote-Missouia
April	Pawnee
Annual Symposium on the American Indian	Sac & Fox Nation Pow Wow
Choctaw Intertribal Pow Wow	
May	August
"Trail of Tears" Art Show and Pow Wow	American Indian Exposition
Kiowa Armed Forces Celebration	Cherokee Nation
Delaware tribe of Indians	Choctaw Nation
Miami Tribe May	Kaw Nation & Shawnee
Pow Wow of Champions	Kickapoo & Ponca Pow Wow
	Seneca-Cayuga & Ottawa
	Wichita & Affiliated Tribes
June	September
Red Earth Native American Cultural Festival	Chickasaw Nation
Apache Tribe	Cheyenne & Arapaho Pow Wow
Creek (Muscogee) Nation	Enid Intertribal Club Annual Pow Wow
Iowa Tribal Pow Wow	Eastern Shawnee & Fort Sill Apache
Kialegee Tribe	Indian Summer Festival
Osage Nation	Standing Bear Pow Wow
Peoria Pow Wow	Seminole Nations Days
Potawatomi Nation	Wyandotte Pow Wow
	October
	Chickasaw Nation Annual Festival
	Creek Council House Indian Pow Wow
	Intertribal Fall Gourd Dance
December	November
Good Medicine Society's New Year's	Euchee (Yuchi) Tribe 2-3
Sobriety Dance	Veterans Day Dance & Pow Wow

Sources: Oklahoma Tourism and Recreation Department 2000 and Oklahoma Tribal Headquarters

Overview of Executive Orders, Acts, Laws, and Policies Pertaining to American Indians

In order to meet legal responsibilities concerning American Indian cultural resources there have been numerous Executive Orders, Directives, Acts, and Amendments enacted to protect these cultural resources. For example, an agency will not engage in any activities without conducting inventories, evaluation, and definition of uses, identification, protection and preservation of all significant cultural resources. Under Section 106, of the National Historic Preservation Act of 1966, agencies are to provide interpretation of significant cultural resources and seek review and advice from the State Historic Preservation Office, appropriate Native American Tribal Governments and the President's Advisory Council on Historic Preservation prior to engaging in activities that may encompass any tribal interest or concern (Appendix A).

National Historic Preservation Act

Concern for historic and cultural resources has been expressed in legislation throughout the twentieth century. In 1906, the Antiquities Act authorized the President of the United States to declare landmarks, structures, and objects of historic or scientific interest to be national monuments. It established the process and procedures for obtaining permits for archaeological excavation on public lands.

The Historic Sites Act of 1935, provided for the preservation of historic American sites, buildings, objects and antiquities of national significance. It was greatly expanded in 1955 with the National Historic Preservation Act (NHPA)

(National Historic Preservation Act, 16 USC, sec. 470, title 16, chap. 1A, sub. chap. II, retrieved on December 14, 2001) (Appendix A).

After 1955, NHPA expanded the type of properties deemed worthy of preservation to include those being significant in American history, architecture, archeology and culture (Section 101-2). NHPA is implemented when any Federal or Federally assisted project, activity, or program encompasses any type of property deemed worthy of preservation (36 C.F.R. § 800.2, National Historic Preservation Act, 16 USC, sec. 470, title 16, chap. 1A, sub. chap. II, retrieved on December 14, 2001). The Act provides assistance to states, establishes an Advisory Council on Historic Preservation (ACHP) to advise the President and Congress on historic preservation, encouraging public interest in historic preservation, and helping other governments draft legislation historic preservation laws (Advisory Council on Historic Preservation, 1980; 1993; 1994. ACHP regulations assign most responsibility for the Section 106 process to State Historic Preservation Officers (SHPOs) (Suagee & Funk, 1993). Section 502 of the 1980 amendments to the NHPA directed the Secretary of the Interior to study the means of "preserving and conserving the intangible elements of our cultural heritage such as arts, skills, folk life, and folkways" and to recommend ways to "preserve, conserve, and encourage the continuation of the diverse traditional prehistoric, historic, ethnic, and folk cultural traditions that underlie and are a living expression of our American heritage" (Advisory Council on Historic Preservation, PL 96-515, December 12, 1980). For example, Devils Tower National Monument, located in northeastern Wyoming, holds religious meaning

to 23 Northern Plains tribes. These tribes gather to hold religious ceremonies such as their sun dance and sweat lodge at the foot of the volcanic monolith (Thomas, 1998).

Native American Graves Protection and Repatriation Act (NAGPRA)

President George Bush signed the Native American Graves Protection and Repatriation Act (NAGPRA) into law in November 1990 (Bush 1990, 1991). It protects burial sites on federal and tribal lands and creates a process for repatriating cultural items, including artifacts and human remains, to native tribes. In November 1993, museums holding certain Native American artifacts were required to prepare written summaries of their collections for distribution to culturally affiliated tribes. In November 1995, museums were required to prepare detailed inventories of their Native American collection (Native American Grave Protection and Repatriation Act, 101ST, 2nd session 101-877).

Government-to-Government

On April 29, 1994, President Clinton, Vice President Gore, and members of the President's cabinet met with more than 300 Native American leaders of federally recognized Indian tribes on the south lawn of the White House. It was the first time in the nation's history that a President of the United States had held such a meeting (Clinton, 1994).

During the meeting, the President signed a memorandum directing the heads of all executive branch departments and agencies to:

> "operate within a government-to-government relationship with federally recognized tribal governments"

> "consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments prior to taking actions that affect federally recognized tribal governments"
>
> "assess the impact of federal government plans, projects, programs, and activities on tribal trust resources and assure that tribal government rights and concerns are considered during the development of such plans, projects, programs, and activities" (Clinton, 1994).

Executive Order 12898

President Clinton issued Executive Order 12898 entitled “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.” This order mandates that federal agencies develop strategies for implementing environmental justice initiatives to ensure all populations have the opportunity to voice their opinions prior to the implementation of programs and activities that may affect their natural environment and health. This Executive Order advocates programs and education that promote environmental protection for minorities and low-income populations. It also allocated monies to federal agencies and state governments to assist communities in develop strategies to identify and address local environmental problems (Clinton, 1994).

National Environmental Policy Act

The National Environmental Policy Act (NEPA) was signed into law in January 1970. NEPA encompasses any Federal action that might affect the environment. The conceptual boundaries of the term environment are not specifically defined in the law or resulting regulations, but over time have come to

include cultural resources and socioeconomic elements. The Act requires completion of an Environmental Impact Statement (EIS) when such an action is judged to have potentially significant environmental impacts. Relevant to the purposes of this study, NEPA encourages the preservation of historic resources and requires consideration of social impacts. A report from the Council on Environmental Quality specifically directs (but without the force of law) the solicitation of input from affected Indian tribes at the earliest possible time in the NEPA process (40 CFR 1501.2). The lead agency in the process is also directed to invite the participation of any affected Indian tribes in the scoping process (40 CFR 1501.7). The scoping/evaluation process involves a resources inventory of the proposed selected site/area that may potentially impact endangered species, natural, cultural historic resources and/or social impacts. The agency preparing a draft EIS must request comments of Indian tribes whose reservations may be affected (40 CFR 1503.1). Where project impacts are entirely social or economic, no EIS is required despite the severity of impacts. NEPA is effective for incorporating Native American interests into any federal planning, but requires a process of impact documentation. It thus provides no specific form of protection for any resource concerns (Environmental Protection Agency, 2000, pub. L 91-190, 42 U.S.C. 4321-4347, amended pub. L. 94-54, July 3, 1975, pub. L. 94-83, August 9, 1975 and pub. L. 97-258, sec. 4(b), September 13, 1982).

Executive Order 13175

Executive Order 13175 of November 6, 2000, Consultation and Coordination with Indian Tribal Governments, signed by President Clinton, ordered the establishment of regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications (Environmental Protection Agency, 2001, *Federal Register*, vol. 65, no. 218). Since the Federal government did not always fulfill obligations as promised after Indian tribes ceded their lands, water, and mineral rights in exchange for peace, security, health care, and education, this order was designed to emphasize the importance of tribal sovereignty.

Executive Order 13007

Executive Order 13007, "Indian Sacred Sites," was issued and signed by President Clinton on May 24, 1996. The general purpose of the Executive Order is to ensure that Federal agencies are as responsive as possible to the concerns of American Indian tribes regarding sacred sites. In addition, it specifically addresses access to sacred sites by Indian tribal religious practitioners and the physical protection of such sites. This order eventually became the Native American Sacred Lands Act of 1997 (Environmental Protection Agency, 2001, *Federal Register*, vol. 61) (Appendix A).

Promoting Awareness of American Indian Heritage

Early proponents for honoring American Indians by proclaiming a day of recognition were Dr. Arthur C. Parker, Seneca Indian, director of the Museum of

Arts and Science, Boy Scouts of America, the Congress of the American Indian Association, the governor of New York (1916), Red Fox James, Blackfeet Indian, and President George Bush. Dr Parker persuaded the Boy Scouts of American to set aside a day for the “First Americans,” which was honored for three years. In 1915, the Congress of American Indian Associations called upon the country to set aside a day, which was declared as the second Saturday of May. A year before this proclamation, Red Fox James, rode horseback from state to state seeking approval for such a day. On December 14, 1915, Red Fox James presented the endorsements of 24 state governments to the White House. No day was proclaimed. The first American Indian Day to be celebrated in a state was declared on the second Saturday in May, 1916 by the governor of New York. In 1919, Illinois legislators, enacted such a day.

In 1990, President George Bush approved a joint resolution designating November 1990 as “National American Indian Heritage Month. The National American Indian Heritage Month, Public Law 101-343, was signed on August 3, 1990 (Bush 1991). This Act originated as a Joint resolution (H.J. 577) and was codified into law by Congress. It set aside November of each year for special recognition:

> "...the President is authorized and requested to issue a proclamation calling upon Federal, State and local governments, interested groups and organizations, and the people of the United States to observe the month with appropriate programs, ceremonies and activities."

Since this time, President Bush issued proclamations in 1990, 1991 and 1992, expressing interest in and enthusiasm for historic highlights and information during the month of November that have an American Indian theme and recognition. The National American Indian and Alaska Native Heritage Month is celebrated to recognize the intertribal cultures American Indian and to educate the public about the heritage, history, art, and traditions of this population (Department of the Interior, Appendix A).

Environmental Justice and Movements

The Environmental Protection Agency (EPA) defines environmental justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. (USEPA Environmental Justice Grants, 2002).

Many have defined environmental justice as a movement comprising Civil Rights activists and environmentalists working to ensure the rights of minority and low-income populations to clean and healthy environments. Others have defined environmental justice as the intersection of civil rights and natural science. (USEPA Environmental Justice Grants retrieved January 26, 2002).

According to Bullard (1994) environmental injustice occurs for several reasons: the lack of information, money, and access to the decision-making process. Others believe that environmental justice has evolved from the basic issue of “Quality of Life” for the nation’s poor and minorities right to safe drinking water, uncontaminated soils, and fresh air to breath (Nance 1995).

Bullard (1995) reported that environmental justice movements began in 1982 when Warren County, North Carolina was selected as a site for a polychlorinated biphenyl (PCB) landfill. This decision sparked protests and marches that resulted in more than 500 arrests (Bullard 1995). Bullard (1995) supports the idea that grassroots activists, academic research, and civil rights leaders have put the issue of environmental justice on the nation's agenda. According to Nance, environmental justice movements have been organized to bring environmental inequities of the poor and minorities to the attention of the public by methods typically used to surface civil rights issues (Nance 1995). Kuzmiak (1991) suggests that environmental movements have developed because minority and poor citizens are tired of being subjected to dangerous environmental hazards in their communities and their effective skills to develop coalitions to promote change.

On February 13, 1998, American Indian activists, elders, and warriors camped out on a plot of federal land, Ward Valley, twenty miles from the Colorado River, to block the land transfer for a nuclear waste dump (Skolnick 1998). According to Skolnick (1998) this site contains sacred areas for five Indian tribes, provides essential habitat to the endangered desert tortoise, and is a major source of drinking water for the Californians. Even though the nuclear dump is pending judicial review, these American Indian tribes perceived their encampment as a victory and demonstrated they are willing to take measures to protect the environmental and their sacred areas and traditions (Skolnick 1998). The Ward Valley situation supports the views of Daniel Brook (1998) that the

United States government and private corporations are perpetrating against American Indians (a destructive form of environmental genocide). The encampment by the American Indians further demonstrated that American Indians are becoming more unified, organized, and prepared to fight for their survival, environment, and sacred areas (Brook 1998).

A community-based collaboration for environmental justice erupted in Halifax County, North Carolina to fight seven hog farm corporations (Wing et al 1996). This collaboration of community members was made up of African Americans who rallied into an organization called Halifax Environmental Loss Prevention (HELP) (Statter 1997). In Halifax County, 25 percent of the population lives below poverty level, 46 percent have not completed high school, and 50 percent are African American, In addition, the hog farms were located in areas where the population was 90 to 98 percent African American (Statter 1997). HELP was able to convince county commissioners to establish an Ad Hoc committee to investigate their concerns about potential groundwater and surface water contamination and air quality problems. The committee passed livestock ordinances that caused three of the seven hog factories and at least fifty others to abort their plans to build and conduct business in this county (Statter 1997). According to Wing et al (1996) environmental racism was the underlying cause for the site selection of toxic dumps among American Indians and hog production factories among African Americans. In addition, it was reported that the site selections occur systemically in poverty areas where education levels are low (Wing et al 1996).

The Ward Valley encampment and the eruption of HELP are examples that support Dorceta Taylor's interpretation that minorities are tired of the disproportionally negative impacts on people of color. American Indians, African-American, Latino, and Asian-American environmental justice groups are mobilizing to provoke actions that prevent the placement of environmental hazards in their communities of color (Taylor 1996).

In 1980, Phil Harrison, Navajo, formed the Uranium Radiation Victims Committee to fight for environmental justice for 3,000 Navajo uranium miners. These miners worked in the pits of New Mexico and Arizona for 50 years for Union Carbide and Kerr McGee. These miners blasted it, dug it, shoveled it, breathed it, and wore it home in their clothes. Their children played with it, they built their homes on its tailings and surviving miners say they were never told that uranium was dangerous. The Uranium Radiation Victims Committee joined other activist groups to lobby for compensation from the federal government. Their efforts resulted in the passage of the Radiation Exposure Compensation Act (RECA) in 1990 (Motavalli et al 1998, Appendix A). RECA determined eligibility based on a formula that calculated “working months” underground, relative toxicity of the site, and worked in the miners between 1947 and 1971. Miners suffering from cancer and other malignant respiratory diseases received compensation if they were not smokers. Since RECA was passed, “less than 500 people have been compensated, 400 have been denied and another 400 cases are pending” (Motavalli et al 1998). Phil Harrison stated: “You have to have one foot in the ground or actually be dead to make a claim” (Motavalli et al 1998).

There are many sick and uncompensated Navajo miners who have lung cancer, leukemia pneumonia, and silicosis that are still fighting for environmental justice.

In June 1995, at the Protecting Mother Earth Conference held by the Indigenous Environmental Network (IEN), over 700 American Indian delegates gathered to discuss grassroots activism, confrontation, and community organization among American Indians in their movements for sovereignty and environmental movement for a cleaner earth (Grossman 1995).

In the early 1990s, two major environmental conferences were held which further increased awareness of environmental justice and promoted the environment movement. *The First National People-of-Color Environmental Leadership Summit* was held on October 24-27, 1991, in Washington DC. The Delegates to the *First National People of Color Environmental Leadership Summit* drafted and adopted 17 principles of Environmental Justice. The principles adopted are:

1) Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.
2) Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.
3) Environmental Justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things.

4) Environmental Justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right to clean air, land, water, and food.

5) Environmental Justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples.

6) Environmental Justice demands the cessation of the production of all toxins, hazardous wastes, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the point of production.

7) Environmental Justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation.

8) Environmental Justice affirms the right of all workers to a safe and healthy work environment without being forced to choose between an unsafe livelihood and unemployment. It also affirms the right of those who work at home to be free from environmental hazards.

9) Environmental Justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.

10) Environmental Justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration on Human Rights, and the United Nations Convention on Genocide.

11) Environmental Justice must recognize a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.

12) Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honoring the cultural integrity of all our communities, and provided fair access for all to the full range of resources.

13) Environmental Justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of color.

14) Environmental Justice opposes the destructive operations of multi-national corporations.

15) Environmental Justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms.

16) Environmental Justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives.

17) Environmental Justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible; and make the conscious decision to challenge and reprioritize our lifestyles to insure the health of the natural world for present and future generations (First National People of Color Environmental Leadership Summit 1991).

These principles have served as a defining document for the growing grassroots movement for environmental justice (Bullard 1995).

The National Tribal Environmental Council (NTEC) was founded to assist tribes in protecting and preserving their environment. NTEC's mission is to enhance each tribe's ability to protect, preserve and promote wise management of air, land and water for the benefit of current and future generations (NTEC 2002).

Perception, Awareness, and Environment Justice Studies among American Indians

When President Clinton issued Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income,” it mandated federal agencies to develop specific agency strategies for implementing environmental justice initiatives (Clinton 1994). The United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) had developed an Environmental Justice Strategy to make a positive difference in the lives of people, improve underlying conditions of people at risk, and strive to improve the quality of life of all people across the nation (Social Science Institute 2000).

NRCS is charged with the responsibility of providing technical assistance to all landowners to enable them to protect their natural resources such as water, soil, air, plants and animals. Keeping their Environmental Justice Strategy in mind, they funded an environmental justice study to evaluate and understand the issues related to natural resources and agriculture among undeserved populations (Social Science Institute 2000).

The NRCS funded study focused on the Black Belt Region to discover whether environmental injustices are occurring. In addition, the study was designed to determine how the NRCS workforce could work effectively to resolve and prevent environmental injustices from occurring (Social Science Institute 2000). During the study 743 randomly selected face-to-face interviews were conducted in 11 Black Belt states within counties having 25 percent or more living below poverty level (Social Science Institute 2000).

Findings of the study indicated 73 percent felt their health was being negatively affected by the environment, 65 percent were most concerned with water pollution, 40 percent were unfamiliar with environmental regulations, and 22 percent definitely indicated environment injustice was an issue in their community. The African-American respondents indicated their income was well under $30,000 annually and rated their community's environmental quality significantly less than the Caucasian respondents (Social Science Institute 2000). These significant findings of the study supported Florence Robinson's theory that people who suffer environmental injustices are most often people of color and poor (Robinson 1994).

The NRCS and the USDA Social Science Institute partnered to complete a study that would identify landowner's perception of barriers that may prevent the delivery of some of their programs to implement conservation practices; such as conservation buffers. They teamed up with the forestry department, rural sociologist, agriculture economist, and rural community groups to develop a questionnaire that would be administered through face-to-face interviews. The interviews concentrated on an individual's knowledge of conservation buffers, local economic conditions, environmental concerns, and community social activities. Three groups were randomly selected for the interviewers, livestock producers, low-income and minority producers, and American Indian producers (USDA 2002).

The American Indian producers identified the following barriers that prevent the delivery of government programs:

1.) Materials may be written at too high an academic level.

2.) Minority producers were not on government mailing lists.

3.) Government personnel had a problem identifying minority farmers.

4.) Government personnel were unfamiliar with American Indian culture.

5.) Government personnel were unfamiliar with tribal government structure.

6.) Government personnel were unfamiliar with appropriate protocol when working with American Indians.

7.) Historical, cultural, and sacred areas may be located in areas where the tribes will not permit the ground to be disturbed.

This study did not provide information regarding this population's environmental concerns, as indicated in their introduction. It does provide valuable information regarding barriers that prevent the delivery of government programs to minority and American Indian populations (USDA 2002).

Environmental Risks and Toxic Waste in Indian Country

Williams (1992) reported that a survey was conducted on only 25 Indian reservations, revealing, "…that 1200 hazardous waste generators or other hazardous waste activity sites were located on or near…those reservations selected for the survey" (Williams 1992, p. 282). The Shoshone have fought for decades to end nuclear testing on their land in the Nevada desert. This testing has exposed them to levels of radiation many times higher than that generated by the bombs dropped on Hiroshima and Nagasaki at the end of the Second World War. Nineteen American Indian tribes have been approached for multiple

retrievable storage (MRS) facility to be placed on their tribal lands. Grace Thorpe founded and promoted the “Freeze Zone” initiative to prevent future nuclear waste or facilities on tribal lands (Thorpe 2000). There are continuous environmental issues being addressed on the Rosebud Reservation as a result of toxic dumping from Pine Ridge nuclear facility (Thorpe 2002).

Robert Tomsho (1990) stated: “Indian tribes across America are grappling with some of the worst of its pollution: uranium tailings, chemical lagoons and illegal dumps. Nowhere has it been more troublesome than on the Mohawk reservation the Indians call Akwesasne – land where the partridge drum.” For years, the Mohawk Tribe, St. Regis Indian Reservation, has fought factories that have fouled the St. Lawrence River. General Motors Corporation (GM) has a toxic waste site and Reynolds Metal and Aluminum Company has smelters that belch out fluoride-laced smoke, both sources of industry receive the credit for the environmental issues the tribes has been forced to deal with. This river once provided food, income and spiritual sustenance for the tribe. Today, over 9,000 residents can no longer eat the perch or pike from the river and their cattle suffer from fluoride poisoning. As early as the 1960s, Mohawk ranchers identified sick and dying cattle and hunters reported skin ulcers and other strange marking on small game (Tomsho 1990). In 1978, a Cornell University study indicated that sick cattle were suffering from fluoride poisoning. In 1983, EPA added the GM site to its Superfund cleanup list, estimating 800,000 cubic yards of polychlorinated biphenyls (PCBs) sediments. Reservation residents were warned

to avoid lettuce and tomatoes from the gardens: women of childbearing age were advised to stop eating fish from the river (Tomsho 1990).

Over the past years, a number of laws have been passed to protect tribal sacred lands. These laws include the American Indian Religious Freedom Act, Native American graves Protection and Repatriation Act, President Clinton's Executive Order 13007 on Indian Sacred Sites, which became the Native American sacred Lands Act of 1997, the Archaeological Resources Protection Act, and the National Historic Preservation Act. According to Tex Hall, chair of the National Congress of American Indians, the laws are ineffective because they lack enforcement. Yet, according to Dr Henrietta Mann, Cheyenne tribal member and endowed chair of Native American studies at Montana State University, "it is estimated that more than 75% of tribal sacred sites are now unavailable to Native peoples, who saw some 90 million acres taken by the U. S. government--without compensation—between 1887 and 1934" (Taliman and Zwinger 2002, p.2). For example, the Hopi religious leaders spent a decade trying to stop the destruction of their sacred shrines on the Woodruff Butte. When the butte was pulverized for gravel, it destroyed eagle nests and Hopi shrines. Another example is the social and cultural impacts for American Indians at Yucca Mountain, nuclear waste storage facility. Fifteen tribes have cultural resource concerns in the area (Stoffle and Evans 1988).

In 1994, the Indian Open Dump Closure Act, Public Law 103-399, became a law on October 22. The law was enacted because of the identification of solid waste open sites on American Indian or Alaskan Native lands. These sites were

identified as an environmental issue that was threatening the health and safety of residents on the lands. The purpose of the Act was to identify location of open dumps, identify relative health and environmental hazards, and provide technical and financial assistance to Indian tribal governments. The law gave Indian Health Service (IHS) ten years to clean up Indian opens dumps.

The IHS inventory of open dumps on Indian land found 1,104 sites (IHS 1998, Table 5).

Table 5. Number of Indian Dump Sites and Classification

Municipal Solid Waste	485 Sites
Wastes Requiring Special Handling	34 Sites
Hazardous Waste	13 sites
Municipal & Special Waste	303 Sites
Municipal & Hazardous Sites	22 Sites
Municipal/Special/Hazardous Wastes	7 Sites
Hazardous & Special Wastes	3 Sites
Undetermined	237 Sites
Total Sites	1104

Source; Indian Health Service 1998

The classification of the sites was divided into three content descriptions; municipal solid waste, special waste, and hazardous waste (HIS 1998 and Table 6).

Table 6. Site Content Descriptions.

Municipal Solid Waste	Any household, commercial, industrial, or

	institutional solid waste that legally can be discarded in a municipal landfill under the provisions of the Resource Conservation and Recovery Act (RCRA), Subtitle D.
Special Waste	Solid or other wastes not specially regarded as hazardous under RCRA, Subtitle C, but are considered to require special handling either due to regulation under other statutes or for worker safety.
Hazardous Waste	Includes those materials listed by EPA under RCRA, Subtitle C, as hazardous.

Source; Indian Health Service 1998

Oklahoma has 44 high threat, 69 moderate threat, 21 low threat, 0 threat undetermined, a total of 134 sites. Oklahoma has the largest number of sites identified as high threat, 44 sites out the 142 sites identified in the United States (IHS 1998 and Table 7).

Table 7. Location of Indian Open Dump Sites -- Potential Threat to Health and Environment

IHS Offices	Serving Areas	High Threat	Moderate	Low	Undetermined	Total
Aberdeen	North and South Dakota, Iowa, Nebraska	14	11	25	2	52
Alaska	State of Alaska	7	136	6	2	151
Albuquerque	New Mexico, Colorado, and Texas	1	9	6	8	24
Bemidji	Indiana, Minnesota, Michigan, and Wisconsin	4	4	0	0	8
Billings	Montana and Wyoming	14	19	0	0	33
California	California and Hawaii	6	25	26	32	89
Navajo	Arizona, New Mexico, and Utah	0	1	240	0	241
Nashville	Eastern United States	22	35	6	0	63
Oklahoma	Oklahoma, Kansas and part of Texas	44	69	21	0	134
Phoenix	Arizona, California, Nevada, and Utah	13	77	62	2	154
Portland	Idaho, Oregon, and Washington	8	12	44	0	64
Tucson	Southern Arizona	9	47	35	0	91
Total		142	445	471	46	1104

Source; Indian Health Service 1998

Tribal lands across the nation can be found on the National Priorities List (NPL) of sites that have uncontrolled hazardous wastes (EPA 2003). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, requires that the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP") to include a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States. The National Priorities List ("NPL") constitutes this list (EPA 2003). There are 8 counties, in Oklahoma, listed on the National Priorities List (NPL) (Figure 3). All 8 counties have sites located within the tribal boundaries of Oklahoma tribes (EPA 2003, Figure 2 and 3, Table 8).

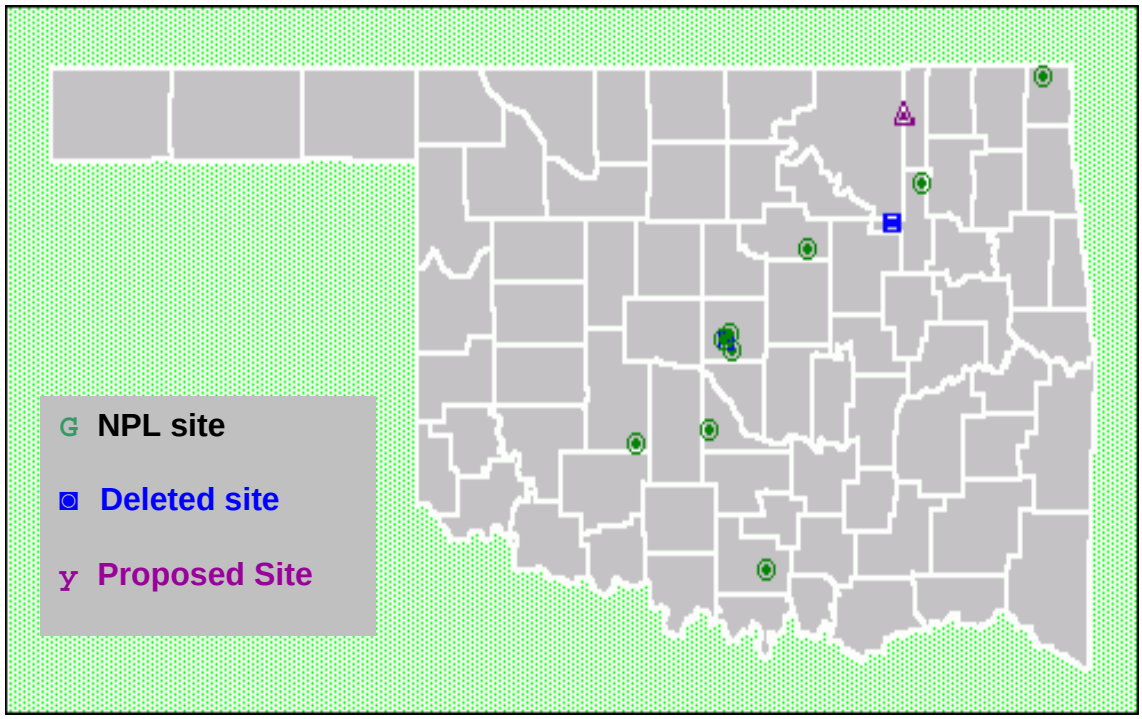

Figure 3. National Priorities List of sites in Oklahoma. Source; EPA National Priorities List Sites in Oklahoma 2003.

Table 8. Oklahoma National Priority List Sites by County and Tribal Boundary

County	Number of Sites	Tribal Boundaries
Caddo	1	Comanche, Kiowa, and Fort Sill Apache
Carter	1	Chickasaw Nation
McClain	1	Chickasaw Nation
Oklahoma	5	Kickapoo, Citizen Pottawatomie, and Absentee Shawnee
Ottawa	1	Quapaw
Payne	1	Iowa, Sac and Fox, and Pawnee
Tulsa	3	Cherokee, United Keetoowah, Loyal Shawnee, and Eastern Delaware
Washington	1	Cherokee, United Keetoowah, Loyal Shawnee, and Eastern Delaware

Source; EPA National Priorities List Sites in Oklahoma 2003.

Degradation of tribal lands has become an environmental issue among this population. Robyn stated, “the 561 federally recognized Indian reservations within the United States are the most exploited and environmentally degraded lands anywhere in rural America” (Robyn 2002, Pg. 214.) Through agreements with the Bureau of Indian Affairs, corporations, and federal agencies, tribes have allowed activities that have now led to environmental issues. For example, strip mining for coal and drilling for oil on the Crow, Navajo, Blackfeet reservations have created environmental issues. Garbage dumping and medical waste incinerators on the Blackfeet, Salt River and Gila River reservations threaten

their health and cultural resources. Mining activities threaten the Sokaogon Chippewa sacred rice beds (Robyn, 2002).

Environmental threats, issues, and concern for the environment are not new to American Indians. As early as the mid-1800s, Indian chiefs, elders, and medicine men spoke openly about their environmental concerns. Chief Seattle of the Suquamish tribe reportedly stated: (Chief Seattle {1854} 1987)

> "The Earth does not belong to human beings; humans belong to the Earth. This we know. All things are connected like the blood, which unites one family. All things are connected. Whatever befalls the Earth befalls the children of the Earth. Human beings did not weave the web of life; they are merely a "strand" in it. Whatever they do to the web, they do to themselves."

American Indians have always altered their environment to survive, transforming the landscape with fire and water and hunting rituals. However, these methods of altering the environment are not the same as having others alter the environment in which this population lives. To American Indians the environment, like their culture, is inherently dialectical and dynamic. American Indians have not always adapted to forced changes in their environment, yet they have always adapted to meet their cultural and material desires (Foreman 1966). In the past, they performed ceremonies, used song and ritual speeches to protect their environment; however these methods have no impact on toxic waste. The introduction of toxic waste, environmental hazards and military related degradation has dramatically affected the present and future health and culture of this population (Lewis 1994).

The Goshutes tribe of the Skull Valley Reservation is a good example of how such activities have forced tribal communities to become very concerned with the environment and activities around them. East of Skull Valley there is a nerve gas storage facility for the United States. This area was once native sagebrush, pine trees, food plants, and wild game. South of the reservation lies the Intermountain Power Project that provides coal-fired electric power. Its emissions pollute the air and cover their tribal lands with dust. Northeast is the Envirocare Low–Level Radioactive Disposal Site that buries radioactive waste for the entire country. In this same area there are two hazardous waste incinerators and one hazardous waste landfill. North is the Magnesium Corporation plant that produces magnesium and has had numerous gas releases. A chlorine gas release from the plant caused the death of over 6,400 sheep (Kamps 2001). The EPA has identified the Magnesium plant as the most polluting plant of its kind in the United States (Kamps 2001).

The Quapaw tribe of Oklahoma is concerned about the environment their tribal families live in. Many Quapaw tribal members live in or around Picher, Oklahoma, known as Tar Creek and America's number one EPA superfund site (Kennedy 1999). They are surrounded by large chat piles that sit outside local schoolyards and their homes. Not only are the residents facing health issues, contaminated ground and surface water and tribal lands; there are mixed emotions that have split their community. Some residents are voicing their concerns and are ready to battle: others want to move out. Some see no hope and many can't agree on a solution (Kennedy 1999).

Health issues among the children are one of the community's biggest concerns. The Quapaw tribe worked with the University of Oklahoma Health Science Center to develop initiatives to educate the young children about cleanliness in relation to contamination. The program they developed was called Tribal Efforts Against Lead (TEAL) (Kennedy 1999, Communication, Lynch, 2000). Even through there have been efforts to address some health issues, EPA continues remediation efforts, environmental education has been attempted, and the community's perception of risk has changed; this community is a good example of why American Indians are concerned about the environment in which they live.

Environmental Education

It has been well documented that American Indians are dealing with a variety of environmental issues such as nuclear waste, toxic dumping, open dumps, superfund sites, nuclear testing, hog farming, and other environmental problems. In most situations it is assumed that this population is aware of the environmental issue(s) that exist within their tribal boundaries. Awareness of an environmental issue is not enough; environmental education is essential for individuals to make sound decisions and take action to manage the environment and activities in their own "backyard" (Yerkes and Haras, 1997).

In the 1970s environmental education gained momentum with the environmental movement. For example, Rachel Carson's book, *Silent Spring*, demonstrated the need for environmental education. In aiding citizens to make intelligent decisions about managing the environment in which they live. The

book was written to alert the public and stir people to take action against the abuse of chemicals and pesticides. Carson awakened people all over the world to the idea that people are inseparable from nature; what they do to it, they do to themselves. She changed the way society looked at nature and the environment. Her interpretation of chemical abuse and its impact on nature set in motion an environmental movement, legislation, policies and formation of agencies that continues today. One such piece of legislation enacted was the Environmental Education Act of 1970.

Environmental Education Purpose

The purpose of environmental education is to enhance critical thinking, problem solving, and effective decision-making skills, and provide individuals the skill to make decisions about their environment (EPA 2003).

Environmental education needs no justification in a period when the degradation of our natural resources is so readily apparent (Lawrence 1997). We must provide environmental education in order to preserve our environment for future generations.

Hill stated “environmental adult education contributes to environmental justice learning by mobilizing citizen participation, popular activism, and direct action which are essential for democracy and for health of people and ecosystems (Hill, 2003, Pg 27).

Defining Environmental Education

There has been a great deal of interest in defining environmental education. Environmental education has different meanings to different people depending on their level of education, social background, professions, training, and working experience in the field (Heimlich 1993). Over the years, many environmental education definitions have evolved from national policies, goals, broad objectives, continuum of understanding and personal thought.

Many practitioners acknowledge that environmental education was nurtured into existence through nature study, outdoor education, resource management, and conservation education. This led to an early definition that emerged from a graduate seminar involving resource conservation planning under the leadership of William Stapp in 1969. At this seminar it was declared:

> Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to solve these problems, and motivated to work towards their solution (Disinger 1983).

This definition was modified by R. Roth in 1970 by references to both biophysical, and sociocultural environments and it stressed the management dimension with this definition:

> Environmental management education is the process of developing a citizenry that is; knowledgeable of the interrelated biophysical and sociocultural of which man is a part; aware of the associated environmental problems and management alternatives of use in solving these problem; and motivated toward the maintenance and development of diverse environments that are optimum of living (Disinger 1983, R. Roth 1970a).

Both of these definitions imply a problem solving approach, which is viewed by some researchers as characteristic of the informed decision making in our democratic society (Disinger 1983, Harvey 1977, and Simmons 2000).

The U. S. Office of Education, through the Environmental Education Act of 1970 offered this definition:

> For the purposes of this act, the term “environmental education” means the educational process dealing with man’s relationship with his natural and manmade surroundings, and includes the relationship of populations, conservation, transportation, technology, and urban and regional planning to the total human environment (Ninety First Congress 1970).

An international effort to define environmental education was provided by the United Nations Educational, Scientific, and Cultural Organization. It states:

> Environmental education is a life-long, multidisciplinary approach to teaching, mass communication, community participation or some other activity aimed at the development of a world population that is aware of, and concerned about, the environment, and its associated problems and that has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (As cited in Moseley 2000).

Some practitioners express the need for the definition of environmental education to have an ecology-based approach rather than a problem-solving approach. Others take a postmodern approach, which emphasizes individual development and an outcome-based approach.

Disinger provided a more complete definition that captures the characteristics and essential elements in most environmental education perspectives.

> Environmental education is based on knowledge of ecology and social systems, drawing on disciplines in the natural sciences, social sciences, and humanities; reaches beyond biological and physical phenomena to consider social, economic, political, technological, cultural, historic, moral, and aesthetic aspects of environmental issues; recognizes that the understanding of feelings, values, attitudes, and perceptions at the center of environmental issues is essential to analyzing and resolving these issues; and emphasizes critical thinking and problems-solving skills needed for informed, reasoned personal decisions and public action (Disinger and Monroe 1994).

Research in the field of Environmental Education

Over the past two decades environmental education has become an important issue. Being able to provide the best approach to environmental education has received its share of research interest. Hungerford and Volk have both conducted research and written extensively on ways to effectively increase responsible environmental behavior in learners. Hungerford and Volk's (1991) research suggested a less traditional approach focusing on empowerment instead of awareness as a crucial tool for creating behavioral change in an individuals attitude towards the environment. Hines (1987) developed a model known as the Hines Model of Responsible Environmental Behavior, which supports the theory that people will do something about an environmental problem if they feel the issue is important and will do something about the environmental problem if they have knowledge and training.

Research has been conducted on what type of framework provides the best vehicle for integrating environmental education. Heimlich's (1991) research on "framing" techniques suggest learning be related to the individual's life so they can identify and investigate the environmental issues and problems and find a solution. Research by Trisler (1993) suggests that the approach for environmental education on global issues acquires more than scientific knowledge; there must be a relationship made between the individual and the global issue before an individual will take action. Ruskey (1995) conducted research to evaluate environmental education as a comprehensive program in every state and found that few states are using framing, problem-solving and action project approaches. McKisson conducted research and developed programs emphasizing curriculum to educate learners between the 4th and 12th grade on hazardous waste and programs that encourage youth to learn about the environment (Evans F. and Micki McKisson 1995).

Research has been conducted and several books have addressed strategies and approaches to environmental education, but none has addressed the delivery of environmental education to underserved population, such as American Indians.

Environmental Education Foundation

As the field of environmental education has evolved, two documents have provided the principles that have been utilized as the core foundation of what concepts and skills citizens and students need in the field of environmental

education. The Belgrade Charter and the Tbilisi Declaration have provided a strong foundation for environmental education (NAAEE 2001). The Belgrade Charter provided a widely accepted goal statement for environmental education:

> The goal of environmental education is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones (NAAEE 2001).

The Tbilisi Declaration, adopted at the world's first intergovernmental conference on environmental education, outlined five categories of objectives for environmental education:

- Awareness and sensitivity to the environment and environmental challenges,
- Knowledge and understanding of the environment and environmental challenges,
- Attitudes of concern for the environment and a motivation to improve or maintain environmental quality,
- Skills to identify and help resolve environmental challenges, and
- Participation in activities that lead to the resolution of environmental challenges. (NEEAC 1996).

Both of these policy documents were developed as a result of the interest in human activity and the environment by the United Nation in 1975 and 1977.

As environmental education has progressed, the North American Association for Environmental Education (NAAEE) took the "responsible citizen" approach to environmental education. This organization incorporated the

problem-solving approach into a national policy document, *The Excellence in Environmental Education: Guidelines for Learning,* which set standards for environmental education (NAAEE 1999).

Environmental Literacy

Over the last two decades of the 20th century, since the first Earth Day, organizations such as the NAAEE, EPA, and Department of Education have endorsed developing well informed and environmentally literate citizens as an answer to the environmental issues that threaten the health of the environment (NAAEE 1999, EPA 2000). The ultimate goal of environmental education is to create environmentally literate citizens (Moseley 2000). Environmental literacy is used to describe an individual's ability to perceive and interpret the condition of the environment around them and capable to take action to maintain, restore, and/or improve the environment (Roth 1990). Robert Roth stressed the importance of knowledge about both the biophysical, sociocultural environment and awareness of management alternates to solve the environmental problems (Roth, 1970). Charles Roth initially worked on defining and developing a continuum for environmental literacy. He asserted that an individual, who is environmentally literate, would possess the following characteristics; environmental knowledge, environmental attitude and sensitivity, problem solving and collaborative skills, action strategies and the ability to take action to improve the environment (Roth, 1992). According to Sagee, it is important to remember

that environmental literacy has various levels and degrees of environmental literacy and each level builds on another (Sagee 1996).

The Environmental Council defines environmental literacy as:

> Environmental literacy requires a fundamental understanding of the systems of the natural world, the relationships and interactions between the living and the non-living environment, and the ability to deal sensibly with problems that involve scientific evidence, uncertainty, and economic, aesthetic, and ethical considerations.

In 1990 the United Nations Educational, Science, and Cultural Organization expanded the 1978 Tbilisi Declaration by adding an environmental literacy statement:

> Environmental literacy is a basic functional education for all people, which provides them with the elementary knowledge, skills, and motivates to cope with environmental needs and contribute to sustainable development (Moseley 2000).

Environmental Education Acts

On October 30, 1970, President Nixon signed into law the first National Environmental Education Act. The Act was funded for five years and repealed I981. The 101st Congress brought up the issue again in a bill signed on November 16, 1990, by President Bush and became Environmental Education Act (PL 101-619) (EPA 2000, Appendix A). The Act mandates the EPA to make environmental education a priority. Funding is authorized to the EPA to establish and operate environmental education, training, grants, awards, and internships

for college students. It established a Federal Task Force and National Environmental Education Advisory Council and promoted environmental education worldwide (EPA, 2000).

Survey Instruments

Self-Administered Surveys

The self-administered survey is becoming one of the most frequently used data collection techniques for social and behavioral research. According to Dillman (2000) the number of surveys conducted by self-administration exceeds the number of interview surveys conducted each year. The reasons for the increase involve, lower costs, organizations can conduct survey themselves, and contracting to professionals is no longer necessary (Dillman 2000).

Dillman stresses that technologies are the major drivers behind the greatly increased use of self-administered surveys that lead to the author's prediction that self-administered surveys will dominate surveying in the early 21st Century (Dilman 2000). Dillman stated:

> "If the forces---societal organization and culture, technology, costs and efficiency, and survey error consideration---are decisive ones in shaping our future, then I think a strong case can be made that greater use of self-administered survey methods is inevitable" (p.14).

Dillman also points out that the societal demand for small group and area surveys is moving research in the direction where there will be a shift toward a self-administration of surveys that our culture supports (Dillman 2002).

A large amount of research work has been conducted on survey measurement, but there has not been substantial evidence that interview methods are superior for producing more reliable research data. Even though a recent study reported strong evidence that interview methods yield more socially desirable answers and respondent acquiescence than self-administered methods (De Leeuw 1996), Dillman still supports self-administered methods (Dillman 2002). Dillman's support for self-administered surveys is based on his assessment that there is a lack of evidence that interviews produce a better measurement.

With telephone interviewing, the respondents may feel pressured, resulting in lower response rates and 30 percent of callbacks not obtaining a significant response rate indicating that potential for self-administered surveys is increasing (Hox and De Leeuw 1994). One survey method, mail self-administrated surveys, has held steady with good response rates (Hox and De Leeuw 1994). According to De Leeuw (1996) on average, face-to-face interviews achieve the highest response (70%), telephone interviews the next highest (67%), and mail surveys the lowest (61%).

Chapter III

Research Methods

This investigation was designed with the intention of revealing, through self-administered surveys, the perception, awareness, and concerns of indigenous grassroots American Indian people and their tribal environmental departments regarding environmental issues. The data gathered during this investigation were expected to provide a better understanding of the environmental setting that exists within the population. Understanding this population's perception, awareness, and concerns will provide important information that can be utilized in planning and implementation of strategies to ensure the delivery of equal quality of life for this population.

This chapter describes the following; sample selection process, research setting, research design, instrument development, administration of the instrument, analysis of data, rationale of the analysis, research questions and hypotheses, and hypothesis testing.

Sample Selection Process

The first step in the sampling process was to identify which Oklahoma tribes that would be willing to participate in the study. The initial sampling plan was to conducted surveys with all 39 tribes of Oklahoma. Based on my research

regarding the Oklahoma tribes' traditional celebrations, I realized there would be conflicts with celebration dates; some tribes holding their celebrations on the same date or weekend. In addition, funding and resources were limited, as there was only one person conducting the research and data entry. After assessing my resources for the study it was determined to reduce the number of tribes to a subset of the 39 Oklahoma tribes.

The official census of members of the 39 tribes residing in Oklahoma was approximately 380,000 (Oklahoma Indian Affairs, 2003). The five largest tribes account for almost 300,000 people, enough to describe most tribal members. To assure that members of smaller tribes were also considered, I decided to select, at random, six large and six small tribes. Small tribes were defined as tribes with less than 7,000 and large tribes with more than 7,000 tribal members. These two categories, small and large tribes, also provided the opportunity to evaluate and compare the perceptions of two tribal populations with different resources to address environmental issues/concerns, awareness, and assistance within their tribal communities.

The third step in the sampling process was to identify the sampling population. In order to assess the environmental issues/concerns, awareness, and assistance for this population it was important that the research be conducted among two groups, the indigenous grassroots population, those American Indians living in their tribal communities, and those tribal professionals holding tribal positions that provide assistance to address environmental issues within their tribal boundaries. These two sampling populations also provided the

opportunity to determine if both groups have the same perceptions regarding environmental issues/concerns, awareness, and assistance in their tribal communities.

The final step involved random selection of the 12 tribes. Before a random selection of the 12 tribes could be conducted, an assessment was conducted to identify possible tribal participation, what permission process was required, and tribal protocol.

Assessment of Research Permission

I made phone contact with the tribal leaders or officials of each of the 39 Oklahoma Indigenous American Indian tribes to evaluate tribal response to a proposed investigation to gather data on the perception, awareness, and concerns regarding environmental issues (Appendix C). Representatives of all 39 tribes were given an overview of my proposed research study and asked five questions. The questions were designed to identify the need for environmental education, benefit, permission, accessibility to tribal celebrations, and tribal protocol (Table 9).

Representatives of all 39 tribes agreed to the need for and benefits of the study, and granted permission for the study. Thirty eight tribes agreed to allow access for the research during their tribal celebration. Only the Citizen Potawatomi Nation would not allow access to tribal celebrations for any reason; their celebration is closed to the public. Five of the 38 tribes could not grant access because they do not have their own separate tribal celebration. These tribes agreed to participate in the study as long as permission was granted by the

hosting tribe (Appendix C). Sixteen of the 38 tribes did not require additional approval by tribal council, celebration committees, tribal elders, or cultural resources directors (Appendix C). Twenty two tribes indicated further contact and approval was necessary (Appendix C).

Table 9. Phone Contact Questions for Tribal Leaders or Officials

1.	Is there a need to conduct an investigation on environmental issues among American Indians?
2.	Could your tribal government and tribal community utilize the information gathered from an investigation to address environmental issues and education?
3.	Would your tribal community permit and support this investigation?
4.	Could the investigation be conducted during your tribal celebration, homecoming, festival, or Pow Wow?
5.	Who would I contact to ensure the proper protocol and cultural traditions would be followed while the investigation is taking place during your tribal celebration, homecoming, festival, or Pow Wow?

These additional 22 designated tribal members were contacted by phone (Appendix C). After a brief introduction they were asked 2 questions to ensure proper protocol and cultural traditions would be respected (Table 10).

Table 10. Departments, Elders, Tribal Leaders, Celebration Committees and Festival Directors

1.	Is there a protocol that needs to be followed to receive permission from your tribal celebration committees or organizer before a research investigation is conducted during your tribal celebration?
2.	If permission is received, will I need to set-up a meeting to discuss the proper protocol and cultural traditions that will need to observed and honored during this investigation?

The following tribal contacts were required:

- 3 tribes required contact with their cultural resources director
- 2 tribes required contacted with tribal leaders
- 2 required contact with Tribal elders
- 7 required contact with the tribal celebration committee
- 5 tribes required contact with tribal council
- 1 tribe required meeting with one tribal family (Passing of the Drum ceremony).
- 2 tribes required contact with Pow Wow chairman

All tribal leaders, celebration committees, councils, elders, and festival and Pow Wow directors were consulted prior to random selection of the six small and large tribes. Proper protocol and cultural outlines were established for each tribe.

I made phone contact with the 39 tribal environmental, cultural and education departments, in Oklahoma, to evaluate tribal staffs' response to a proposed investigation to gather data on the perception, awareness, and concerns of indigenous grassroots Indians regarding environmental issues within their tribal boundaries. Three questions were developed and asked of the tribal staffs to evaluate agreement, benefit/need, and availability to conduct the research (Table 11).

Table 11. Phone Contact Questions for Tribal Cultural, Educationals, Environmental Department Professionals

1. Would your environmental department agree to participate in this investigation to determine and identify environmental issues, delivery of environmental education, awareness of environmental justice and environmental legislation, and barriers identified regarding delivery of programs?
2. Would your environmental department and tribal government utilize the information gathered from this investigation to address environmental issues, education needs, and barriers identified in regarding program delivery?
3. Would your office be available to complete the self-administered survey between September 24 and November 6, 2002?

All 39 environmental departments agreed to participate in the study, they would utilize the information, and all were available between September 24 and November 6, 2002 to complete their questionnaires for this study (Appendix C).

Once all required contacts had been made and permission granted; I contacted all 38 tribes were conducted to obtain the dates of their tribal celebration, homecoming, festival and/or Pow Wow in 2002 (Appendix C). I entered all tribal celebration dates into a table to evaluate and establish feasible research dates (Appendix C). The evaluation of tribal celebration dates indicated random selection was possible and no conflict would occur because the celebrations were held on more than one day. Finally, a random drawing was conducted to select six small and large tribes (Table 12). The same six small and large tribes were also selected to participate in surveys to be conducted with cultural, education, and environmental departments (Table 12).

Table 12. Participating Tribes and their Populations Cunsus

Small Tribe	Population	Large Tribe	Population
Iowa Tribe	451	Creek Nation	64,330
Otoe-Missouria	813	Cherokee Nation	114,864
Pawnee Tribe	954	Osage Nation	15,192
Quapaw Tribe	949	Chickasaw Nation	30,975
Caddo Tribe	4,240	Choctaw Nation	59,832
Comanche Tribe	5,404	Cheyenne-Arapaho	11,558

Source: Tribal enrollment offices of each tribe 2002 (Appendix B).

A time table was established of all selected tribal celebration, homecoming, festival, and Pow Wow (Table 13). In addition, council members and appropriate tribal elders were conducted to establish arrival date, time, location, and protocol. Sampling for the indigenous grassroots people began on May 25, 2002 and continued through November 6, 2002. Since the celebrations, homecomings, festivals, and/or Pow Wows lasted all day and into the evening, sampling was conducted between 10:00 A.M. and 3:00 A.M. accommodating all cultural and spiritual traditions.

Table 13. Time Table for Tribal Celebrations

Small Tribe	Date	Large Tribe	Date
Iowa Tribe	6-14-2002	Creek Nation	6-15-2002
Caddo Tribe	6-26-2002	Osage Nation	6-29-2002
Pawnee Tribe	7-6-2002	Cheyenne-Arapaho	8-30-2002
Quapaw Tribe	7-5-2002	Choctaw Nation	8-31-2002
Otoe-Missouria	7-19-2002	Cherokee Nation	9-1-2002
Comanche Tribe	7-20-2002	Chickasaw Nation	9-29-2002

Research Setting

The investigation was conducted in Oklahoma and within the boundaries of six small and large tribes that were randomly selected for this study (Table 13, Figure 1). The investigation among the indigenous grassroots people took place in areas that are considered to have spiritual or sacred meaning to the tribe. All investigations were conducted outdoors. All cultural, heritage, spiritual and established traditions were upheld with utmost respect and consideration during the research investigation.

The investigation among the environmental departments of the six small and large tribes was conducted at the tribal headquarters of each tribe (Table 14). Surveying was conducted between September 24 and November 6, 2002 during office hours between 10:00 A.M. and 3:00 P.M.

Table 14. Time Table and Location for Tribal Professionals Investigation

Small Tribe	Date	Large Tribe	
Iowa Tribe Perkins, OK	10-2-02	Creek Nation Okmulgee, OK	10-18-02
Otoe-Missouria Red Rock, OK	10-2-02	Cherokee Nation Tahlequah, OK	10-18-02
Pawnee Tribe Pawnee, OK	10-2-02	Osage Nation Pawhuska, OK	11-1-02
Quapaw Tribe Quapaw, OK	11-6-02	Chickasaw Nation Ada, OK	10-5-02
Caddo Tribe Binger, OK	10-25-02	Choctaw Nation Durant, OK	9-25-02
Comanche Tribe Lawton, OK	10-21-02	Cheyenne-Arapaho Concho, OK	10-25-02

Total Design Method

For this study I selected the Total Design Method (TDM). My decision was based on the fact that the TDM provides a one-size-fits-all approach to conducting surveys. It emphasizes the application of social exchange theory, a comprehensive approach to encouraging respondent trust, creating perceptions of increased rewards, and reduced costs as a means of increasing survey response rates. In addition, it introduces specific survey procedures to broaden consideration of the causes of survey errors (Dillman 2000).

Research Design

This investigation utilized a self-administered questionnaire to ascertain the perception, awareness, and concerns of indigenous grassroots Indians and tribal cultural, education, and environmental staffs regarding environmental issues. The self-administered questionnaire was made available for voluntary participation during tribal celebrations, homecomings, festivals, and Pow Wows. Upon my arrival, tribal organizers determined location for the research booth. A booth was erected at each of the tribal celebration, homecoming, festival and/or Pow Wow locations (Appendix D). The booth was designed to provide ample room for eight voluntary participants to complete the self-administered questionnaire at one time (Appendix C). It displayed information regarding the research investigation (Appendix E).

Information included a brochure describing the study, confidentiality and disclaimer statement, how the information will be documented and handled, and the point of contact for questions. All questionnaires were placed in a sealed

envelope to ensure confidentiality. They remained in the envelope until they were opened at Oklahoma State University and entered into Microsoft Excel spreadsheets (Microsoft Excel 2002). Once the surveys were numbered and entered they were placed in folders that identify the tribe, number of surveys, date, location, and then placed in a container for safe keeping and easy access if necessary.

Instrument Development

A pilot study was conducted prior to the development of the questionnaire used in this study. On November 17, 2001, at the American Indian Science and Engineering Society (AISES) Annual Conference, in Albuquerque, New Mexico, 167 college students answered a questionnaire similar to the questionnaire designed for this study (Appendix F). The title of the questionnaire was "Environmental Issues Among American Indian College Students: Perceptions, Awareness, Concerns, and Knowledge of Assistance" (Appendix F). The AISES questionnaire was approved by the Oklahoma State University Institutional Review board (Appendix G). The college students that participated in the study were all American Indians attending college. All participants completed the questionnaire on a voluntary basis. After the college students completed the questionnaire they were asked the following questions:

1.) Were the questions clear and simple?

2.) Were the questions ambiguous or threatening?

3.) Was there consistency in the format?

4.) Was there sequential order of the questions?

5.) Was it easy to read?

6.) Do you think that a survey like this one could provide valuable information?

The results of their responses to the questionnaire presented at the AISES conference are in Appendix F. Nearly all the participants answered the six questions posed after they completed the questionnaire. In addition to answering the six questions, the participants were given the opportunity to recommend what population should be sampled. The majority of responses recommended that the participants for future studies should target the indigenous grassroots people of their tribes that live in tribal communities (Appendix F). After careful evaluation of the pilot study, changes were made in the questionnaire to fit the indigenous grassroots Indians and their tribal cultural, education, and environmental staffs for this investigation. Refinements were made so that all items were consistent in their meaning to both respondents of this study.

Two questionnaires were developed for this study, one for the indigenous grassroots population and one for the tribal professionals of tribes selected for this study. Both questionnaires had three segments; environmental issues, awareness, and demographic information. The first segment of the questionnaires addressed the environmental issues, conditions/quality. The second segment was designed to assess this population's awareness of environmental laws, education, justice, injustices, barriers that prevent delivery of programs, and preferred method to receive environmental and program

information. The third segment was designed to assess demographic information such as age, gender, education level, and ethnic background (Appendix H). Segments of the questionnaires were replicated and modified from the AISES and Social Science Institution (SSI) questionnaire and input from professionals in the environmental field, colleagues and research committee (Appendix I). The reliability and validity of this survey could not be confirmed. Permission to utilize components of the SSI questionnaire was obtained from Frank Clearfield, director of SSI. (Clearfield 2001). The questionnaires were reviewed by my research committee and approved by the Oklahoma State University Review Board (Appendix J and K).

Administration of Instrument

Each voluntary participant was greeted, given a brief introduction, and a brochure to explain the details of the research investigation. Each voluntary participant was asked to raise their hand to indicate that they were 18 years of age before completing the questionnaire. The questionnaire took 7 to 15 minutes for participants to complete. The questionnaires were not administrated during certain songs, dances, and some traditional ceremonies.

Analysis of Data

Because of the large number of respondents and length of the questionnaire, data were entered into Microsoft Excel spreadsheets and then transferred into SPSS computer software (Microsoft 2002, SPSS 2002). Data

from the completed surveys provided descriptive statistics, five-point Likert rating scale responses, dichotomous responses, rating scales, and demographic information. In addition, respondents had the opportunity for some open-ended responses.

I utilized SPSS to conduct statistical analyses. This included frequency reporting, T-tests, and one-way analysis of variance. Chapter 4 provides the detail on these analyses.

Research Questions and Hypotheses

The research objectives were utilized to develop the research questions for this study. The literature review and research questionnaire was designed to answer the following research and hypotheses questions:

Research Question 1: How would this population rank pre-selected issues of concern (quality of life) and environmental issues within the communities in which they live?

Research Question 2: How would this population rank the environmental quality in their communities, and is there a difference within and between the indigenous grassroots respondents of the small and large tribes regarding how they would rank environmental quality/conditions within the communities in which they live?

Research Question 3: Has this population received environmental education on identified environmental issues and problems in their communities and is the environmental education addressing the identified environmental issues. Who is

providing the environmental education on the identified issues and programs, and are they aware of environmental education programs being offered on any of these issues or other environmental concerns in their communities?

Research Question 4: How would this population rate the level of environmental education within the communities in which they live, and is there a difference within and between the indigenous grassroots respondents of the small and large tribes regarding how they would rate environmental education within the communities in which they live?

Research Question 5: Is this population aware of industrial, government, recreational, or agricultural activities that pose a threat to their cultural resources?

Research Question 6: Is this population aware of the environmental laws, Federal Acts and Orders, and mandates that have been issued or enacted to ensure their quality of life and protect their cultural resources?

Research Question 7: Is it perceived by this population that laws and regulations are being sufficiently enforced and adequate to protect their cultural resources, values, sacred sites, and tribal lands?

Research Question 8: Is this population aware of the term environmental justice?

Research Question 9: Is it perceived by this population that environment injustice is occurring within the communities in which they live?

Research Question 10: How would this population rate the level of awareness of environmental and conservation programs in their communities, and is there a difference within and between the indigenous grassroots respondents of the small and large tribes regarding their awareness of environmental and conservation programs within the communities in which they?

Research Question 11: What agencies do the grassroots and tribal respondents utilize for programs and how would this population rate the delivery of programs and assistance within their tribal communities?

Research Question 12: Is this population aware of barriers that might prevent delivery of programs and technical assistance from federal, state, local and tribal agencies and what agencies do they utilize for programs and assistance?

Hypothesis Testing

Each hypothesis was tested at $\alpha = .05$ using appropriate statistical techniques. The following null hypotheses were tested:

$H_0 1$: There is no difference within or between the indigenous grassroots populations of small and large tribes' perceptions of environmental quality/conditions within the communities in which they live.

$H_0$2: There is no difference within or between the indigenous grassroots populations of small and large tribes' level of environmental education.

$H_0$3: There is no difference within or between the indigenous grassroots populations of small and large tribes' in how they would rate the level of awareness of environmental and conservation programs in their communities.

CHAPTER IV

RESULTS OF QUESTIONNAIRES

Introduction

This chapter presents the responses to the indigenous grassroots and environmental professional questionnaires utilized in this study. The results presented in this chapter sought to identify the environmental issues/concerns, awareness, perception, and rating of environmental education, legislation, justice/injustice, environmental and conservation programs, and barriers that prevent the delivery of programs among both groups. Demographic profile information on the indigenous grassroots population and the environmental professionals of six small and large tribes selected for this study is also presented.

To adequately present the results of this study, this chapter is divided into three segments. The first segment provides a demographic description of respondents. The second segment provides the results of the indigenous grassroots questionnaire. The third segment provides the results of the tribal environmental professional questionnaire. Results of both questionnaires are presented in the following categories; demographics, environmental issues/concerns, awareness, perception, rating of environmental education,

legislation, justice/injustice, delivery of environmental and conservation programs, and barriers that prevent the delivery of programs. Results from the questionnaires are not always presented in numerical order but by issues addressed in the study. All questions and frequency counts are presented in Appendix H, for both the indigenous grassroots and environmental professional questionnaires. Discussion of research questions, null hypotheses, differences between the two groups, and differences within and between grassroots tribes is presented in Chapter V.

Description of Respondents

In order to adequately describe the respondents, descriptive research techniques were employed to develop a profile of the respondents in this study. The respondents included the indigenous grassroots population and the environmental professionals of their respective tribes of six small and six large tribes in Oklahoma. The profile of the respondents is presented from the results of the demographic questions asked on both questionnaires. Demographics variables presented are the respondent's tribal affiliation, gender, geographic location, education, and age. A total of 687 respondents were included in this study. Not all respondents answered every item. Demographic questions 33 through 37 from the indigenous grassroots questionnaires are presented in this segment. Demographic questions 28 through 31 from the environmental professional questionnaire are also presented in this segment.

Indigenous Grassroots Responses

The indigenous grassroots population included 645 respondents from the large and small tribes (56 percent and 43 percent of the respondents, respectively) (Table 15). The indigenous grassroots population respondents were asked to indicate their tribal affiliation(s). Twelve Oklahoma tribes, six small and six large, were randomly selected to participate in the study. These twelve tribes, 24 other Oklahoma tribes, and 10 tribes outside of Oklahoma boundaries participated in the study (Table 16).

Table 15. Indigenous Grassroots Population

Tribe	Frequency	Size	Valid Percent
Cheyenne-Arapaho	69	Large	10.7
Cherokee	47	Large	7.3
Chickasaw	53	Large	8.2
Choctaw	70	Large	10.9
Creek	69	Large	10.7
Osage	50	Large	7.8
Caddo	39	Small	6.0
Comanche	64	Small	9.9
Iowa	46	Small	7.1
Otoe-Missouria	30	Small	4.7
Pawnee	41	Small	6.4
Quapaw	54	Small	8.4
Total	645	12	100.0

Only three Oklahoma tribes were not identified by respondents: Wyandotte, Alabama Quassarte, and United Keetoowah. The respondents of 46

tribes provided a representation of the indigenous grassroots population of American Indians (Table 16).

Table 16. Tribes Represented in the Study*

Oklahoma Tribes			
Apache Tribe	Delaware Tribe (Eastern)	Cherokee Nation	Absentee Shawnee Tribe
Caddo Tribe	Iowa tribe	Eastern Shawnee	Seminole Nation
Cheyenne-Arapaho Tribe	Kaw Tribe	Miami Tribe	Citizen Potawatomi Nation
Comanche Nation	Osage Tribe	Modoc Tribe	Chickasaw Nation
Delaware Nation	Otoe-Missouria	Ottawa Tribe	Choctaw Nation
Fort Sill Apache	Pawnee	Peoria Tribe	Kickapoo Tribe
Kiowa Tribe	Ponca Tribe	Quapaw Tribe	Kialegee Tribal
Wichita & Affiliated	Sac & Fox Nation	Seneca-Cayuga	Muscogee (Creek)
Yuchi (Euchee)	Tonkawa Tribe	Shawnee Tribe	Thlopthlocco Tribe
Tribes Outside Oklahoma			
Blackfeet	Sioux	Navajo	Mescalero Apache
Lakota	Chippewa	N. Cheyenne	Oneida
O'edham**	**Toheno		

* Question 37—Indigenous Grassroots Questionnaire
** Presented as respondent did on questionnaire

The respondents to the indigenous grassroots population questionnaire included 351 males and 251 females, with 43 respondents not indicating their sex. The geographic location of the indigenous grassroots population was identified; 296 rural areas, 108 rural towns, 89 farms, 48 tribal lands, 29 suburb, and 21 allotted land (Table 17). The total responses to geographic location were 697, with some respondents indicating more than one geographic location such as; allotted land and rural area.

Table 17. Geographic Location of Indigenous Grassroots Respondents

Rural Area	Rural Town	City	Farm	Tribal	Suburb	Allotted Land
296	108	106	89	48	29	21

* Question 36—Indigenous Grassroots Questionnaire

Sixty-seven percent of indigenous grassroots respondents identified their highest level of education as high school or less (38 percent completed high school and 29 percent had some high school). Almost 20 percent had some college and 7 percent completed college. Only 7 percent had attended technical school, 2 percent had completed graduate school, and 2 percent had professional degrees (Table 18). Most of the indigenous grassroots respondents identified their age group as; (38 percent) 55 and over or (35 percent) between 36 and 54. Only 13 percent were between 25 and 35 and 9 percent between 18 and 24 (Table 19 and Figure 4). Those under 18 were not permitted to take the survey.

Table 18. Indigenous Grassroots Respondents Level of Education

Level of Education*	Indigenous Grassroots	Percent
Some high school	186	28.8
High School Grad	248	38.4
Some College	122	18.9
College Grad	48	7.4
Professional degree	13	2.0
Graduate School	15	2.3
Technical School	47	7.3

* Question 35—Indigenous Grassroots Questionnaire

Table 19. Indigenous Grassoroots Respondents Age by Groups

Age Groups*	Indigenous Grassroots Age Groups	Percent
Between 18 - 24	84	13.0
Between 25 - 35	60	9.3
Between 36 - 54	223	34.6
55 and Over	246	38.1

*Question 34—Indigenous Grassroots Questionnaire

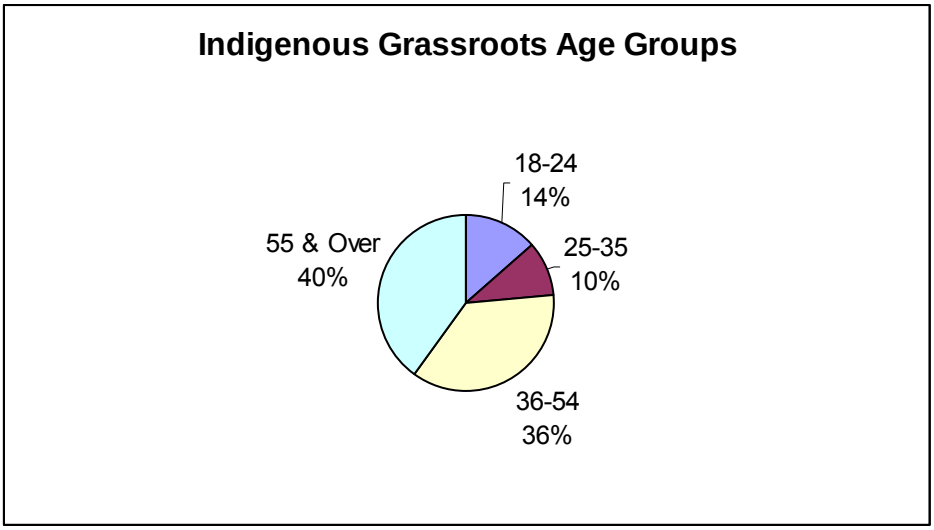

Figure 4. Indigenous Grassroots Respondents Age Groups

The indigenous grassroots respondents had a larger percentage of respondents over the age of 55 when compared to the tribal environmental professionals (Figures 3 and Table 22). Among the indigenous grassroots age group 55 and over, 7 respondents could not read or write and 3 of the respondents only spoke their native language. All ten individuals participated in the study with family members of these individuals acting as interpreters and assisting them in completing the questionnaire.

Environmental Professional Respondents

The environmental professionals of the six small and large tribes included 42 respondents (Table 20). Virtually every tribe, selected to participate in the study, had an environmental staff member who completed a questionnaire. The environmental professionals representation is presented by tribal size, total number of respondents, and percentage for each tribe in Table 20.

Table 20. Environmental Professional Respondents

Tribe	Frequency	Size	Valid Percent
Cheyenne-Arapaho	3	Large	7.1
Cherokee	5	Large	11.9
Chickasaw	5	Large	11.9
Choctaw	4	Large	9.5
Creek	3	Large	7.1
Osage	2	Large	4.8
Caddo	4	Small	9.5
Comanche	3	Small	7.1
Iowa	4	Small	9.5
Otoe-Missouria	3	Small	7.1
Pawnee	3	Small	7.1
Quapaw	3	Small	7.1
Total	42	12	100.0

The respondents to the environmental professional questionnaire included 69 percent (29) males and 21 percent (9) females, with 3 not responding to question 29. The tribal environmental professional respondents were

geographically located at their tribal headquarters as shown in Figure 1, 2 and Table 14.

Most of the tribal environmental professionals identified their highest level of education as high school or college. Ten percent of the respondents indicated that they had completed graduate school, and 5 percent had professional degrees. None of the environmental professionals reported less than a completed high school education degree, with 4 not responding to this question (Table 21).

Table 21. Environmental Professionals Level of Education

Level of Education*	Environmental Professionals Response	Percentage
College Grad	19	45.2
High School Grad	15	35.7
Graduate School	4	9.5
Professional degree	2	4.8
Some high school	0	0
Some College	0	0
Technical School	0	0

* Question 31— Environmental Professional Questionnaire

All the environmental professional respondents identified their age group as between 36 and 54 or 55 and over. Only 10 percent did not respond to this question (Table 22).

Question 32 asked the environmental professional to indicate their job title and/or tribal department. The categories indicated for job title and/or tribal department were environmental department director, cultural resources department, grazing lands coordinator, realty department and/or director, and land management department.

Table 22. Environmental Professionals Age Groups

Age Groups	Environmental Professionals Age Groups	Percent
Between 18 - 24	0	0
Between 25 - 35	0	0
Between 36 - 54	24	57.1
55 and Over	14	33.3
Not Responding	4	9.3

* Question 30— Environmental Professional Questionnaire

The above data have been offered in an attempt to represent the characteristics of the respondents in the study.

Results of the Indigenous Grassroots Questionnaire

The indigenous grassroots questionnaire identified this population's environmental issues/concerns; awareness, perception, and rating of environmental education, legislation, justice/injustice; environmental and conservation programs; and barriers that prevent the delivery of programs. There were 645 indigenous grassroots respondents that completed the 38 questions on the Indigenous grassroots' questionnaire. The questionnaires were divided into three categories; environmental issues, awareness, and demographics (Appendix H). Questions 4, 20, and 24 are not presented in numerical order but by research issues presented in the study.

Environmental Issues/Concerns

Question 1 sought to determine what the most important issues are in the indigenous grassroots' communities. Respondents ranked six issues presented

in Table 23. Respondents used a likert scale with 1 being extremely important, 2 being important, 3 being moderately important, 4 being important, 5 not important, and 6 being least important. Means were calculated and results are shown in Table 23. Respondents indicated health as their most important issue, followed by income, and their least important being crime (Table 23).

Table 23. Likert Means of Issues in Tribal Communities

	Health	Income	Employment	Education	Environmental Quality	Crime
Mean	1.79	2.93	2.98	3.37	4.04	4.68
Number	612	609	611	608	608	607

* Question 1— Indigenous Grassroots Questionnaire. **Likert scale: 1 extremely important and 6 being least important

Question 2 sought to determine the most serious environmental issue in the indigenous grassroots respondents' communities. Respondents used a likert scale with 1 being least serious important, 2 being not serious, 3 being moderately serious, 4 being serious, 5 being extremely serious. Likert means are shown in Table 24. Respondents indicated preservation of their cultural resources as being the most serious environmental issue in their tribal communities, followed by natural resources. Air pollution was identified as being the least important issue (Table 24).

Question 3 sought to determine if the indigenous grassroots respondents perceived that environmental education on the environmental issues identified in question 2 would benefit their communities. Respondents indicated Yes, No, or Not Sure. Over half of the respondents indicated No, with 28 percent Not Sure, and 12 percent indicating Yes (Appendix H).

Table 24.Likert Means of Environmental Issues in Tribal Communities - Indigenous Grassroots Population

Environmental Issues*	Means**
Preservation of Cultural Resources	3.05
Conservation of Natural Resources	2.80
Poor agriculture Practices	2.64
Water Pollution	2.62
Toxic waste	2.28
Groundwater Contamination	2.28
Flooding	2.00
Air Pollution	1.92
Occupational Hazards	1.90

* Question 2— Indigenous Grassroots Questionnaire
** Likert scale 1 to 5, with 5 being most serious

Environmental Quality/Conditions

Question 5 sought to determine how the respondents rated the general environmental quality/conditions in their tribal communities. Analysis identified that the indigenous grassroots respondents are concerned about the environmental quality/conditions within the communities where they live. The respondents were asked to rate their environmental quality/conditions using the following rating scale:

1 = Poor

2 = Below Average

3 = Average

4 = Above Average

5 = Excellent

A large percentage of the respondents, 41 percent, rated their communities to be below average (Table 25). Only 1 percent (7 of 586) of the respondents considered their community environmental quality/conditions to be excellent (Table 25).

Table 25. Indigenous Grassrouts Responses to Environmental Quality

Tribe	Poor		Below Average		Average		Above Average		Excellent		Size
Cheyenne Arapaho	17.5%	(11)	27.0%	(17)	46.0%	(29)	4.8%	(3)	4.8%	(3)	L
Creek	34.8%	(24)	42.0%	(29)	32.6%	(15)	1.4%	(1)	0		L
Cherokee	8.9%	(4)	46.7%	(21)	40.0%	(18)	2.2%	(1)	2.2%	(1)	L
Chickasaw	14.0%	(7)	44.0%	(22)	38.0%	(19)	4.0%	(2)	0		L
Choctaw	21.5%	(14)	53.8%	(35)	20.0%	(13)	3.1%	(2)	1.5%	(1)	L
Osage	14.0%	(7)	50.0%	(25)	32.0%	(16)	4.0%	(2)	0		L
Comanche	19.3%	(11)	47.4%	(27)	29.8%	(17)	3.5%	(2)	0		S
Caddo	3.0%	(1)	42.4%	(14)	36.4%	(12)	18.2%	(6)	0		S
Iowa	30.4%	(14)	28.3%	(13)	32.6%	(15)	6.5%	(3)	2.2%	(1)	S
Otoe-Missouria	20.7%	(6)	24.1%	(07)	55.2%	(16)		(0)	0		S
Pawnee	22.2%	(8)	38.9%	(14)	30.6%	(11)	5.6%	(2)	2.8%	(1)	S
Quapaw	14.0%	(6)	34.9%	(15)	46.5%	(20)	4.7%	(2)	0		S
Total		113		239		201		26		7	S=6
% Within Tribes	19.3%		40.8%		34.3%		4.4%		1.2%		L=6

* Question 5— Indigenous Grassroots Questionnaire

Identified Environmental Problems

Question 6 sought to identify what the indigenous grassroots respondents perceived as the major causes/sources of environmental problems in their tribal communities. Respondents could mark one or multiple causes/sources of environmental problems listed on the questionnaire (Table 26). Respondents indicated farming, both crop and livestock as the major cause/source of environmental problems, followed by open dumps and mining, oil & gas, toxic waste and sanitation systems, respectively (Table 26).

Question 7 sought to determine if the indigenous grassroots respondents had received environmental education on the causes/sources of environmental problems they had indicated in question 6 (Table 26). Respondents could mark one or multiple causes/sources of environmental problems in their communities that were listed on the questionnaire. The number responding to this question was 630 and the largest number, 30, indicated they had received environmental education on open dumps. This 30 indicated they have received environmental education regarding open dumps, followed by sanitation systems, mining, oil and gas, and farming. Only 20 respondents indicated they had received environmental education regarding toxic waste (Table 26).

Question 8 sought to determine if the indigenous grassroots respondents' had incurred damages, loss of property, or health problems as a result of the environmental problems indicated in question 6 (Table 26). Respondents could mark one or multiple causes/sources of environmental problems listed on questionnaire (Table 26). The maximum number responding to this question was

82. The major cause/source for damages, loss of property, or cause for health problems indicated was sanitation followed by open dumps (Table 26).

Table 26. Environmental Problems, Causes, Education, and Damages Indicatd by Grassroots Respondents

Source	Identified Cause Q. 6	Education Q. 7	Damages Q. 8
Toxic Waste	103 (16.0%)	20 (3.1%)	15 (2.3%)
Open Dumps	280 (43.3%)	30 (4.7%)	72 (11.2%)
Sanitation Systems	62 (9.6%)	28 (4.3%)	82 (12.7%)
Mining, Oil, & Gas	261 (40.5%)	24 (3.7%)	27(4.2%)
Farming (Crops/Livestock)	326 (50.6%)	22 (3.4%)	62 (9.6%)

Question 9 sought to determine if the indigenous grassroots respondents had incurred expenses for environmental problems. Items listed for respondents selection were associated with their drinking water sources, sanitation, and/or to improve air quality (Appendix H). Respondents could mark one or multiple sources of environmental items requiring expenses listed in Table 27. Most of the respondent indicated they had purchased bottled water (Table27).

Table 27. Expenditures for Environmental Quality Items

Water Well	Septic Tank	Water Purification	Air Purification	Bottled water
26 (4.0%)	49 (7.6%)	9 (1.4%)	23 (3.6%)	365 (56.6%)

* Question 9— Indigenous Grassroots Questionnaire

Question 10 asked the indigenous grassroots respondents to identify what resources they utilized for their drinking water. Respondents could mark one or

multiple resources of drinking water listed in Table 28. The maximum number responding to this question was 371. Nearly 58 percent indicated public water and approximately 32 indicated private wells as their drinking water supply (Table 28).

Table 28. Identified Resources for Drinking Water - Indigenous Grassroots Respondents

Private Well	Bottled Water	Public Water	Pond	Other
207 (32.1%)	36 (5.6%)	371 (57.5%)	5 (.8%)	1 (.2%) Water filter

* Question 10— Indigenous Grassroots Questionnaire

Question 11 asked the indigenous grassroots respondents to identify what environmental topics they perceived could improve the present environmental conditions in their communities if these topics were the subject of training or programs. Respondents could mark one or multiple environmental topics listed in Table 29. The maximum number responding to one environmental topic was 401, safe drinking water (Table 29).

Table 29. Identified Environmental Topics - Indigenous Grassroots Respondents

Safe Drinking Water	Environmental Laws	Agriculture Related Topics	Solid Waste	Preservation Culture/Land
401 (62.2%)	265 (41.1%)	209 (32.4%)	168 (26.0%)	343 (53.2)

* Question 11— Indigenous Grassroots Questionnaire

Question 12 asked what environmental problems the indigenous grassroots respondents had experienced in the last 5 years. Respondents could

mark one or multiple environmental problems listed in Table 30. Most respondents indicated trash/dumps (Table 30).

Table 30. Identified Environmental Problems - Indigenous Grassroots Respondents

Environmental Problems*	Number of Responses and Percent
Trash/Dumps	143 (22.2%)
Sewer Backups	138 (21.4%)
Unhealthy Drinking Water	83 (12.9%)
Livestock Facilities	71 (11.0%)
Faulty Septic Tanks	45 (7.0%)

* Question 12— Indigenous Grassroots Questionnaire

Question 13 sought to identify what activities (sources) the indigenous grassroots respondents were exposed to on regular bases that they perceived as causing an air quality problem in their communities (Appendix H). Respondents could mark one or multiple activities (sources) listed in Table 31. Most of the respondents indicated dust as the air quality problem in their communities (Table 31).

Table 31. Identified Air Quality Problems - Indigenous Grassroots Respondents

Air Quality Sources*	Number of Responses and Percent
Dust	323 (50.1%)
None	171 (26.5%)
Unpleasant Odor from Livestock	96 (14.9%)
Chemicals in the Air	96 (14.9%)
Industrial Smoke	27 (4.2%)
Other: Mining, Oil/Gas, and Sewers	3 (.6%)

*Question 13— Indigenous Grassroots Questionnaire

Questions 14, 15, 16, and 17 sought to identify the indigenous grassroots respondents' awareness of industrial, government, agricultural, or recreational activities that pose a threat to their cultural resources. The respondents indicated Yes, No, or Not Sure to questions 14, 15, 16, and 17 (Table 32). Respondents who answered Yes were asked to indicate what type of activities posed a threat to their cultural resources (Table 33). Few respondents indicated an activity if they answered yes. The number of responses for each activity ranged from 1 to 5. Farming received 5, poultry, mining, and chemicals received 4, and superfund, dams, and tire industry received 3 responses. Other responses received 2 or less. Most respondents indicated No or Not Sure (Table 32 and 32).

Table 32. Threat to Cultural Resources Exist – Indigenous Grassroots Respondents

Source	Question	*Yes = 1	No =2	Not Sure =3	Missing
Industrial	Q. 14	9.0	43.9	37.7	9.5
Government	Q. 15	11.0	40.9	38.6	9.5
Agriculture	Q. 16	6.2	40.5	43.7	9.6
Recreational	Q. 17	2.3	45.9	41.9	9.9
Average Percent		7.1	42.8	40.4	9.6

*If respondents selected yes, they indicated the type of activity (Table 33).

Table 33. Identified Activities Posing Threat to Cultural Resources Indigenous Grassroots Respondents

Industrial Q.14*	Government Q15*	Agricultural Q.16*	Recreational Q17*
Poultry** (3)	Dams	Chemicals** (4)	Jet skiing
Oil/Gas** (3)	Farming	Farming** (5)	Boating
Mining** (2)	Mining	Dust Cropping	Everywhere
Hog Farms	Roads	Livestock in River	City Expansions
Tire Industry	Don't Care	Poultry Farming	Hunting
Cement Company	Every where	Water Quality	Lakes
Farming	Too many	Every where	River sporting
Superfund Site			
Tree Cutting			
Water Plant			
Sewage plant			

*Based on responses to questions 14, 15, 16, and 17. ** Received more than I response.

Question 18 asked the indigenous grassroots respondents to identify what agency they would contact if they were aware of an industrial, governmental, or agricultural activity that could pose a threat in their community. Respondents filled in the blank. Open ended responses are listed in Table 34. A large majority of the responses indicated they would contact their tribal leader (Table 34).

Table 34. Identified Contacts Regarding Activities Posing a Threat Indigenous Grassroots Respondents

Open Ended Responses*	Number of Responses
Tribal Leaders	187
EPA	57
Local Police	35
Don’t Know	26
Health Department	18
Tribal OEH	14
Local Government	11
Tribal Police	10
Source (Causing the threat)	9
Federal Government	7
Family (Tribal)	6
BIA	5
Tribal Elders	4
Tribal Housing	3
USDA/NRCS/SCS	3
Conservation District	1

Question 18— Indigenous Grassroots Questionnaire

Environmental Education

Question 19 sought to determine how the respondents rated the level of awareness regarding environmental education in their tribal communities. Respondents utilized the following rating scale;

3 = High

2 = Medium

1 = Low

0 =Zero

Cross tabulations of the indigenous grassroots responses regarding the level of environmental education in their communities are presented in Table 35. Most of the respondents rated the level of awareness regarding environmental education as medium, with 77 percent responding med or low (Table 35).

Question 4 asked the respondents to identify if they had received environmental education in the areas listed in Table 36. Of the 645 survey respondents, fewer than 30 percent indicated they had received environmental education (Table 36).

Question 21 asked the indigenous grassroots respondents to indicate if they were aware of environmental education programs being offered in their communities. Respondents were asked to respond by selecting Yes, No, or Not Sure. Of the 582 indigenous grassroots respondents, approximately 51 percent answered No and 36 percent were Not Sure. Nearly 10 percent did not respond (Table 37).

Table 35. Indegenous Grassroots Rating Level of Awareness Regarding Environmental Education

Tribe	Size	Zero = 0	Low = 1	Medium = 2	High = 3	Total
Cheyenne Arapaho	L	2 (3.2%)	22(36%)	31(50.9%)	6(9.8%)	61
Creek	L	13(18.9%)	35(50.8%)	18(26%)	3(4.34%)	69
Cherokee	L	10(22.8%)	13(29.5%)	18(40.9%)	3(6.8%)	44
Chickasaw	L	7(14.3%)	24(48.9%)	14(28.5%)	4(8.3%)	49
Choctaw	L	20(30.7%)	26(40%)	16(24.2%)	3(4.6%)	65
Osage	L	6(12%)	22(44%)	21(42%)	1(2%)	50
Caddo	S	2(6.1%)	9(27.2%)	21(63.6%)	1(3.1%)	33
Comanche	S	7(12.7%)	24(43.1%)	23(41.8%)	1(1.8%)	55
Iowa	S	7(15.2%)	11(23.9%)	22(47.9%)	6(13%)	46
Otoe-Missouria	S	0(0%)	14(48.3%)	13(44.8%)	2(6.9%)	29
Pawnee	S	13(35.1%)	5(13.6%)	16(43.8%)	3(8.1%)	37
Quapaw	S	7(16.2%)	18(41.9%)	15(34.9%)	3(6.9%)	43
Total	12	94	223	228	36	581
Percentage		16.2	38.4	39.2	6.2	100.0

Overall	No Response	Percent	Respondents	Percent
Totals & Percent	64	9.9	581	90.1

* Question 19— Indigenous Grassroots Questionnaire

Table 36. Indigenous Grassroots Respondents Receiving Environmental Education

Areas of Environmental Education*	Respondents	Percentage
Air Pollution	14	2.2
Water Pollution	55	8.5
Groundwater Contamination	18	2.8
Flooding	7	1.1
Conservation and Natural Resources	9	1.4
Preservation of Cultural Resources	58	9.0
Occupational Hazards	14	2.2
Toxic Waste	6	.9
Poor Agricultural Practices	5	.8
Total	186	28.9

* Question 4— Indigenous Grassroots Questionnaire

Table 37. Environmental Education Awareness Indigenous Grassroots Respondents

Valid	Frequency	Percent	Valid Percent
Yes*	21	3.3	3.6
No	327	50.7	56.2
Not sure	234	36.3	40.2
Total	582	90.2	100.0
Missing	63	9.8	

* Question 21— Indigenous Grassroots Questionnaire.

If respondents indicated Yes to question 21, they were asked to indicate who provided the environmental education in question 21a. The opened ended responses to this question are listed in Table 38.

Table 38. Indeginous Grassroots Respondents Identify Environmental Education Providers (Open-ended Responses)

Environmental Education Providers*	Respondents	Percentage
Tribe	10	1.6
County Fairs	1	.2
Conservation Fairs	1	.2
Conservation District	1	.2
EPA	1	.2
OSHA/FDA	1	.2
Oklahoma State University	1	.2
Vo-Tech	1	.2

* Question 21a— Indigenous Grassroots Questionnaire.

Environmental Legislation Indigenous Grassroots

Question 20 sought to determine if the respondents perceived the environmental regulations as being adequate to protect them and their tribal communities. Respondents were asked to respond by selecting Yes, No, or Not Sure to their perception regarding environmental regulations providing adequate protection. Of the 583 indigenous grassroots respondents, approximately 53 percent indicated they were Not Sure (Table 39).

Table 39. Adequate Environmental Regulations

Valid	Frequency	Percent	Valid Percent
Yes	34	5.3	5.8
No	209	32.4	35.8
Not sure	340	52.7	58.3
Total	583	90.4	100.0
Missing	62	9.6	

* Question 20— Indigenous Grassroots Questionnaire.

Question 24 asked the indigenous grassroots respondents to identify the environmental legislation rulings they were familiar with. Respondents could mark one or multiple pieces of the legislation listed in Table 40. The majority of the respondents were more familiar with legislation that pertained to American Indian heritage and culture, followed by Clean Water Act. Relatively few were aware of the Clean Air Act, NEPA, or Executive Order 12898 (Table 40).

Table 40.Indigenous Grassroots Respondents Awareness of Legislation

Legislation*	Responses
Native American Graves & Repatriation Act (NAGPRA)	447
National American Indian Heritage Month (PL 101-343)	440
Clean Water Act	249
National Historic Preservation Act (NHPA)	181
State Drinking Water Standards	158
Clean Air Act	79
National Environmental Policy Act (NEPA)	76
Executive Order 12898	46

* Question 24— Indigenous Grassroots Questionnaire.

Question 25 asked the indigenous grassroots respondents to identify if they perceived that sufficient enforcement of environmental laws and regulations is occurring in their communities. Respondents were asked to respond by selecting Yes, No, or Not Sure to indicate their perception regarding sufficient enforcement of environmental laws and regulations. Of the 572 indigenous grassroots respondents, approximately 45 percent indicated they were Not Sure (Table 41).

Table 41Enforcement of Environmental Regulations - Indigenous Grassroots Respondents

Valid	Frequency	Percent	Valid Percent
Yes	83	12.9	12.9
No	200	31.1	31.0
Not sure	289	44.8	44.8
Total	572	88.8	
Missing	73	11.2	

* Question 25— Indigenous Grassroots Questionnaire.

Environmental Justice

Question 22 sought to determine if the indigenous grassroots respondents were familiar with the term environmental justice and its meaning. Respondents could select either Yes or No. Of the 579 respondents, 52 percent answered Yes and 37 percent answered No (Table 42).

Table 42. Familiarity with the Term Environmental Justice - Indigenous Grassroots Respondents

Valid	Frequency	Percent	Valid Percent
Yes	338	52.4	52.4
No	241	37.4	37.4
Total	579	89.8	89.8
Missing	66	10.2	100.0

* Question 22— Indigenous Grassroots Questionnaire.

Injustice Occurring

Question 23 sought to determine if the indigenous grassroots respondents perceived environment injustice is occurring within the communities in which they live. Respondents could select Yes, No, or Not Sure to indicate if they felt environmental injustice is occurring in their communities. Of the 579 respondents, 56 percent indicated they were Not Sure. Fifty-two percent of the respondents indicated they were familiar with the term environmental justice, yet 56.0 percent were Not Sure if environmental injustice was occurring in their communities (Table 42 and 43).

Table 43. Environmental Injustice Occurring – Indigenous Grassroots Respondents

Valid	Frequency	Percent	Valid Percent
Yes	81	12.6	14.0
No	136	21.1	23.5
Not sure	361	56.0	62.3
Total	579	89.8	100.0
Missing	66	10.2	

* Question 23— Indigenous Grassroots Questionnaire

Awareness of Environmental and Conservation Programs

Question 26 sought to determine how the indigenous grassroots population rated the level of awareness of environmental and conservation programs in their communities. The respondents were asked to rate the level of awareness of environmental and conservation programs in their communities with the following rating scale:

3 = High

2 = Medium

1 = Low

0 =Zero

Most of the respondents rated the awareness of environmental and conservation programs in their communities as zero or low, 53 percent (Table 44).

Table 44. Awareness of Environmental and Conservation Programs – Indigenous Grassroots Respondents

Valid	Frequency	Percent	Valid Percent
High	38	5.9	5.9
Medium	178	27.6	27.6
Low	264	40.9	40.9
Zero	76	11.8	11.8
Missing	89	13.8	13.8

* Question 26— Indigenous Grassroots Questionnaire

Question 27 asked the indigenous grassroots respondents to indicate which federal, state, local, and tribal agencies or organizations they had utilized for programs and assistance. Respondents could mark one or multiple agencies or

organizations listed in Table 45. Respondents indicated they utilized IHS and tribal offices the most (Table 45).

Table 45. Indigenous Grassroots Respondents Identify Agencies and Organizations Utilized for Programs

Federal, State, Local, Or Tribal *	Respondents	Percentage
Indian Health Service	477	74.0
Tribal Offices	368	56.4
Extension Offices	155	24.0
Universities	111	17.2
Natural Resources Conservation Service	81	12.6
Conservation Districts	71	11.0
Department of Environmental Quality (EPA)	27	4.2

* Question 27— Indigenous Grassroots Questionnaire.

Question 28 asked the indigenous grassroots respondents that indicated they had utilized an agency or organization listed in question 27, to rate the delivery of the program (Table 46). Respondents rated the delivery of programs from the agency or organization utilizing the following rating scale:

3 = High

2 = Medium

1 = Low

Table 46. Indigenous Grassroots Respondents Rating of Program Delivery

Valid	Frequency	Percent	Valid Percent
High	99	15.3	17.4
Medium	277	42.9	48.8
Low	191	29.6	33.6
Missing	78	12.2	

* Question 28— Indigenous Grassroots Questionnaire

Barriers Preventing Delivery of Programs

Questions 29, 30, and 31 sought to identify barriers that might prevent delivery of programs, assistance, and initiatives to this indigenous grassroots population. Respondents were asked to identify barriers that prevent delivery of assistance for programs offered by tribes, states, and the federal government. Respondents selected from the barriers listed in Table 47.

A majority of the respondents identified program accessibility and awareness of programs as barriers preventing delivery of assistance for programs offered by tribes. Awareness of programs and program accessibility were identified as barriers preventing delivery of assistance for programs offered by federal agencies. Lack of education regarding program guidelines and awareness of programs stood out as barriers preventing delivery of assistance for programs offered by state agencies (Table 47).

Table 47. Barriers Preventing Delivery of Programs and Assistance – Indigenous Grassroots Respondents

Barriers	Tribal Q.29	State Q.30	Federal Q.31
Program Accessibility	35.0	33.3	33.3
Discrimination	6.8	12.7	14.0
Lack of Interest from Agency	12.1	16.0	18.4
Awareness of Programs	34.0	41.4	43.1
Lack of Education-Guidelines	27.0	74.6	27.9

* Questions 29, 30, and 31— Indigenous Grassroots Questionnaire

Question 32 asked the indigenous grassroots respondents to identify how they preferred to receive information regarding program assistant and environmental education. Respondents selected from the methods of communication listed in Table 48. Respondents were asked to make three selections from the list provided. Most respondents preferred to receive information through a newsletter, followed by personal visits (Table 48).

Table 48. Indigenous Grassroots Respondents Preferred Method of Communication

Preferred Communication Method *	Respondents	Percentage
Newsletter	330	51.2
Personal Visit	238	36.6
Group/Community Training	230	35.7
Television/Video	153	23.7
Family/Friends	145	22.5
Printed Materials	144	22.3
Conservation/Tribal Fairs	98	15.2
Pow Wows	97	15.0

* Question 32— Indigenous Grassroots Questionnaire.

Results of the Environmental Professional Questionnaire

The environmental professional identified the tribal environmental issues/concerns; awareness, perception, and rating of environmental education, legislation and justice/injustice; environmental and conservation programs; and barriers that prevent the delivery of programs. There were 42 environmental professional respondents that completed the 32 questions on the environmental professionals' questionnaire. The questionnaire was divided into three categories; environmental issues, awareness, and demographics (Appendix H). Not all questions on the environmental professional questionnaire are the same as the indigenous grassroots questionnaire. Questions 4, 20, and 24 are not presented in numerical order but by research issues presented in the study.

Environmental Issues/Concerns

Question 1 sought to determine what the most important issues are in the tribal communities. Respondents ranked six issues using a likert scale with 1 being extremely important, 2 being important, 3 being moderately important, 4 being important, 5 not important, and 6 being least important (Table 49). Means were calculated and results are shown in Table 49. Respondents indicated income as being an extremely important issue, followed by education, and their least important being crime (Table 49).

Question 2 sought to determine the most serious environmental issue in the tribal communities of the environmental professionals. Respondents used a likert scale

with 1 being least serious in importance, 2 being not serious, 3 being moderately serious, 4 being serious, 5 being extremely serious (Table 50). Means were calculated and results are shown in Table 50. Respondents indicated water pollution and preservation of their cultural resources as being the most serious environmental issues in their tribal communities, followed by natural resources. Air pollution and flooding were the least important issues (Table 50).

Table 49. Likert means* of Quality of Life Issues in Tribal Communities - Tribal Professionals

	Health	Income	Employment	Education	Environmental Quality	Crime
Mean	2.02	3.97	2.73	3.57	3.19	5.40
Number	42	42	42	42	42	42

*Question 1— Environmental Professional Questionnaire
Likert scale 1 to 5 with 1 being most serious

Question 3 sought to determine if the environmental professional respondents had received environmental education on the environmental issues identified in question 2. Respondents could make one or multiple selections from the list in Table 51. All environmental professional respondents indicated they had had environmental education or training in the areas of water pollution and preservation of cultural resources (Table 51). Most had training in conservation and natural resources, occupational hazards, and water and groundwater contamination. Fewer than half were trained in toxic waste and very few (9.5 percent) were trained in flooding.

Table 50. Likert Means of Environmental Issues in Tribal Communities - Tribal Professionals

Environmental Issues*	Means**
Water Pollution	3.52
Preservation of Cultural Resources	3.14
Conservation of Natural Resources	3.04
Poor agriculture Practices	2.97
Occupational Hazards	2.66
Groundwater Contamination	2.14
Toxic waste	2.04
Air Pollution	2.23
Flooding	1.57

* Question 2— Environmental Professional Questionnaire
** Likert scale 1 to 5, with 5 being most serious

Table 51. Environmental Professionals Receiving Environmental Education or Training in these Areas

Environmental Issues*	Responses	Percentage
Air Pollution	40	95.2
Water Pollution	42	100
Groundwater Contamination	23	54.8
Flooding	4	9.5
Conservation of Natural Resources	37	88.1
Preservation of Cultural Resources	42	100
Occupational Hazards	32	76.2
Toxic Waste	17	40.5
Poor Agriculture Practices	40	95.2

* Question 3— Environmental Professional Questionnaire

Question 4 sought to determine if the environmental professional respondents had delivered environmental education on the environmental issues identified in question 2. Respondents could make one or multiple selections from

the list in Table 52. There were fewer responses to this question than to question 3. No environmental professionals had delivered training in the area of toxic waste (Table 52).

Table 52. Environmental Professional Delivering Environmental Education or Training In these Areas

Environmental Issues*	Responses	Percentage
Air Pollution	17	40.5
Water Pollution	39	92.9
Groundwater Contamination	5	11.9
Flooding	2	4.8
Conservation of Natural Resources	5	11.9
Preservation of Cultural Resources	22	2.4
Occupational Hazards	15	35.7
Toxic waste	0	0
Poor agriculture Practices	9	21.4

* Question 4— Environmental Professional Questionnaire

Environmental Quality/Conditions

Question 5 sought to determine how the environmental professional respondents rated the general environmental quality/conditions in their tribal communities. Analysis identified that the professional respondents were concerned about the environmental quality/conditions within the communities in which they live. Table 53 contains results from the professional responses concerning how they rated the environmental quality in their tribal communities.

Table 53. Environmental Professional Rating of Environmental Quality

Rating Environmental Quality	Response	Percentage
1 = Poor	14	33.4
2 = Below Average	20	47.6
3 = Average	5	11.9
4 = Above Average	0	5.55
5 = Excellent	0	5.55

* Question 5— Environmental Professional Questionnaire.

Identified Environmental Problems

Question 6 sought to identify what the environmental professionals perceived as the major causes/sources of environmental problems in their tribal communities. Respondents could mark one or multiple causes/sources of environmental problems listed on the questionnaire (Table 54). Respondents indicated open dumps as the major cause/source of environmental problems.

Question 7 sought to determine if the environmental professional respondents were aware of environmental problems indicated in question 6 that had caused damages, loss of property, or health problems in their tribal communities (Table 54). Respondents could mark one or multiple causes/sources of environmental problems listed on questionnaire (Table 54). The major causes/sources for damages, loss of property, or cause for health problems indicated were virtually identical to those of question 6, except for a large increase from farming (crops/livestock) (Table 54).

Table 54. Environmental Problems: Causes, Education, and Damages Indicated by Environmental Professional Respondents

Source	ID Cause Q. 6	Percent	Damages Q. 7	Percent
Toxic Waste	5	11.9	5	11.9
Open Dumps	39	92.9	39	92.9
Sanitation Systems	5	11.9	5	11.9
Mining, Oil, & Gas	24	57.1	23	54.8
Farming (Crops/Livestock)	4	9.5	29	69.0

* Question 6 and 7— Environmental Professional Questionnaire.

Question 8 asked the environmental professional respondents to identify what environmental topics they perceived could improve the present environmental conditions in their tribal communities if these topics were presented as training or programs. Respondents could mark one or multiple environmental topics listed in Table 55. Most of the environmental professionals indicated all topics could improve environmental condition in their communities (Table 55).

Table 55. Identified Environmental Topics – Tribal Professionals

Safe Drinking Water	Environmental Laws	Agriculture Related Topics	Solid Waste	Preservation Culture/Land
35 (83.3%)	39 (92.9%)	39 (92.9%)	39 (92.8%)	39 (92.8%)

* Question 8— Environmental Professional Questionnaire

Question 9 asked what environmental problems the environmental professional respondents' had experienced in the last 5 years. Respondents could mark one or multiple environmental problems listed in Table 56. Most respondents indicated trash/dumps, sewers backups, or unhealthy drinking water (Table 56).

Table 56. Identified Environmental Problems – Tribal Professionals

Environmental Problems*	Number of Responses and Percent
Trash/Dumps	38 (90.5%)
Sewer Backups	33 (78.6%)
Unhealthy Drinking Water	16 (38.1%)
Faulty Septic Tanks	5 (11.9%)
Livestock Facilities	3 (7.1%)

* Question 9— Environmental Professional Questionnaire

Question 10 sought to identify what activities (sources) the environmental professional respondents perceived their tribal communities were exposed to on regular bases that may be causing an air quality problem in their tribal communities. Respondents could mark one or multiple activities (sources) listed in Table 57. Most of the respondents indicated dust as the air quality problem in their tribal communities, with livestock odor a distant second (Table 57).

Table 57. Identified Air Quality Problems – Tribal Professionals

Air Quality Sources*	Number of Responses and Percent
Dust	39 (92.9%)
Unpleasant Odor from Livestock	20 (47.6%)
Chemicals in the Air	4 (9.5%)
Industrial Smoke	1 (2.4%)
Other: Mining, Oil/Gas, and Sewers	None

* Question 10— Environmental Professional Questionnaire

Questions 11, 12, 13, and 14 sought to identify the environmental professional respondents' awareness of industrial, government, agricultural, or recreational activities that pose a threat to their cultural resources. Respondents indicated Yes, No, Not Sure (Table 58). Respondents who answered Yes were asked to indicate what types of activities posed a threat to their cultural resources

(Table 59). Responses to the four questions are presented in Table 58. Most respondents indicated no activities specified as threats listed in Table 59.

Table 58. Threat to Cultural Resources Exists – Tribal Professionals

Source	Question	*Yes = 1	No =2	Not Sure =3	Missing
Industrial	Q. 11	5	37	0	0
Government	Q. 12	8	31	3	0
Agriculture	Q. 13	3	36	3	0
Recreational	Q. 14	4	35	3	0

*If respondents selected yes, they indicated the type of activity (Table 35).

Table 59. Identified Activities Posing Threat to Cultural Resources - Tribal Professionals

Industrial	Q.11	Government	Q.12	Agricultural	Q.13	Recreational	Q.14
Oil/Gas**	(3)	Agriculture	(8)	Burning	(2)	Hunting	(4)
				Leases	(1)	Trespassing	(1)

Question 15 asked the environmental professional respondents to identify what agency their tribal members would contact if they were aware of an industrial, governmental, or agricultural activity that could pose a threat in their community. Open ended responses indicated that all environmental professional perceived the tribal members would contact the tribal headquarters or tribal police.

Environmental Education

Question 16 sought to determine how the environmental professionals would rate the level of awareness regarding environmental education in their tribal communities. Respondents indicated 3 for high, 2 for medium, 1 for low, and 0 for

zero. Most of the respondents rated the level of awareness regarding environmental education as medium (Appendix H).

Question 18 asked the respondents to identify if environmental education is offered to tribal members either by the tribe or another agency. Respondents indicated their response by selecting Yes, No, or Not Sure. Nearly all respondents indicated Yes(Appendix H).

Environmental Legislation Tribal Professionals

Question 17 sought to determine if the environmental professionals' perceived the environmental regulations as being adequate to protect their tribal communities. Respondents were asked to respond by selecting Yes, No, or Not Sure to their perception regarding environmental regulations providing adequate protection. Of the 42 environmental professional respondents, approximately 81 percent indicated no (Appendix H).

Question 20 asked the environmental professionals to identify the environmental laws, executive orders, public laws and standards they were familiar with. Respondents could mark one or multiple pieces of legislation listed in Table 62. The majority of the respondents were more familiar with legislation that pertained to American Indian heritage and culture. The lowest was Executive Order 12898 (Table 60).

Table 60. Environmental Professionals Awareness of Legislation

Legislation*	Responses
National American Indian Heritage Month (PL 101-343)	41(98.5%)
Native American Graves & Repatriation Act (NAGPRA)	41 (98.5%)
Clean Water Act	39 (92.9%)
National Historic Preservation Act (NHPA)	39 (92.9%)
State Drinking Water Standards	39 (92.9%)
Clean Air Act	25 (59.5%)
National Environmental Policy Act (NEPA)	24 (57.1%)
Executive Order 12898	10 (23.8%)

* Question 20— Environmental Professional Questionnaire.

Question 21 asked the environmental professional respondents if they perceived sufficient enforcement of environmental laws and regulations is occurring in their communities. Respondents were asked to respond by selecting Yes, No, or Not Sure. Nearly all respondents indicated No (Appendix H).

Environmental Justice

Question 19 sought to determine if the environmental professional respondents perceived environmental injustice is occurring within their tribal communities. Respondents could select Yes, No, or Not Sure to indicate if they felt environmental injustice is occurring in their communities. Nearly all respondents indicated Yes, (39), (Appendix H).

Awareness of Environmental and Conservation Programs

Question 22 sought to determine how the environmental professionals would rate the level of awareness of environmental and conservation programs in their tribal communities. Respondents rated their level of awareness of

environmental and conservation programs by selecting 3 for high, 2 for medium, 1 for low, and none for zero. Most of the respondents rated the awareness of environmental and conservation programs in their communities as medium, (39), (Appendix H).

Question 23 asked the environmental professionals to indicate which federal, state, local, and tribal agencies or organizations they had utilized for programs and assistance. Respondents could mark one or multiple agencies or organizations listed in Table 61. Nearly 100 percent of the respondents indicated they utilized IHS and tribal offices the most, followed by the Natural Resources Conservation Service (Table 61).

Table 61. Environmental Professionals Identify Agencies & Organizations Utilized for Programs

Federal, State, Local, Or Tribal *	Respondents
Indian Health Service	41 (98.5%)
Environmental Protection Agency (EPA)	39 (92.9%)
Natural Resources Conservation Service	24 (57.1%)
Universities	10 (23.8%)
Extension Offices	5 (11.9%)
Conservation Districts	5 (11.9%)
Department of Environmental Quality (DEQ)	5 (11.9%)

* Question 23— Environmental Professional Questionnaire.

Question 24 asked the environmental professionals that indicated they had utilized an agency or organization listed in question 23, to rate the delivery of the program. Respondents rated the delivery of programs utilizing a rating scale shown in Table 62. The results are presented in Table 62. Most of the respondents rated the EPA, IHS, DEQ, and NRCS as either high or medium. HIS and NRCS was

either medium or low with few rating it high, and EPA was the opposite. Universities were the only group rated low (12%). Conservation districts and extension offices were not rated either high or low (Table 62).

Table 62. Environmental Professionals' Rating of Program Delivery

Federal, State, Local, Or Tribal *	3=High	2=Medium	1=Low
Indian Health Service	4 (9.5%)	19 (45.2%)	0
Environmental Protection Agency (EPA)	19 (45.2%)	4 (9.5%)	0
Natural Resources Conservation Service	5 (11.9%)	19 (45.2%)	0
Universities	4 (9.5%)	1 (2.4%)	5 (11.9%)
Extension Offices	0	21 (50%)	0
Conservation Districts	0	5 (11.9%)	0
Department of Environmental Quality	19 (45.2%)	15 (35.7%)	0

* Question 24— Environmental Professional Questionnaire

Barriers Preventing Delivery of Programs

Questions 25, 26, and 27 sought to identify barriers that might prevent delivery of programs, assistance, and initiatives to environmental professionals and their tribal communities. Respondents were asked to identify barriers that prevented delivery of assistance for programs offered by tribes, states, and the federal government. Respondents made multiple selections from the barriers listed in Table 63.

Table 63. Barriers Preventing Delivery of Programs & Assistance – Tribal Professionals

Barriers	Tribal Q.25	State Q.26	Federal Q.27
Program Accessibility	34 (81%)	23 (54.8%)	42 (100%)
Discrimination	0	25 (59.3%)	5 (11.9%)
Lack of Interest from Agency	24 (57.1%)	42 (100%)	24 (57.1%)
Awareness of Programs	3 (7.1%)	9 (21.4%)	9 (21.4%)
Lack of Education-Guidelines	25 (59.5%)	38 (90.5%)	20 (47.6%)

* Questions 25, 26, and 27— Environmental Professional Questionnaire

Nearly all respondents identified program accessibility, interest of programs and lack of education guidelines as the major barriers preventing delivery of assistance for programs offered by tribes and federal agencies. Program accessibility and discrimination stand out as a unique barrier preventing delivery of assistance for programs offered by state agencies (Table 63).

Question 28 asked the environmental professionals to identify how they preferred to receive information regarding program assistant and environmental education. Respondents selected from the methods of communication listed in Table 66. Respondents were asked to make three selections from the list provided. Most respondents preferred to receive information through group/community training, personal visits, and printed materials (Table 64).

Table 64. Environmental Professionals Preferred Method to Receive Information

Preferred Communication Method *	Responses and Percent
Newsletter	0
Personal Visit	29 (69.0%)
Group/Community Training	42 (100%)
Television/Video	0
Family/Friends	18 (42.9%)
Printed Materials	39 (90.9%)
Conservation/Tribal Fairs	10 (23.8%)
Pow Wows	0

* Question 28— Environmental Professionals Questionnaire.

CHAPTER V

DISCUSSION

The discussion in this chapter is organized and presented in the order of research and questions, 1 through 12, questionnaire questions, and hypotheses testing for research questions 2, 4 and 10. Research questions were developed from the research objectives presented in Chapter 1. For discussion purposes in this chapter, the indigenous grassroots respondents will be referred to as grassroots and the environmental professional respondents will be referred to as tribal.

Research Question 1 Quality of Life and Environmental Issues

Research question 1 asked: “How would this population rank pre-selected issues of concern (quality of life) and environmental issues within the communities in which they live? “ Questions 1 and 2 on both grassroots and tribal questionnaires were utilized to answered research question 1 and to fulfill research objective 3 for this study.

To determine this population’s issues of concern (quality of life issues) within their communities, they were asked to rank pre-selected issues present in question1 of both questionnaires. Figure 5 illustrates the means of the responses

to pre-selected issues of concern (quality of life), 1 as extremely serious, 6 least serious. Both grassroots and tribal respondents ranked health as their most important quality of life issue of concern and crime as an issue of least concern (Figure 5). However, income and environmental quality appear to be more important to the tribal respondents than to grassroots respondents. Regarding employment and education, both the grassroots and tribal respondents ranked these quality of life issues about the same. Based on the results of the pilot study, conducted among the American Indian college students (Appendix F), I expected environmental quality and education to be ranked higher among the tribal respondents. The rationale for this belief was that the college students were in college and getting a degree in environmental science/engineering and the jobs of the tribal respondents focus on environmental quality in most cases require a college degree or specific training.

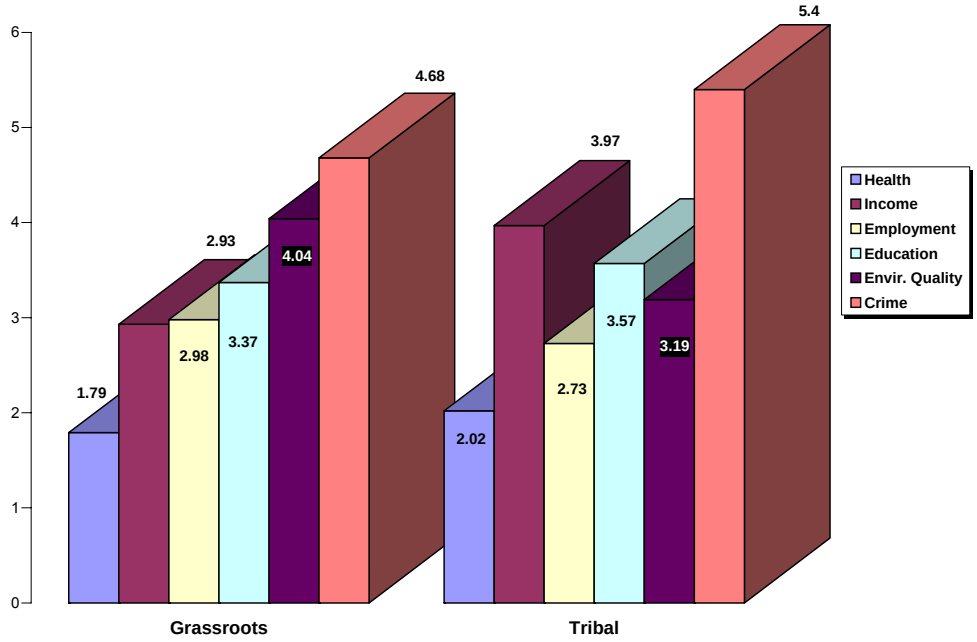

Figure 5. Grassroots and Tribal Respondents Rankings af Pre-Selected Issues in their Communities (1 Being Most Serious and 6 Least Serious)

Question 2 asked both the grassroots and tribal respondents to rank pre-selected environmental issues within their communities. Figure 6 illustrates the means of the ranking responses to the pre-selected environmental issues as presented in question 2. Both respondents indicated they believe flooding to be their least concern from the choices they were given. It appears that the tribal respondents believe water pollution is the most serious environmental issue, while grassroots indicated preservation and protection of their cultural resources as the most serious environmental issue in their communities. Natural resources, agriculture practices, groundwater, and air pollution were ranked almost equally by both groups. Occupational hazards were ranked higher by the tribal respondents than grassroots (Figure 6).

In summary, the most important quality of life issue for both grassroots and tribal respondents in this study was health. The most serious environmental issue identified by the grassroots respondents was preserving and protecting their cultural resources, while for the tribal respondents it was water pollution.

Both the grassroots and tribal respondents have a perception (belief) on how quality of life issues and environmental issues rank within the communities in which they live. Health being the most important quality of life issue with the grassroots respondents was not surprising, considering that over 38 percent of the grassroots were age 55 or over. The job positions of the tribal respondents included; environmental directors, water quality technicians, education, land management, and natural and cultural resources, therefore, one could speculate that their responses would not be very different from the grassroots. Any differences were likely due to job description and educational background. One positive note is that the grassroots were aware enough of the environmental issues within their tribal communities to rank them.

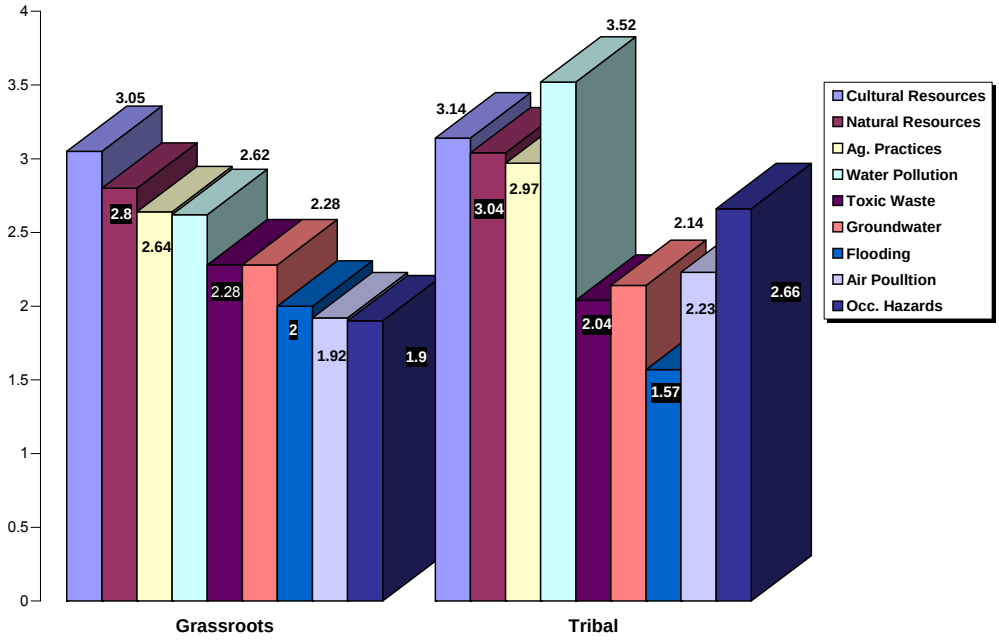

Figure 6. Grassroots and Tribal Respondents Rating of Pre-Selected Environmental Issues in their Communities (5 Being Most Serious and 1 Being Least Serious)

Research Question 2 Environmental Quality/Conditions Ranked

Research question 2 asked: “how would this population rank the environmental/conditions in their communities and is there a difference within and between the indigenous grassroots respondents of the small and large tribes regarding how they would rank environmental quality/conditions within the communities in which they live?” Question 5 on both the grassroots and tribal questionnaires and $H_0 1$ were utilized to answer research question 2 and to fulfill research objective 2 for this study.

Figure 8 illustrates, qualitatively, the grassroots and tribal respondents agreed when ranking the environmental quality/conditions in their communities

either poor or below average. Over 60 percent of the grassroots and 81 percent of the tribal respondents ranked environmental quality/conditions as poor or below average. Less than 6 percent of the grassroots and none of the tribal respondents ranked the environmental quality/conditions as above average or excellent. Of those who ranked their communities as average, there were differences between the grassroots and tribal respondents. Only 12 percent of the tribal versus 35 percent of the grassroots considered the environmental quality/conditions in their communities to be average (Table 25, 53 and Figure 7).

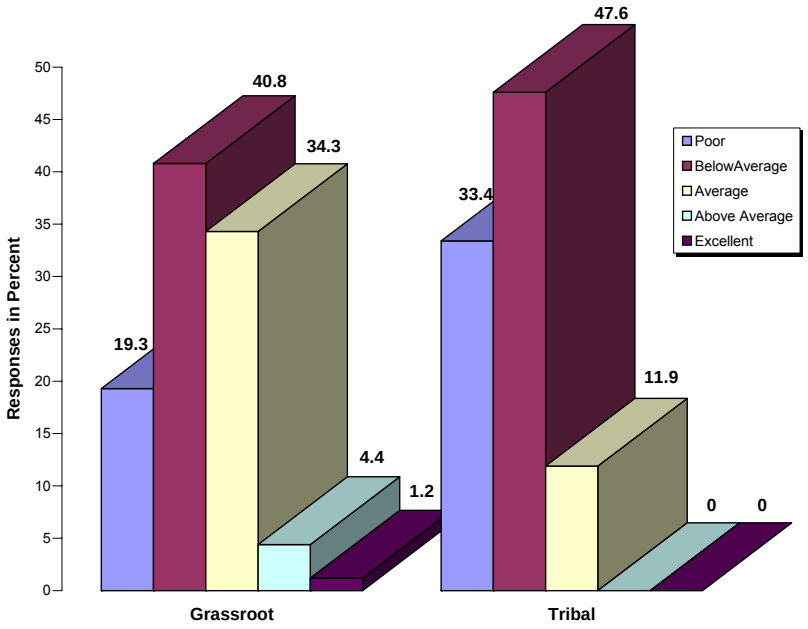

Figure 7. Grassroots Respondents Ranking of Environmental Quality/Conditions in their Communities

$H_0$1: Environmental Quality/Conditions

$H_0$1 stated there is no difference within or between the indigenous grassroots populations of small and large tribes' ranking of environmental quality/conditions within the communities in which they live. Analyses were run to

determine if differences existed between and within the perceptions of the indigenous grassroots populations of small and large tribes in ranking the environmental quality/conditions in their communities. One-way ANOVA revealed significant differences between the tribes (P <.001) (Table 65, APPENDIX L). Post Hoc analysis, with a choice of least significant differences (LSD), was run to test multiple pairs. This test indicated significant differences between and within the large and small grassroots tribes in ranking the environmental conditions/quality in their communities α =.05 (Table 66 and APPENDIX L). $H_0$1, which stated there are no differences within and between the indigenous grassroots populations of small and large in ranking the environmental quality/conditions in their communities, was rejected.

Table 65. One-Way ANOVA: Ranking Environmental Quality Within and Between Small and Large Tribes- Indigenous Grassroots Respondents

One-way ANOVA	Sum of Squares	df	Mean Squares	F	Sig.
Between Tribes	24.558	11	2.233	3.109	<.001
Within Tribes	412.209	574	.718		
Total	436.766	585			

Table 66. Post Hoc Test: Multiple Comparisons on Ranking Environmental Quality Within and Between Small and Large Tribes

Multiple Comparisons	# of Times Sig. Mean Difference Occurred	Size	Differed with Large Tribes # of Times	Differed with Small Tribes # of Times
Cheyenne Arapaho	2	L	0	2
Creek	2	L	0	2
Cherokee	2	L	0	2
Chickasaw	2	L	0	2
Choctaw	2	L	0	2
Osage	3	L	1	2
Caddo	9	S	6	3
Comanche	1	S	1	0
Iowa	3	S	2	1
Otoe-Missouria	2	S	1	1
Pawnee	1	S	0	1
Quapaw	7	S	4	3
Total	36	12	15	21

Table 66 illustrates the number of times a significant difference occurred within and between the small and large tribes of the grassroots tribes based on multiple comparisons on the ranking of environmental quality/conditions, using the Post Hoc test. The Caddo and Quapaw, both small tribes, stand out as having more differences when compared to the other tribes. Both tribes differed with small and larges tribes. All but one of the large tribe (Osage) differed only with the small tribes. On 36 different occasions there were significant differences on how the tribes ranked the environmental quality/conditions in their communities (Table 66).

Small and Large Tribes Rating of Environmental Quality

Qualitative differences exist between the small and large grassroots tribes on how they ranked environmental quality/conditions within their communities, regardless of tribal size. Table 25 and Figures 8 and 9 illustrate observed differences between the small and large tribes on how they ranked environmental quality/conditions in their communities, presented in percent.

The Cheyenne-Arapaho, Osage, and Choctaw tribes were all categorized as large tribes in this study. Only 27 percent of the Cheyenne-Arapaho indicated their environmental quality/conditions to be below average while about 50 percent of the respondents from all the other large tribes chose this response (Table 25). Similar comparisons can be made between the tribes categorized as small tribes. Only a quarter of the respondents from the Otoe-Missouria tribe ranked their environmental quality/conditions as below average, while nearly 50 percent of the Comanche tribe and more than 40 percent of the Caddo tribe ranked their environmental quality/conditions as below average (Table 25). None of the Otoe-Missouria respondents considered their community to be above average or excellent (Table 25 and Figure 8).

It is also notable that approximately 30 percent of the Iowa Tribe rated their community poor. All tribes were consistent in ranking their environmental quality/conditions as being below average (Figure 8 and 9). Few respondents ranked their community to be above average (Figure 8 and 9).

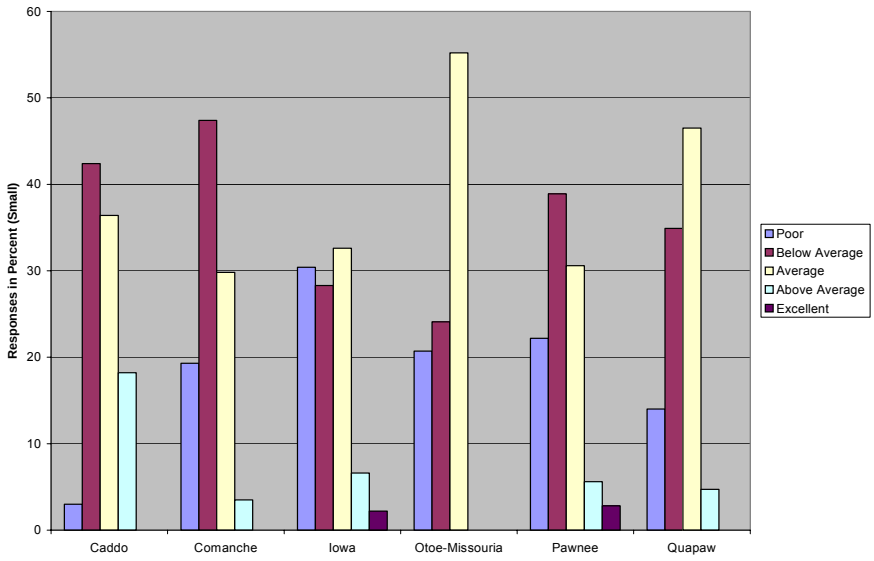

Figure 8. Ranking Environmental Quality/Conditions among Small Grassroots Tribes

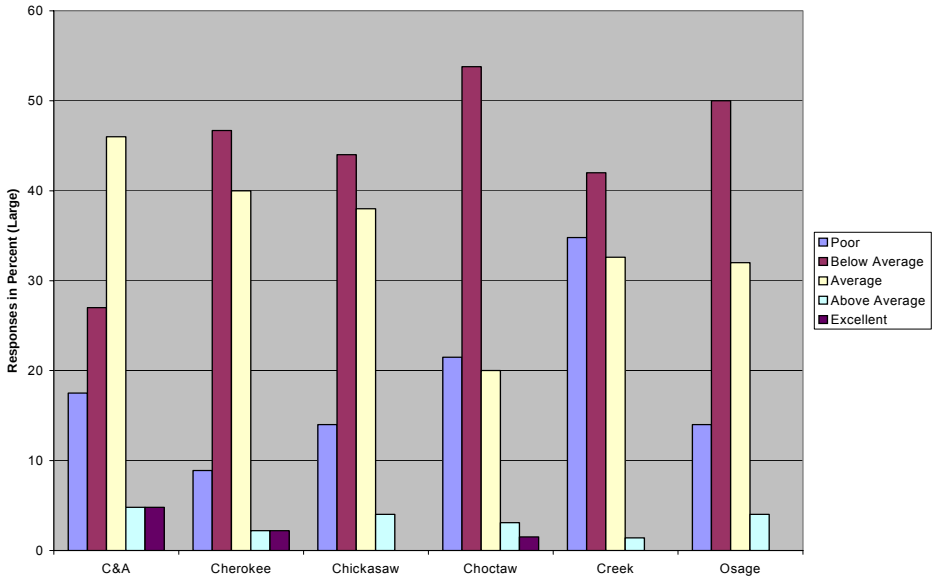

Figure 9. Large Grassroots Tribes Ranking of Environmental Quality/Conditions

In summary, the grassroots and tribal respondents believe the environmental/conditions in their communities to be poor or below average and none of tribal and fewer than 2 percent of grassroots believe it to be excellent or above average. One-way ANOVA revealed significant differences between tribes (P

<.001). Regardless of tribal size, perceptions on environmental quality/conditions in their communities were different. Results of H01 testing indicated significant differences within and between the small and large indigenous grassroots tribes in how they ranked environmental quality/conditions in their communities, therefore, it was rejected.

Research Question 3 Receiving Environmental Education

Research question 3 stated, “has this population received environmental education on identified environmental issues and problems in their communities, is the environmental education addressing the identified environmental issues, who is providing the environmental education on the identified issues and programs, and are they aware of environmental education programs being offered on any of these issues or other environmental concerns in their communities?” Questions 4, 3, 6, and 21 on the grassroots and questions 3, 4, 7, and 18 on the tribal questionnaires were utilized to answer research question 3 and to fulfill research objective 3 for this study.

Education on Environmental Issues

Table 36 and 51 and Figures 10 and 11 illustrate that the grassroots respondents had received little environmental education on the pre-selected environmental issues presented in question 4 on grassroots and tribal respondents had received a great deal of education on these topics. Fewer than 9 percent of the grassroots respondents indicated they had received environmental education

on the issues presented in question 2, while tribal respondents indicated that virtually all had received environmental education on some topics (Figure 10).

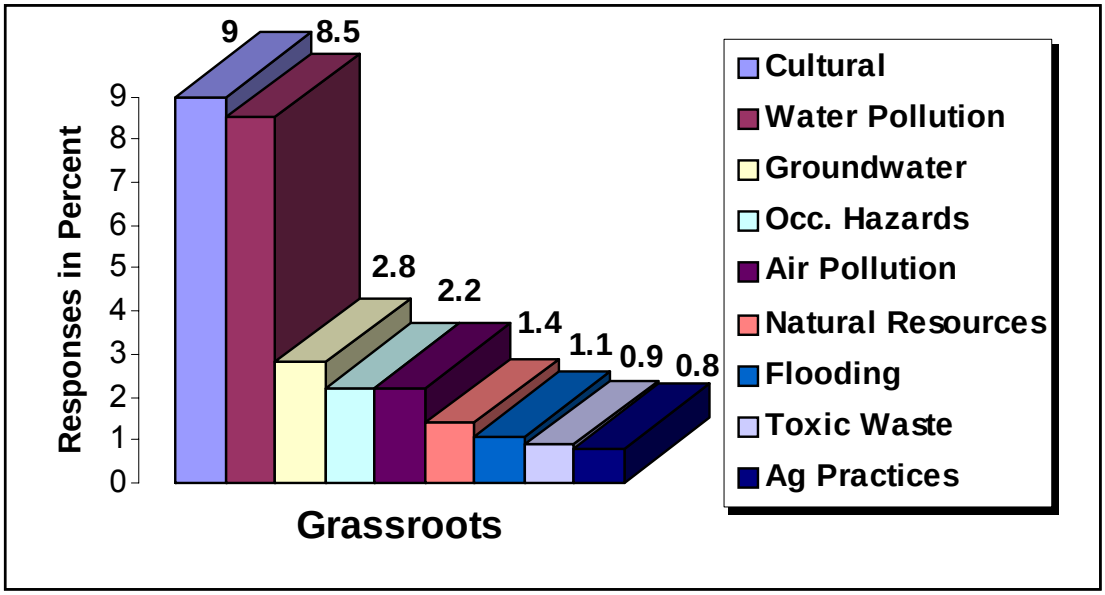

Figure 10. Grassroots Respondents on Receiving Environmental Education on Pre-Selected Environmental Issues

When the grassroots and tribal respondent percentages for receiving environmental education on selected issues are compared in Figures 10 and 11, there are drastic differences. For example, 100 percent of the tribal respondents indicated they had received environmental education on preservation of cultural resources and water pollution, while fewer the nine percent of the grassroots respondents indicated they had received environmental education on the same environmental issues (Figure 10 and 11). The grassroots population percentages were below 10 percent in all categories, while the tribal respondents were below 10 percent on only one issue, flooding (Figure 10 and 11).

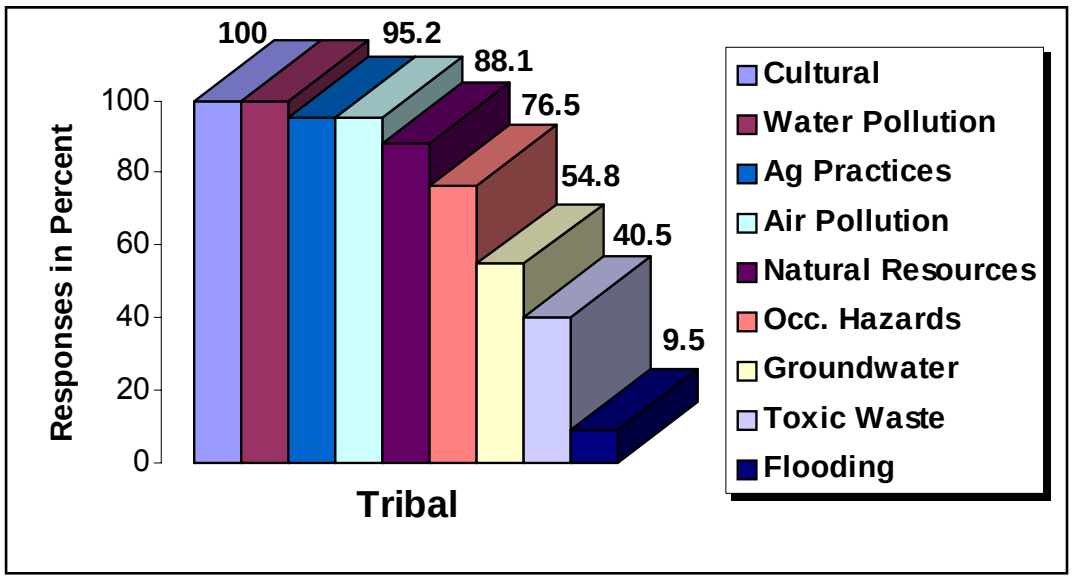

Figure 11. Tribal Respondents Receiving Environmental Education on Pre-Selected Environmental Issues

Delivery of Environmental Education on Environmental Issues

Figure 12 illustrates the grassroots responses to question 3 determining if environmental education had been delivered to address the pre-selected environmental issues (topics) presented in question 2. Only 13 percent of the grassroots respondent indicated Yes that environmental education had been delivered to their communities on the identified environmental issues, and 57 percent were quite sure environmental education in these issues had not been delivered (Figure 12).

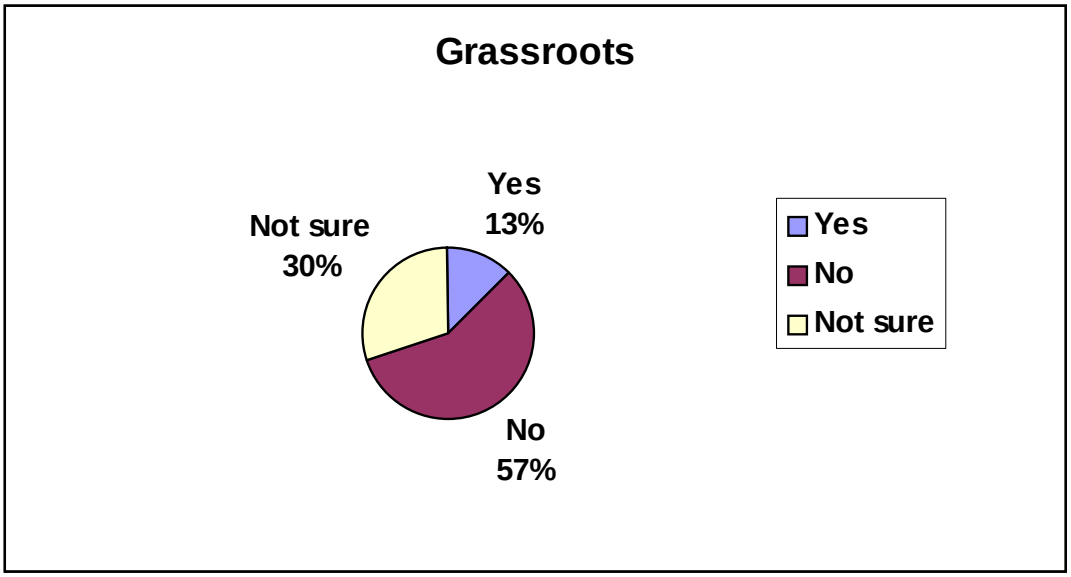

Figure 12. Grassroots Responses to Environmental Education Being Delivered to Address Pre-Selected Environmental Issues

Figure 13 illustrates the responses of the tribal professionals regarding their delivery of environmental education on the same pre-selected environmental issues in question 2. Nearly 90 percent of the tribal respondents indicated they had delivered environmental education and training to their tribal communities regarding the water quality issues in their communities (Table 52, Figure 13). Toxic waste was the only environmental issue on which all tribal respondents indicated they had not delivered environmental education or training to their tribal communities (Figure 13).

Figure 6 illustrates that both groups believe that cultural resources is the most serious environmental issue in their communities and Figure 11 shows that 100 percent of the tribal respondents had received environmental education and training on these environmental issues, yet in Figure 13 less than 3 percent of the

tribal respondents indicated that they had delivered environmental education to address these issues.

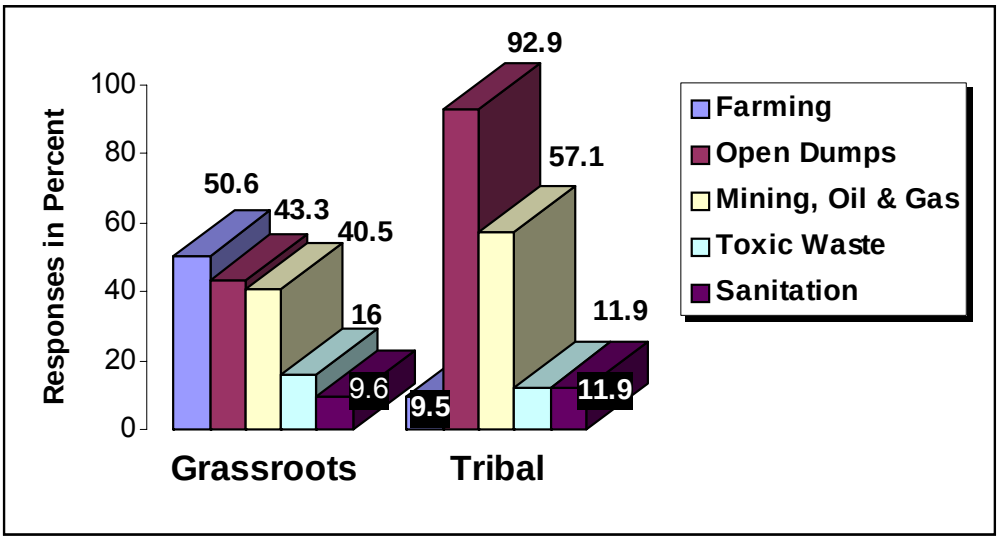

Figure 13. Grassroots and Tribal Respondents Identify Environmental Problems within their Communities

Causes of Environmental Problems

Question 6 on the grassroots questionnaire indicates the grassroots respondents believe the major cause for environmental problems in their communities to be farming (livestock/crops), followed closely by open dumps and mining, oil, and gas (Table 26). Question 6 on the tribal questionnaire indicates the tribal respondents believe the major cause for environmental problems in their communities to be open dumps followed by mining, oil, and gas. Figure 14 illustrates some drastic differences in the perception of the grassroots respondents versus the tribal respondents regarding environmental problems in their communities. For example, nearly 51 percent of the grassroots indicated they believe farming activities (livestock/crops) are causing the environmental problems

in their communities, while fewer than 10 percent of the tribal respondents believe it is a problem.

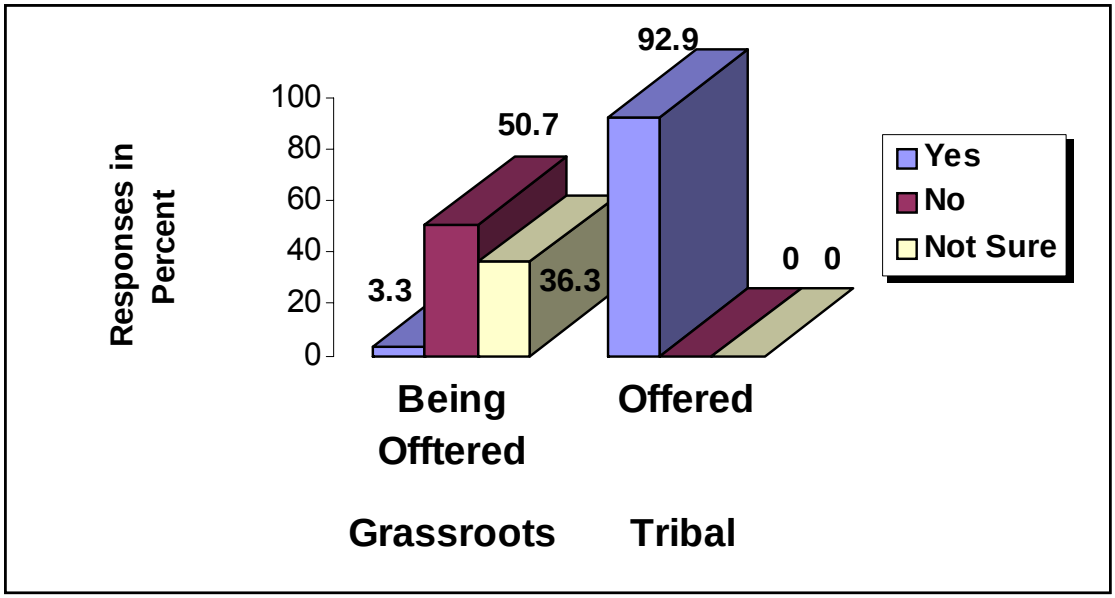

Figure 14. Grassroots Responses and Tribal Responses on Environmental Education Being Offered

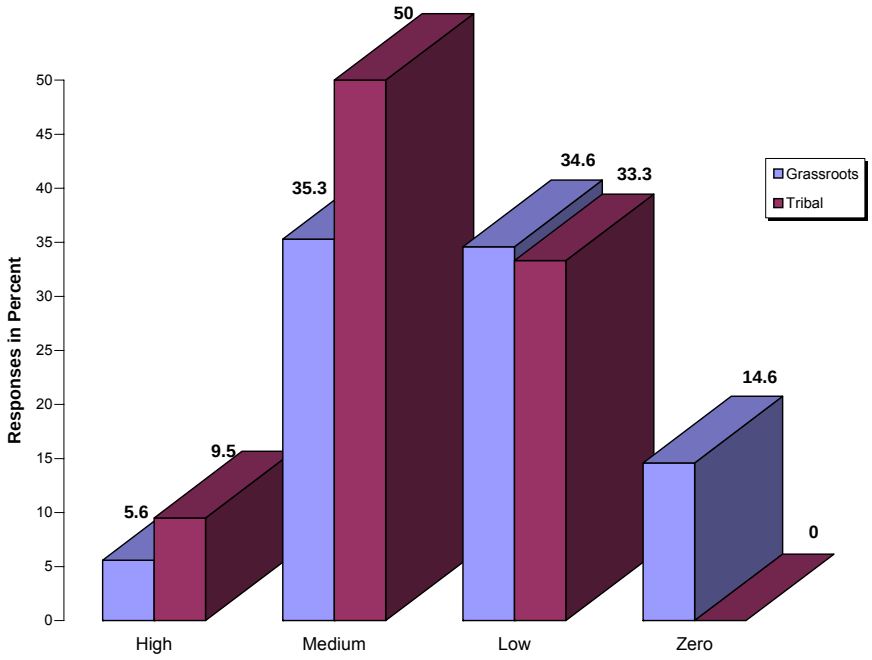

Figure 15. Grassroots and Tribal Responses on Rating the Level of Environmental Education

Environmental Education Programs Being Offered

Figure 15 illustrates the responses to question 21 on the grassroots and question 18 on the tribal questionnaire regarding environmental education programs, in general, being offered in their tribal communities (Table 37 and Figure 15). Fewer than 4 percent were aware of any environmental education programs being offered in their communities, while 87 percent indicated No or Not Sure. In question 18 on the tribal questionnaire, respondents were asked if their tribe offered environmental education, 93 percent indicated Yes (Appendix H). The question of interest now becomes, why such a difference in the perception that environmental education programs are not being offered compared to the tribal respondents indicating they do provide environmental education programs in their communities?

In summary, the grassroots population has received very little environmental education, only 9 percent, even though 100 percent of the tribal respondents indicated they believe environmental education is being delivered to address identified environmental issues. Fewer than 4 percent of the grassroots respondents indicated they had received environmental education of the problems causing environmental issues in their communities; fewer than 4 percent of the grassroots respondents were aware of any environmental education programs being offered in their communities, while 93 percent of the tribal respondents indicated environmental programs are being offered. The percentages by the grassroots regarding environmental education being delivered to address

environmental issues and problems and awareness of any environmental programs are consistently low, while the tribal responses were extremely high.

Research Question 4 Rating the Level of Environmental Education

Research question 4 stated: “how would this population rate the level of environmental education within the communities in which they live and is there a difference within and between the indigenous grassroots respondents of the small and large tribes regarding how they would rate environmental education within the communities in which they live?” Question 19 on the grassroots and 16 on the tribal questionnaire and results of $H_0 2$ were utilized to and answer research question 4 and fulfill research objective 4.

The results of how these respondents rated the level of environmental education, question 19 on the grassroots and 16 on the tribal questionnaire, are illustrated in Figure 16. Approximately 55 percent of the grassroots respondents rated the level of awareness of environmental education as low or zero, with only 6 percent rating the level of awareness of environmental education as high (Figure 16). None of the tribal respondents rated the level of awareness of environmental education as zero, as did approximately 15 percent of grassroots respondents (Figure 16).

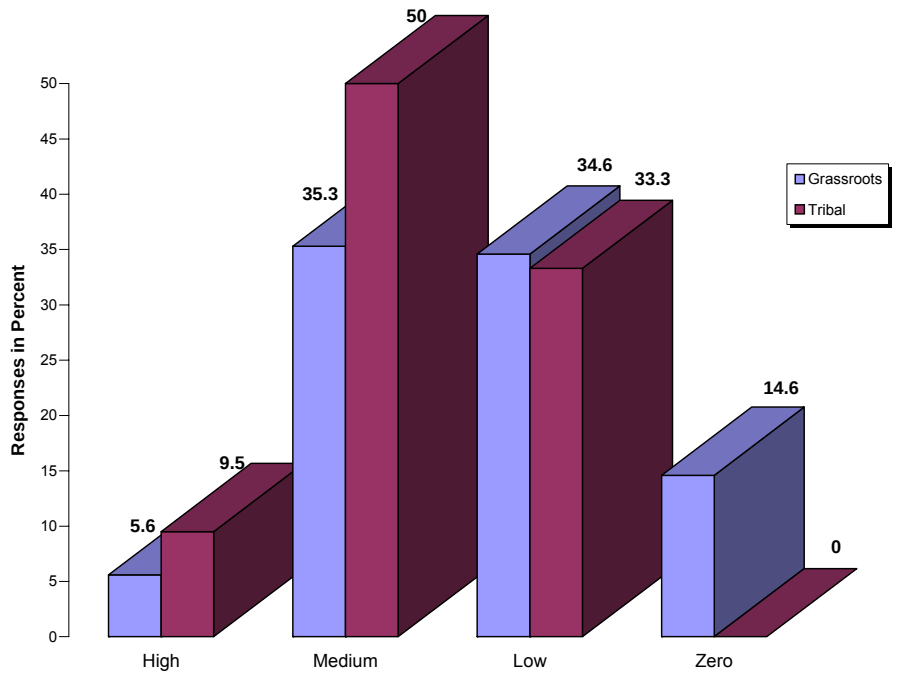

Figure 16. Grassroots and Tribal Responses on Rating the Level of Awareness of Environmental Education

$H_0$2: Level of Environmental Education

$H_0$2 stated there is no difference within or between the indigenous grassroots populations of small and large tribe's level of environmental education.

Analyses were run to determine if differences exist within and between how small and large tribes on how they rated the level of environmental education in their communities. One-way ANOVA revealed significant differences between the tribes ($P < .001$) (Table 67, Appendix L).

Table 67. One-Way ANOVA: Rating Level of Environmental Education within and Between Small and Large Tribes

One-way ANOVA	Sum of Squares	*df*	Mean Squares	F	Sig.
Between Tribes	22.975	11	2.089	3.212	<.001
Within Tribes	369.986	570	.650		
Total	392.960	581			

Post Hoc test analyses, with a choice of least significant differences (LSD), were run to test multiple pairs. This test indicated significant differences within and between the large and small grassroots tribes in rating the level of environmental education in their communities α = .05 (Table 68 and APPENDIX L). The $H_0$2, which stated no difference within and between the indigenous grassroots populations of small and large in rating the environmental education in their communities, was rejected.

Table 68. Post Hoc Test: Multiple Comparisons on Rating Level of Environmental Education within and Between Small and Large Tribes

Multiple Comparisons	# of Times Sig. Mean Difference Occurred	Size	Differed with Large Tribes # of Times	Differed with Small Tribes # of Times
Cheyenne Arapaho	2	L	0	2
Creek	2	L	1	1
Cherokee	2	L	1	1
Chickasaw	1	L	1	0
Choctaw	1	L	1	0
Osage	8	L	4	4
Caddo	4	S	2	2
Comanche	1	S	1	0
Iowa	6	S	3	3
Otoe-Missouria	2	S	1	1
Pawnee	2	S		2
Quapaw	3	S	1	2
Total	34	12	16	18

Table 68 illustrates the number of times a significant mean difference occurred with multiple comparisons on the rating of the level of environmental education within and between the small and large grassroots tribes was calculated, using the Post Hoc test. The Osage and Iowa tribes had more observed difference when compared to the other tribes. The Osage differed more times than the other tribes and differed equally between the large and small tribes, 4 and 4 (Table 68). Likewise the Iowa tribes, differed, six times, 3 and 3. All tribes differed on at least one occasion. The Choctaw, Comanche, and Chickasaw only differed once, all with large tribes.

Differences between Small and Large Tribes

Figure 17 illustrates the differences between how the small and large tribes rated the level of environmental education. With comparing and contrasting responses from a large tribe to a small tribe on this issues; over 40 percent of the grassroots respondents of these tribes, except the Cheyenne-Arapaho, Cherokee, Caddo, Iowa, and Pawnee, rated the level of environmental education in their community as low (Table 35 and Figure 17). Over 63 percent of the Caddo and approximately fifty percent of the Cheyenne-Arapaho and Iowa grassroots respondents rated the level of awareness of environmental education as medium. The Caddo had significant differences with nine of the tribes, large tribes six times and three times with small tribes. All tribes rated the level of awareness of environmental education below 10 percent, except for the Iowa tribe, with 15 percent. All tribes rated the level of awareness of environmental education between 3 percent and 30 percent, except for the Choctaw and Pawnee. All tribes rated the level of awareness of environmental education below percent 10 percent.

In summary, both the grassroots and tribal respondents rated the level of environmental education in their communities as low. One-way ANOVA revealed significant differences between the tribes ($P < .001$). Regardless of tribal size, how the small and large grassroots tribes rated the level of environmental education differed (Table 67). Some differences occurred more often with some tribes, such as the Caddo and Quapaw tribes. Results of $H_0 2$ testing indicated significant differences within and between the small and large grassroots tribes in how they rated the level of environmental education in their communities, therefore, it was

rejected. Post Hoc test analyses, (LSD), to test multiple pairs indicated that that the Osage (large) and Iowa (small) differed more often than the other 10 tribes.

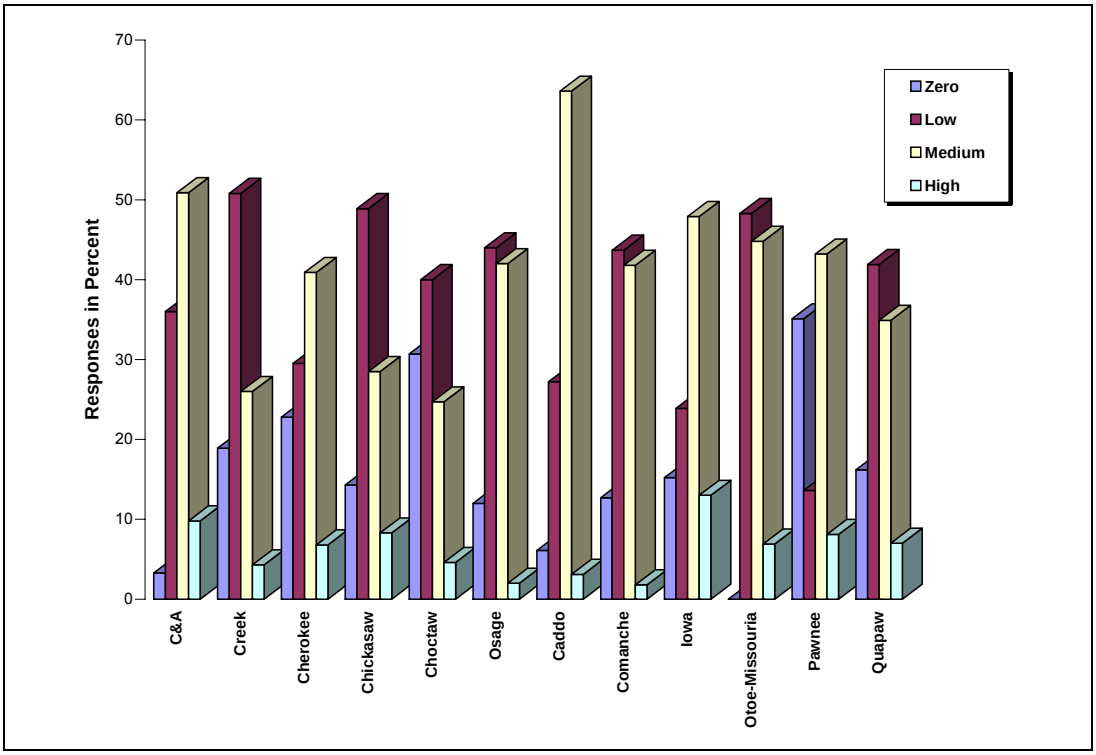

Figure 17. Comparison of Small and Large Grassroots Tribes Rating the Level of Environmental Education

Research Question 5 Threat to Cultural Resources

Research question 5 stated: “is this population aware of industrial, governmental, recreational, or agricultural activities that pose a threat to their cultural resources?” Questions 14, 15, 16, and 17 on the grassroots and questions 11, 12, 13, and 14 on the tribal were utilized to answer research 5 and fulfill research objective 5.

Figure 18 illustrates that few respondents from either group answered Yes; they believe there are no activities posing a threat in their communities. The tribal

respondents consistently answered No to activities listed as posing a threat (Table 58). Over 80 percent of the grassroots respondents either indicated No or Not Sure (Table 32).Very few of the grassroots respondents (19 out of 645) that answered Yes to this open ended question, identified a source posing the threat. The responses presented by the two groups varied (Table 31 and 57). Tribal respondents identified agricultural activities, where as the grassroots identified industrial as their major sources of activities. The tribal respondents were more assured in their responses, more answered Yes, and none were unsure.

In summary, very few of the respondents believed industrial, governmental, recreational or agricultural activities are posing a threat to their cultural resources.

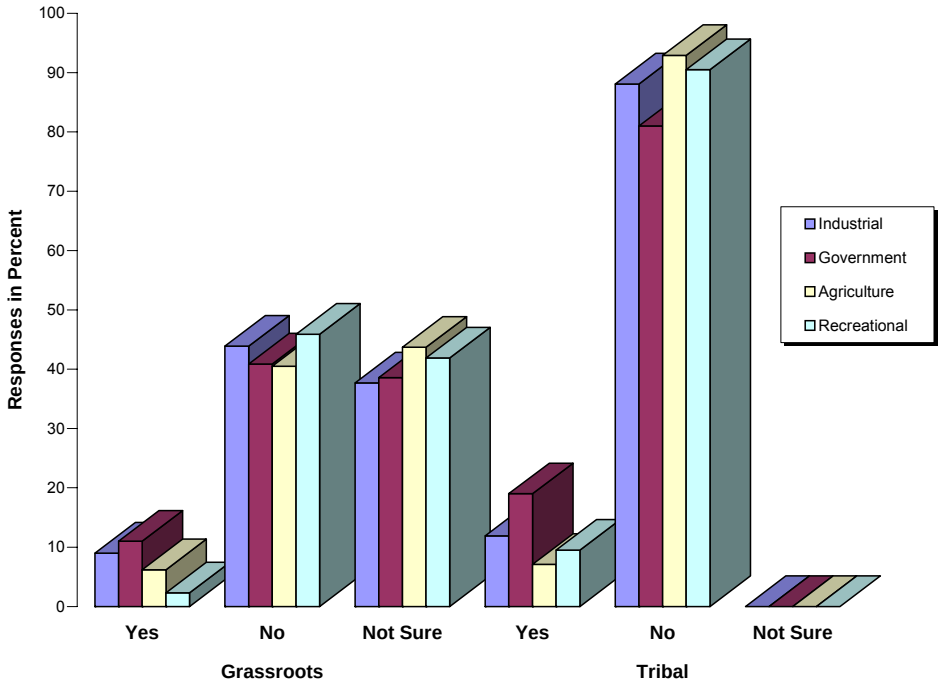

Figure 18. Grassroots and Tribal Responses on Threat to Cultural Resources

Research Question 6 Knowledge of Environmental Legislation

Research question 6 stated: “is this population aware of the environmental laws, Federal Acts and Orders, and mandates that have been issued or enacted to ensure their quality of life and protect their cultural resources?” Question 24 on the grassroots and 20 on the tribal questionnaire were utilized to answer research question 6 and fulfill research objective 6.

Results from questions 24, grassroots, and question 20, tribal, indicated that all respondents were familiar with legislation (Table 40 and 60). Since all respondents could make multiple selections and the number of respondents varied drastically, few statistical determinations could be made regarding this research question. Figure 19 illustrates that the tribal respondents were more familiar with all legislation presented in this question. Both populations were more familiar with legislation that had the term “Native American” in the title and less familiar with National Environmental Policy Act (NEPA), and least familiar with Executive Order 12898 (Figure 19).

The answer to research question 6 is; Yes both the grassroots and tribal respondents indicated they were aware of the environmental laws, Federal Acts and Orders, and mandates that have been issued to ensure their quality of life and protect their cultural resources. Because the grassroots responded more to the legislation with the term “Native American” in the title, one may speculate that the respondents checked it but may not understand the intent of the legislation. NEPA and Executive Order 12898 both have legislative language to protect this population’s cultural resources, yet it was identified by both groups the least.

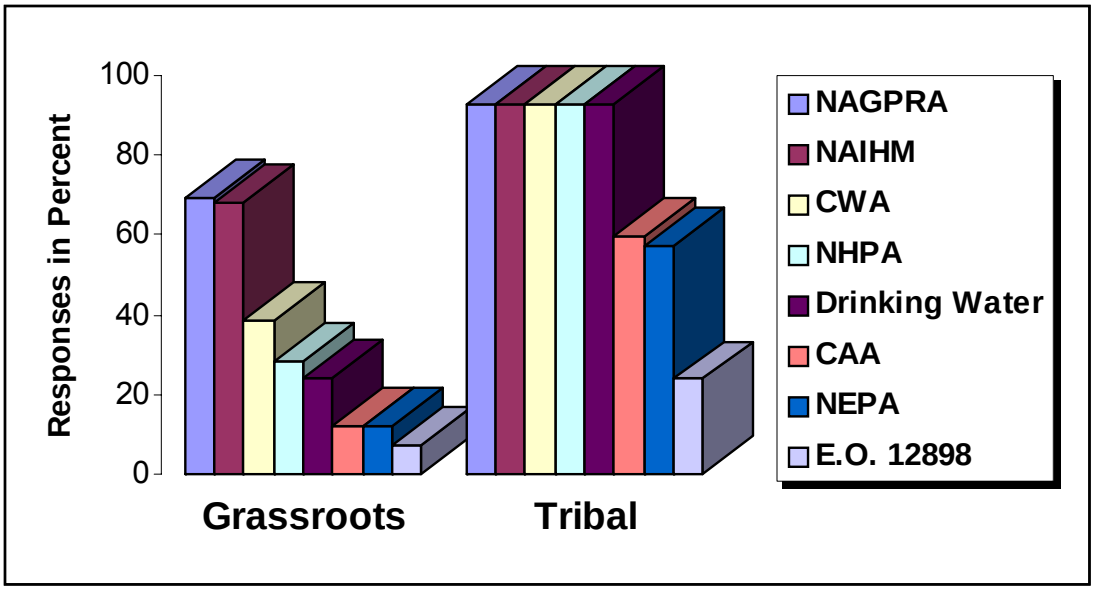

Figure 19. Grassroots and Tribal Awareness of Legislation

Research Question 7 Enforcement of Environmental legislation

Research question 7 stated: “is it perceived by this population that laws and regulations are being sufficiently enforced and are adequate to protect their cultural resources, values, sacred sites, and tribal lands?” Questions 25 and 20 on the grassroots and 21 and 17 on the tribal questionnaire were utilized to answer research objective and research question 7.

Being Sufficiently Enforced

Results of question 25 on the grassroots and question 21 on the tribal questionnaire were utilized to determine this population’s perception regarding legislation being sufficiently enforced in their communities. Figure 20 illustrates that fewer than 13 percent of the grassroots indicate yes, while none of the tribal

respondents said yes. Over 76 percent of the grassroots were Not Sure or indicated No (Figure 20).

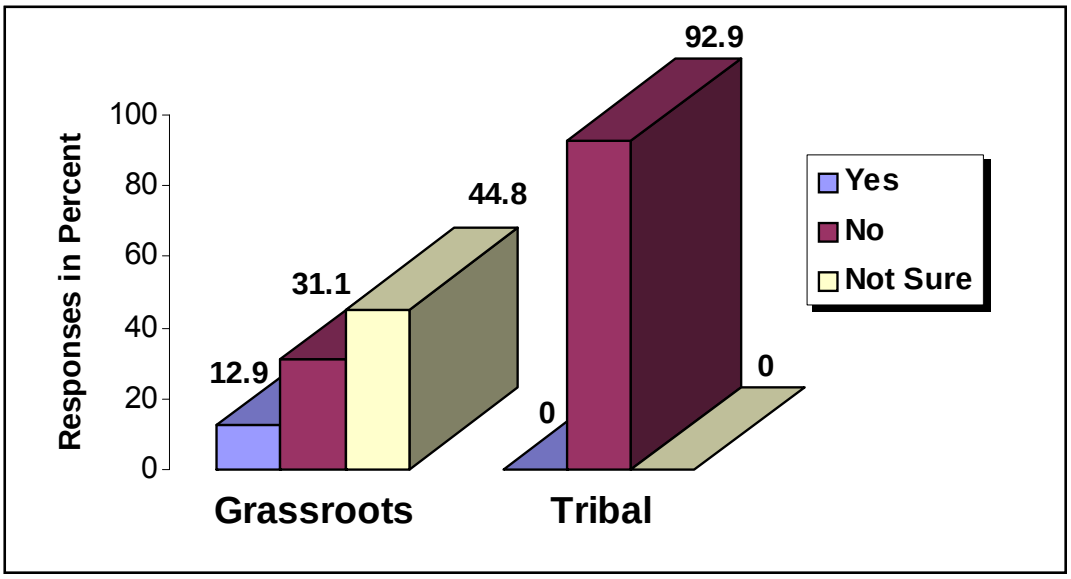

Figure 20. Grassroots and Tribal Perception of Sufficiently Enforced Legislation in Their Communities

Adequate Legislation

Results of question 20 on the grassroots and question 17 on the tribal questionnaires were utilized to determine these populations' perceptions regarding legislation being adequate to protect their cultural resources, values, sacred sites, and tribal land enforced in their communities. Figure 21 illustrates that less than 6 percent of the grassroots indicate Yesand 85 percent of the grassroots were Not Sure or indicated No, while 81 percent of tribal respondents indicate No and 5 percent indicated Yes.

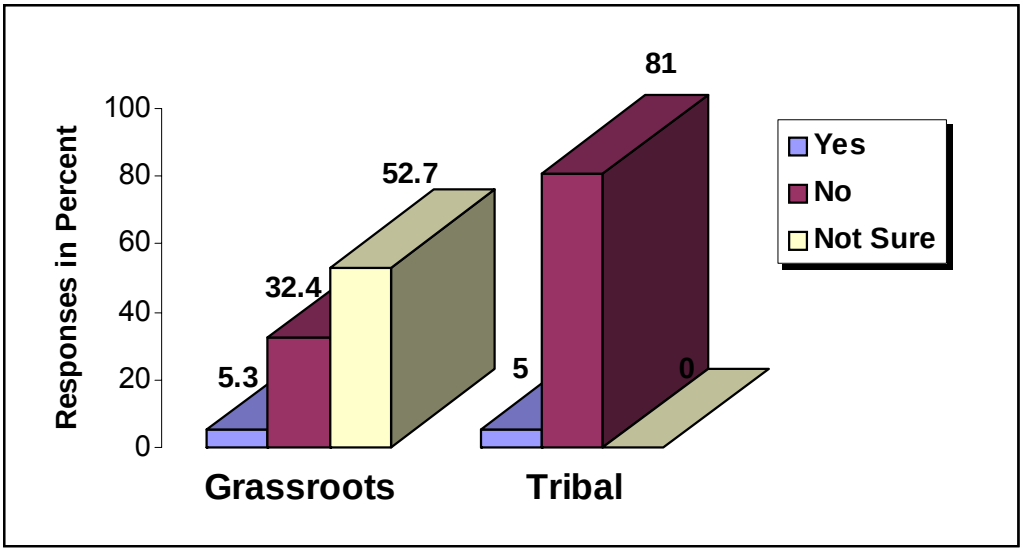

Figure 21. Grassroots and Tribal Perception of Adequate Legislation to Protect their Cultural Resources

In summary, it is apparent that the grassroots respondents were Not Sure if legislation is sufficiently enforced or adequate to protect their cultural resources, while the overwhelming percentage of the tribal respondents are sure legislation is neither sufficient nor adequate (Figures 20 and 21).

Research Question 8 Environmental Justice

Research question 8 stated: “is this population aware of the term environmental justice?” Question 22 on the grassroots questionnaire indicated that over 52 percent of the grassroots respondents were familiar with the term environmental justice and its meaning, yet over 38 percent were Not Sure (Table 42). The tribal respondents did not have this question on their questionnaire. Considering the tribal professional positions, environmental, land management,

cultural resources, and realty, I assumed the professionals were familiar with the term.

Research Question 9 Environmental Injustice

Research question 9 stated: “is it perceived by this population that environment injustice is occurring within the communities in which they live?” Question 23 on the grassroots and question 19 on the tribal questionnaires determined that the majority of the grassroots is Not Sure that environmental injustice is occurring, while virtually all the tribal respondents were sure environmental injustice is occurring in their communities. Figure 22 illustrates that about 21 percent of the grassroots and 93 percent of the tribal respondents perceive environmental injustice is occurring within the communities in which they live (Figure 22).

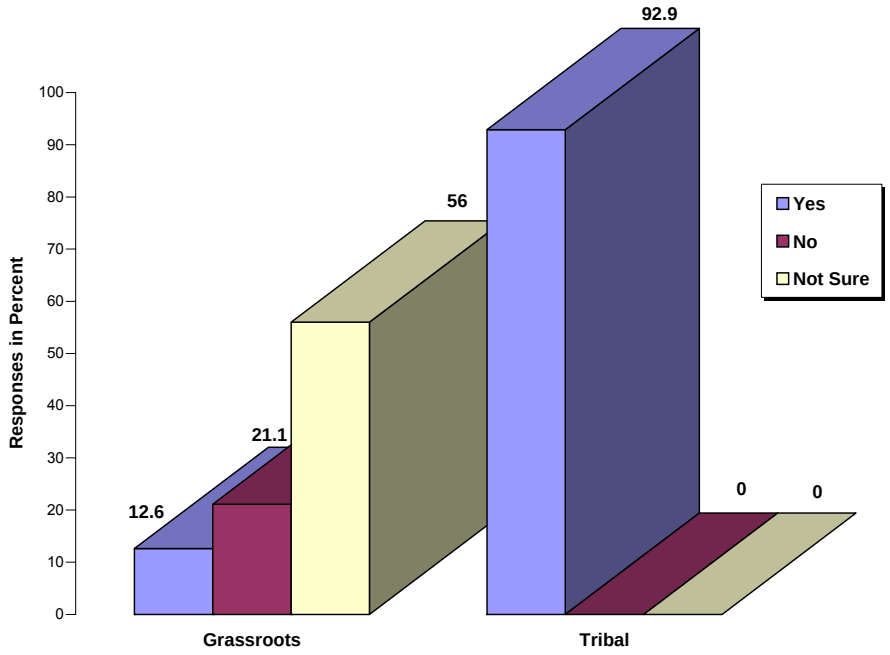

Figure 22. Grassroots and Tribal Responses to Injustice Occurring

In summary, 77 percent of the grassroots respondents said No or Not Sure while virtually all the tribal respondents were sure that environmental injustice is occurring within the communities in which they live.

Research Question 10 Awareness of Environmental and Conservation Programs

Research question 10 stated: “how would this population rate the level of awareness of environmental and conservation programs in their communities, and is there a difference within and between the indigenous grassroots respondents of the small and large tribes regarding their awareness of environmental and conservation programs within the communities in which they live?” Question 26 on the grassroots and 22 on the tribal questionnaires and results of $H_0 3$ testing were utilized to answer research question 10 and fulfill research objective 10.

Figure 23 illustrates fewer than 6 percent of the grassroots and none of the tribal respondents’ rated the level of awareness of environmental and conservation programs as high in their communities. Fifty-two percent of the grassroots versus 7 percent of the tribal respondents rated the level of awareness of environmental and conservation programs in their communities as zero to low. On the other hand, nearly 93 percent of the tribal and less than 28 percent grassroots respondents rated the level of awareness of environmental and conservation programs as medium (Figure 23). These two groups seem to have different perceptions on how they rated the level of awareness of environmental and conservation programs.

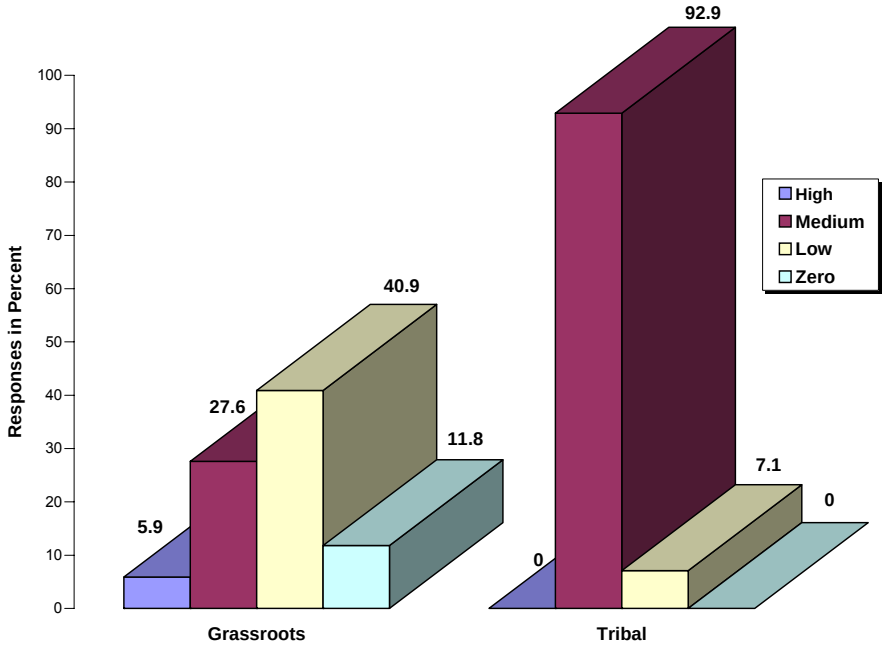

Figure 23. Grassroots and Tribal Responses to Rating the Level of Awareness of Environmental and Conservation Programs in their Communities

$H_0$3: Environmental and Conservation Programs

$H_0$3 stated: There is no difference within or between the indigenous grassroots populations of small and large tribes in how they would rate the level of environmental and conservation programs in their communities.

Analyses was made to determine if differences exist within or between the small and large grassroots tribes on how they rated the level of environmental and conservation programs in their communities. One-way ANOVA revealed significant difference within and between small and large tribes on how they rated the level of awareness of environmental and conservation programs ($P < .002$) (Table 69, APPENDIX L).

Table 69. One-way ANOVA Rating Level of Awareness of Environmental and Conservation Programs within and Between Small and Large Tribes

One-way ANOVA	Sum of Squares	*df*	Mean Squares	F	Sig.
Between Tribes	18.439	11	1.676	2.759	.002
Within Tribes	330.575	544	.608		
Total	349.-14	555			

Post Hoc test analyses, with a choice of least significant differences (LSD), was run to test multiple pairs. This test indicated significant differences between and within the large and small tribes regarding how they rated the level of awareness of environmental and conservation programs in their communities (Table 70). This suggests differences do exist regarding how the tribes rated the level of awareness of environmental and conservation programs in their communities (Table 70 and R). $H_0$3, which stated there is no difference within and between the indigenous grassroots populations of small and large on how they rated the level of awareness of environmental and conservation programs in their communities, was rejected.

Table 70. Post Hoc Test: Multiple Comparisons on Rating Level of Awareness of Environmental and Conservation Programs within and between Small and Large Tribes

Multiple Comparisons	# of Times Sig. Mean Difference Occurred	Size	Differed with Large Tribes # of Times	Differed with Small Tribes # of Times
Cheyenne Arapaho	2	L	1	1
Creek	1	L	0	1
Cherokee	2	L	0	2
Chickasaw	2	L	0	2
Choctaw	1	L	0	1
Osage	3	L	0	3
Caddo	2	S	1	1
Comanche	2	S	0	2
Iowa	2	S	1	1
Otoe-Missouria	8	S	5	3
Pawnee	1	S	0	1
Quapaw	8	S	4	4
Total	34	12	12	22

Rejecting the $H_0$3 suggests differences exist within and between the small and larges grassroots tribes on how they rated the level of awareness of environmental and conservation programs. Significant differences were found with the Otoe-Missourian and Quapaw tribes. On eight different occasions these two tribes differed with all other tribes, both large and small. Generally the large differed with the small tribes (Table 70 and Figure 24).

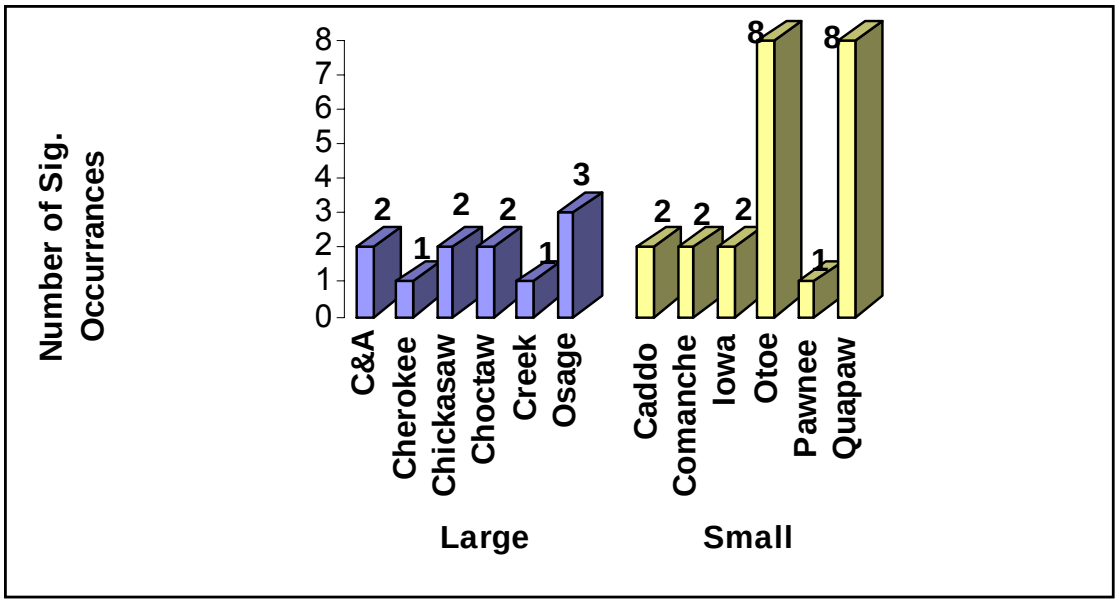

Figure 24. Number of Times Significant Differences Occurred in Multiple Comparisons on Rating Level of Environmental and Conservation Programs within and Between Small and Large Tribes

In summary, the grassroots respondents believe that the awareness of environmental and conservation programs is low, while all but 7 percent of the tribal respondents believe it to be medium. One-way ANOVA revealed significant difference within and between how small and large tribes on how they rated the level of awareness of environmental and conservation programs ($P < .002$). Differences occurred more often with some tribes than others, such as the Otoe-Missouria and Quapaw tribes. Rejecting $H_0 3$ suggests significant differences within and between the small and large grassroots tribes. One interesting observation was that all the large tribes, except for the Cherokee, differed only with the small tribes on this issues. One may speculate that these results indicate that the grassroots respondents of the larges tribes actually receive more information on environmental and conservation programs than the small tribes.

Another consideration may be that the large tribes have more available funding for outreach, personnel, technology (internet, tribal newspapers, etc.), and other resources to provide information to their communities.

Research Question 11 Rating Agency Delivery of Programs and Assistance

Research question 11 stated: what agencies do the grassroots and tribal respondents utilize for programs and how would this population rate the delivery of programs and assistance within their tribal communities? Question 28 on the grassroots questionnaire determined how they would rate the delivery of programs and assistance from all agencies, federal, state, local, and tribal. Question 24 on the tribal questionnaire allowed the respondents to rate the delivery of programs and assistance from a pre-selected list of federal, state, and local agencies.

Identified Programs Utilization

Before rating the delivery of programs and assistance the respondents identified who they utilized for these services. Figures 25 and 26 illustrate what agency(s) this population utilizes for programs and assistance. The first choice of both groups was Indian Health Service. Approximately 74 percent of the grassroots and 99 percent of the tribal respondents indicated they had utilized Indian Health Service for programs and assistance (Table 45 and 61). Fifty-six percent of the grassroots respondents had utilized tribal offices. The tribal professionals were not given the opportunity to identity their own tribes as a

source of programs and assistance. The grassroots respondents more frequently indicated extension offices, colleges and universities than federal and state agencies offering technical assistance and programs. The DEQ, extension offices, and conservation districts were utilized the least by tribal respondents, and EPA was utilized least by the grassroots respondents (Figures 25 and 26).

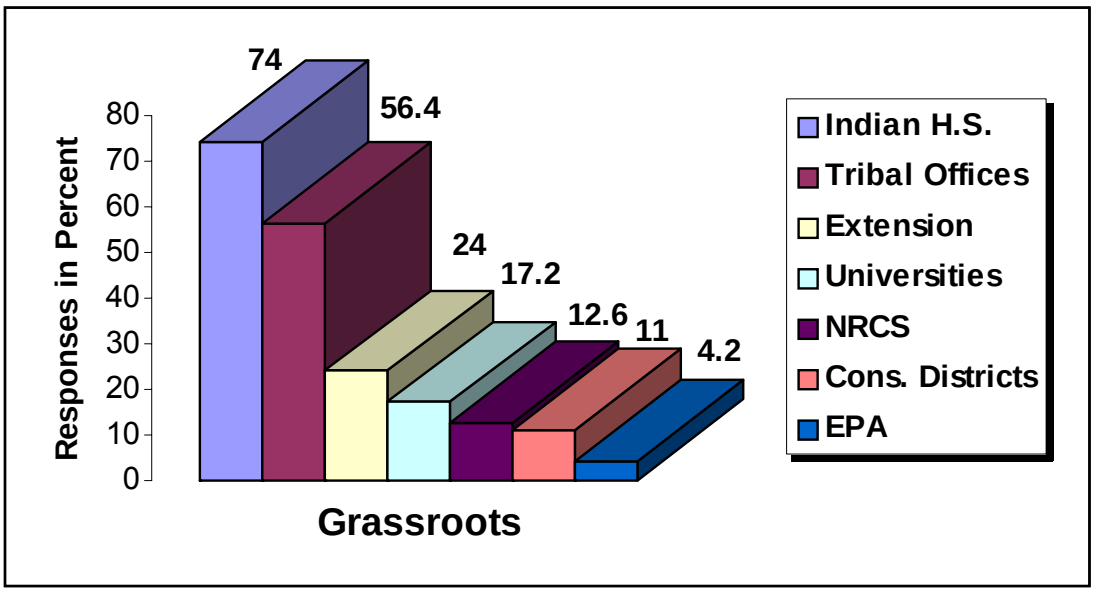

Figure 25. Grassroots Respondents Identify Sources for Programs and Assistance

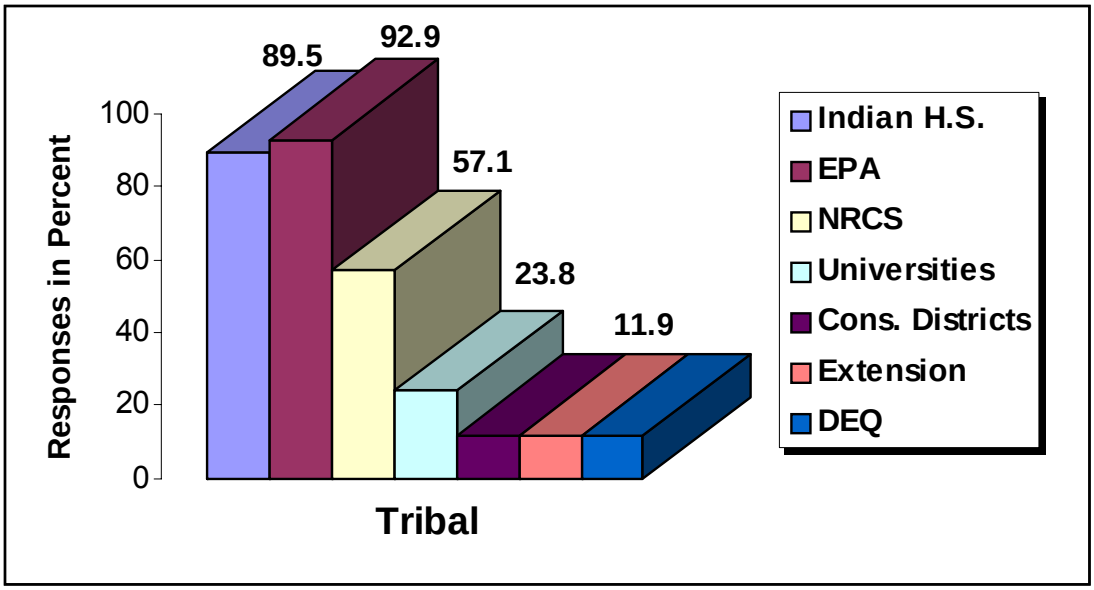

Figure 26. Tribal Respondents Identify Sources for Programs and Assistance

Tribal respondents rated each agency individually, question 24, and grassroots respondents, question 28, with respect to providing delivery of programs and assistance as high, medium, or low (Table 46, and 62). The tribal respondents rated the EPA and DEQ as the highest, 93 percent, followed by IHS and NRCS as medium. Only universities received a low rating by tribal respondents (Figure 27). Approximately 43 percent of the grassroots respondents rated delivery of programs and technical assistance as medium and 30 percent agency delivery as low (Figure 28).

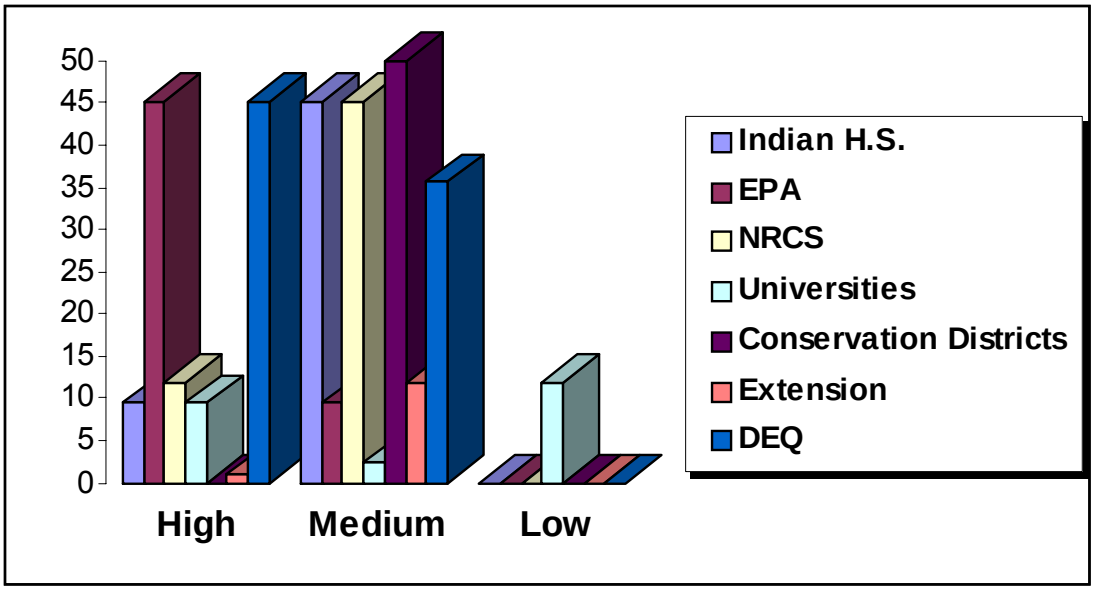

Figure 27. Tribal Respondents Rating Individual Agency Delivery of Programs and Assistance

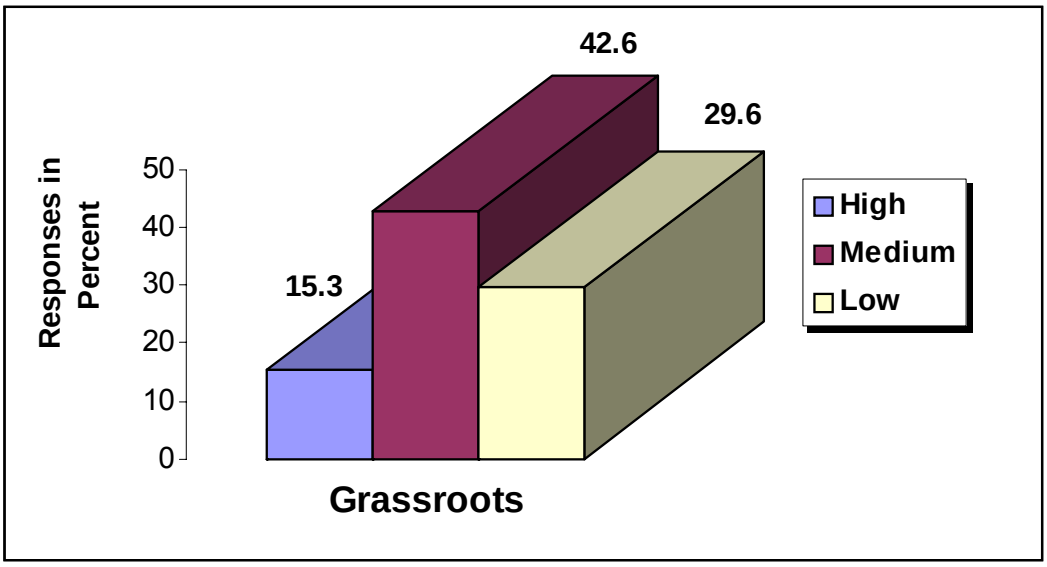

Figure 28. Grassroots Respondents Rating Delivery of Programs and Assistance of All Agencies (High, Medium, and Low)

Research Question 12 Barriers Preventing Delivery of Programs and Assistance

Research question 12 stated: “is this population aware of barriers that might prevent delivery of programs and technical assistance from federal, state, local and tribal agencies?” Questions 29, 30, and 31 on the grassroots and questions 25, 26, and 27 on the tribal questionnaires were utilized to answer research question 12 and fulfill research objective 12.

The grassroots respondents identified program accessibility, awareness of programs, and lack of major barriers that prevent delivery of programs and assistance offered by their tribal, state, and federal programs (Table 47, Figure 29). The grassroots viewed discrimination as low for all three agencies, tribal, state, and federal, with the respondents’ indicating their tribes as least discriminating of the four. Tribal respondents identified program accessibility and lack of interest from the agency as major barriers that prevent their tribes from delivery of programs and assistance to their tribal communities (Table 63, Figure 30).

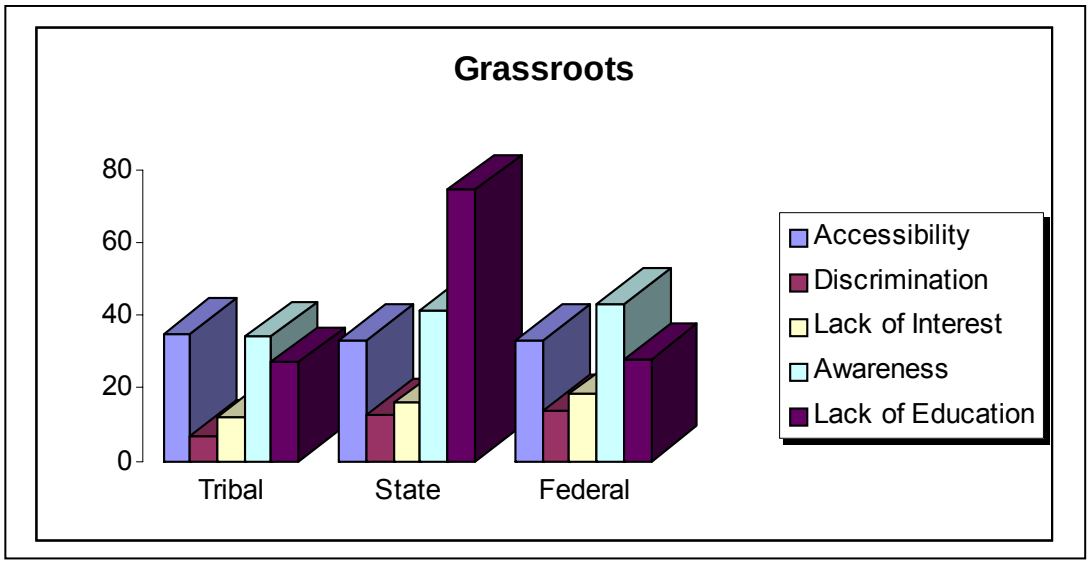

Figure 29 Grassroots Respondents Awareness of Barriers with Tribal, State, and Federal Agencies

Lack of education regarding program guidelines and awareness of programs were identified by the grassroots respondents as barriers preventing delivery of assistance for programs offered by state agencies (Table 47, Figure 29). Lack of agency interest was identified by the tribal respondents as the major barrier preventing the delivery of programs and assistance offered by state agencies (Table 63, Figure 30).

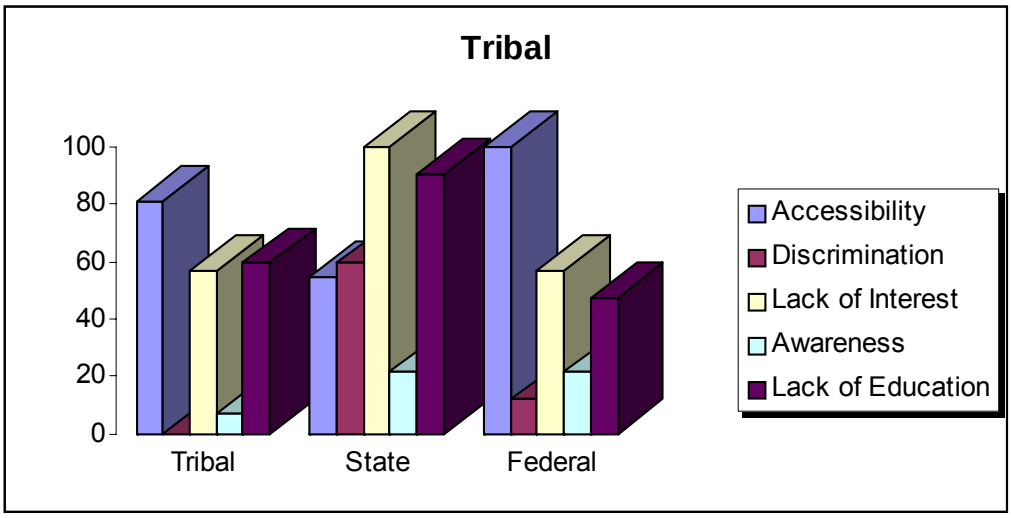

Figure 30 Tribal Respondents Awareness of Barriers with Tribal, State, and Federal Agencies

Grassroots respondents' identified awareness of programs and program accessibility as barriers preventing delivery of assistance for programs offered by federal agencies (Table 47). Tribal respondents identified program accessibility and the major barrier delivery of assistance for programs offered by federal agencies (Table 63).

Tribal respondents consistently did not indicate awareness of programs as a barrier with either tribal, federal, or state agencies (Figure 30). Grassroots respondents were consistent with one issue, discrimination. None of the grassroots respondents indicated discrimination as a barrier for tribal programs being delivered to their tribal communities (Figure 31).

Other Findings

Question 8, grassroots, and 7, tribal, asked the respondents to select from the following environmental problems, toxic waste, open dumps, sanitation systems, mining, oil, and gas, and farming (livestock/crops), which had caused damaged, loss, or health problems within the communities in which they live. Grassroots respondents indicated farming (livestock/crops), followed by open dumps, while virtually all the tribal selected open dumps, followed by farming(Table 26and 54). Based on the results of the 1998 Indian Health Service study, regarding the location of open dumps on Indian land, it is not surprising that open dumps was selected by both groups. The IHS reported that the Oklahoma IHS area has the highest number of high threat open dumps posing a threat to health and environment than any other IHS area in the United States.

Question 10, grassroots, asked the respondents to select how they received their drinking water from the following drinking water sources, private well, bottled water, public water supply, and pond. Over 57 percent of the grassroots respondents indicated public water, 32 percent private wells, and 5 respondents indicated pond (Table 28).

Question 11, grassroots, and 8, tribal, asked the respondents to select from the following educational topics, safe drinking water, environmental laws, agriculture related topics, solid waste issues, and preservation of cultural and land could improve conditions in their community. Grassroots respondents indicated safe drinking water, followed by cultural resources, while virtually all the tribal selected all but water quality.

Question 13, grassroots, and 10, tribal, asked the respondents to select from the following air quality problems, unpleasant odor from livestock, industrial smoke, dust, chemicals in the air, or nothing. Grassroots respondents indicated dust (50 percent), followed by nothing (28 percent), while virtually all the tribal selected dust (100 percent) and unpleasant odor from livestock (48 percent).

Question 18, grassroots, and 15, tribal, asked the respondents to indicate, in an open ended question, who they would contact if they were aware of an industrial, government, agriculture, or recreational activity that could pose a threat in their communities. Both groups indicated they would contact the tribe or tribal officials if they were aware of an activity posing a threat to their community (Table 34 and Appendix H).

Question 32, grassroots, and 28, tribal, asked the respondents to select three ways they would prefer to receive information regarding assistance and environmental education. Grassroots respondents indicated newsletters, personal visit, and group/community training, respectively (Table 48). Tribal respondents indicated group/community training, printed materials, and personal visit, respectively (Table 64).

Question 32 on the tribal professional questionnaire stated: “Please indicate if there are any environmental issues, environmental educational training, or outreach needs that have not been identified in this study.” The following comments were made:

1.) Hire staff with degrees in the environmental field

2.) Do not hire family, hire qualified

3.) Training: Education, Water Quality, Environmental Education, and WET and WILD

4.) Hire training to be done from outside the tribe or EPA

One could assume that a few of the environmental professional of some of the tribes have hiring concerns linked to educational degrees and family. Political placement of people in tribal positions (government positions) is not unique to tribes, when a new tribal leader or President of the United States takes office, titles of positions remain, and people change. Another fact to consider is that tribal leaders can change quickly. Tribal council and tribal members have more political power to change tribal leaders than other governments. It is apparent that some tribal professionals have dealt with political position changes in their departments and they have training and environmental education concerns that have not been met.

Summary of Respondents Demographics

Of the 645 grassroots respondents, 54 percent were males and 39 percent females. Grassroots respondents indicated tribal affiliation with 46 American Indian tribes. Approximately 60 percent of the grassroots indicated they live in the rural area or farm, while fewer than 11 percent live on tribal or allotted land. Over 72 percent of the grassroots respondents were 36 years and over, with 38 percent indicated completing high school and fewer than 3 percent with graduate or professional degrees.

Of the 42 tribal respondents, 69 percent were males and 21 percent females. Tribal respondents indicated tribal affiliation with 12 American Indian tribes. Over 38 percent of the tribal respondents were 36 years and over, with no one indicated they were 35 and younger. Over 45 percent of the tribal respondents had college degrees with over 14 percent completing graduate school or holding a professional degree.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

This chapter provides an overview of the purpose and need, design and conduct of the study, and specific research objectives. It provides conclusions from the questionnaires, hypotheses testing, research questions and objectives, significant findings, and recommendations as a result of this investigation conducted among the indigenous grassroots population and environmental professionals selected for this study.

Purpose and Need

The purpose of this research was to assess the perception, awareness, and concerns on environmental issues identified in this study among indigenous grassroots and the tribal environmental professionals within the boundaries of Oklahoma. The need for the study was founded on decades of well documented environmental issues on Indian land, numerous environmental legislative enactments to protect this population, and environmental justice/injustice in Indian County. A real need existed to investigate the current environmental issues, awareness, and concerns among the indigenous grassroots people and their environmental departments in order to assess the effectiveness of initiatives

implemented to ensure a quality environment for this population and imperative that grassroots people living within their own tribal communities assess their environmental conditions.

Design and Conduct of the Study

The study included the indigenous grassroots people and the environmental professionals of six randomly selected large and small tribes within the boundaries of Oklahoma. Two hand delivered surveys were utilized to collect data for the study. Self-administered questionnaires for the indigenous grassroots people were conducted during traditional tribal celebrations, homecomings, festivals, and Pow Wows. Self-administered surveys for the tribal environmental professionals were conducted at their tribal complex. A total of 687 respondents participated in the study, 645 indigenous grassroots respondents and 42 tribal professional respondents.

Research Objectives

Research objectives focused on identifying this population's environmental issues and problems. The objectives:

1. Awareness of environmental education, legislation, justice and injustice, and activities posing a threat to this population's cultural resources, values and land.
2. What agencies this population utilized for programs and assistance, and identified barriers that may prevent delivery of

programs and assistance and how this population would rate environmental quality/conditions, environmental education, and delivery of programs and assistance within their communities.

3. Identify differences between the perception, awareness, and concerns of the indigenous grassroots respondents of small and large tribes regarding the environmental issues presented in this study.

In addition to research objectives that were developed into research questions and implemented through questionnaires, this study had two additional specific research objectives:

1. To evaluate the effectiveness of initiatives, consultations, legislation, environmental education, and outreach that have been implemented by federal, state and tribal agencies to address environmental issues among this population.
2. To provide valuable information for tribal leaders and their tribal environmental and education departments, state, and federal agencies, university research and educational department, and tribal networks to utilize to assess current environmental issues, educational needs, and barriers among this population.

Respondent Characteristics

The majority of the grassroots respondents was over 55 years of age and had limited education. Some could not read or write and some only spoke their native tongue. Considering that the questionnaires were delivered at traditional

tribal celebrations, homecomings, festivals, and Pow Wows, it is likely that these respondents represent an older traditional population of grassroots American Indians, grassroots. The very low percent of respondents between the ages of 18 and 24 suggests that the younger American Indian generation may not be attending traditional tribal celebrations.

The tribal professionals were largely in an age group between 36 and 54 year of age with some higher education. Their tribal job positions are directly related to environmental issues, cultural and natural resources, land management, and education for tribal governments.

Conclusions

The following conclusions were reached after a review of the literature and analysis of the data collected:

Demographics

1. Oklahoma tribes and other tribes were well represented in the study. Respondents were affiliated with 46 different American Indian tribes which included 36 Oklahoma tribes and 10 outside the boundaries of Oklahoma.

Issues/Concerns

1. The most important quality of life issue from those presented to this population, grassroots and tribal respondents, is health. The least important is crime. Respondents ranked the other quality of life issues in

the following order: employment, income, environmental quality, and education, respectively.

2. The most serious environmental issue from those presented to the grassroots is preservation and protection of cultural resources. The tribal respondents indicated water pollution.
3. The grassroots and tribal respondents perceived the environmental quality/conditions in their communities to be poor or below average.
4. The grassroots respondents perceived the major causes for environmental problems in their communities to be farming (livestock/crops) and open dumps. Tribal respondents perceived open dumps and mining, oil, and gas as the major causes of environmental problems in their tribal communities.

Awareness

1. The grassroots respondents believe they have not received environmental education to address the environmental issues they identified as the most serious in this study. Virtually all the tribal respondents indicated they had received environmental education and training on these issues and have delivered environmental education and training to their tribal communities.
2. Grassroots respondents believe the level of environmental education within the communities in which they live to be low or none, while the tribal respondents considered it medium.

3. It was concluded that the grassroots respondents' awareness of environmental legislation issued or enacted to ensure their quality of life and protect their culture resources was limited unless the piece of legislation had the term "Native American" in the title. Awareness of environmental legislation was higher among the tribal respondents. There was low awareness of NEPA and Executive Order 12898 from both groups.
4. Virtually all the tribal respondents do not believe environmental legislation is being sufficiently enforced in their communities or are adequate to protect their cultural resources, values, sacred sites, and tribal lands. The majority of the grassroots respondents were Not Sure on these two legislative issues.
5. Even through one-half of the grassroots respondents were familiar with the term environmental justice; there were nearly 40 percent that were Not Sure, therefore, their familiarity with this term in not conclusive from the results of this study. It was assumed that the tribal respondents were familiar with the term.
6. Virtually all the tribal respondents were sure environmental injustice is occurring, while nearly all the grassroots respondents were Not Sure it is occurring within the communities in which they live.
7. The respondents in this study do not believe that there are activities being conducted by industrial, government, recreational, or agricultural that is currently posing a threat to their cultural resources.

8. The grassroots respondents' level of awareness of environmental and conservation programs in their communities appears to be low, whereas, virtually all the tribal respondents perceive it to be medium.

Assistance

1. The following agencies were presented to the respondents in this to select from regarding offices they utilize for programs and assistance: IHS, NRCS, EPA, DEQ, universities, and extension and district conservation offices. Grassroots respondents utilize their tribal offices the most, while tribal respondents utilize their tribal offices and EPA the most. Grassroots respondents utilize NRCS, conservation districts, and EPA the least, while tribal respondents utilize conservation districts, extension offices, and DEQ the least.
9. Of the agencies identified in the above question, the tribal respondents rated the delivery of programs and assistance from these agencies individually and the grassroots rated them as a group. The tribal respondents rated EPA high, the others as medium, and only universities as low. The grassroots respondents rated all agencies as either medium or low, respectively.

Barriers

1. From the barriers presented to the respondents in this study, program accessibility, discrimination, lack of interest from agency, awareness of

programs, and lack of education regarding program guidelines, they indicated the following top two barriers for tribal, state, and federal agencies:

Grassroots:

Tribal - program accessibility and awareness of programs

State - lack of education regarding program guidelines and awareness of programs

Federal - awareness of programs and accessibility

Tribal:

Tribal - program accessibility and lack of education regarding program guidelines

State- lack of interest by the agency and lack of education regarding program guidelines

Federal- program accessibility and lack of interest from agency

The tribal respondents did identified discrimination as a barrier. The grassroots were not concerned with discrimination as a barrier and overall expressed limited concern with the other barriers, except for the state agencies in the area of lack of education.

Null Hypotheses Testing

1. The null was rejected, that no significant differences exist within and between small and large tribes in how they rated the environmental quality/conditions within in the communities in which they live. It was particularly apparent that Caddo, Quapaw, and Osage tribes differed. Causes of why these differences occurred were not identified in this study.
2. The null was rejected, that no significant differences exist within and between small and large tribes in how they rated the level of environmental education within in the communities in which they live. It was particularly apparent that the Osage and Iowa tribes differed. Causes of why these differences occurred were not identified in this study.
3. The null was rejected, that no significant differences exist within and between small and large tribes in how they rated the level of awareness of environmental and conservation programs within in the communities in which they live. It was particularly apparent with the Otoe-Missouria and Quapaw tribes differed. Causes of why these differences occurred were not identified in this study.

Summary of Hypotheses Testing

Hypotheses 1, 2, and 3 were all rejected.

Table 71. Hypotheses Decision Table: Research Questions 1, 3 and 9

Null Hypotheses	Decision
The $H_0$1, no difference within and between the indigenous grassroots populations of small and large in rating the environmental quality/conditions in their communities.	Rejected Tables 65 and 66 Figures 8 and 9 Discussion (Pg. 142)
$H_0$2, no difference within and between the indigenous grassroots populations of small and large in rating the environmental education in their communities.	Rejected Figure 18 Tables 67 and 68 Discussion (Pg. 157)
The $H_0$3, no difference within and between the indigenous grassroots populations of small and large in rating awareness of environmental and conservation programs in their communities.	Rejected Tables 69 and 70 Figure 25 Discussion (Pg. 171)

Significant Findings

The fact that the tribal respondents identified water pollution as their most serious environmental issues while the grassroots identified preservation and protection of cultural resources suggest that tribal professionals may not be aware of environmental issues among the grassroots population within their communities. The respondents in the pilot study, American Indian college students at the American Indian Science and Engineering Society Conference, concurred with the grassroots respondents and identified preservation and protection of cultural resources as their most serious environmental issue (Appendix F).

The African American respondents in the Social Science Institute study indicated the most serious environmental issues in their communities to be water quality (Appendix I). The respondents in the NTEC study, which targeted 536 federally recognized tribal council members, also identified water quality as their most serious concern (Appendix B). The fact that the NTEC and tribal respondents identified water quality may be a consequence of the fact that their program funding comes from grants from agencies such as the EPA and that the assessment addressed tribal professionals not grassroots.

Other environmental issues have been well documented among federally recognized Indian reservations. Strip mining for coal, drilling for oil, garbage dumping, open dumps, nuclear testing, hog farming, medical waste incinerators, toxic dumps, uranium, lead and zinc mining, and the Exxon Valdez oil spill are just a few examples of environmental issues among this population (Bauerlein 1991, Basile 2002, Donovan 1997, Robyn 2002, Thorpe 1997, and Wolf and Free 1984). All of these identified environmental issues occurred on Indian reservations. Since Oklahoma does not have reservations, the grassroots and tribal respondents in this study may not have been able to identify all the environmental issues within their tribal communities and boundaries.

The fact that the grassroots respondents indicated they have not received environmental education on the environmental issues identified in this study and tribal respondents indicated that they had delivered environmental education on these issues may also indicate a communication problem between the grassroots and tribal respondents on what environmental education is and how it is

delivered. The same was true regarding awareness of environmental programs being delivered in their tribal communities and the level of environmental education in their communities.

I conclude that these differences in perception of environmental education are significant. These different responses need to be investigated further to ensure that the environmental education needs of this population are met. One may need to consider if the tribal professionals have the staff members they need to meet environmental education needs of their tribal members. The NTEC study revealed that over 56 percent of the tribal leaders indicated that technical, educational, and scientific staffs were not adequate for the tribes to accomplish their environmental management objectives and goals (Appendix B). This same study revealed that the most crucial funding priorities for their environmental programs are education and training (Appendix B). One may need to investigate if the tribal professionals are aware of outreach and environmental education assistance that state and federal agencies are mandated to provide to tribes.

Both the grassroots and tribal respondents indicated open dumps to be a cause of environmental problems in their communities. The NTEC study revealed open dumps as a major pollution source and considered a critical environmental site and concern among the majority of the tribes across the Nation (Appendix B). IHS indicated in their 1998 report that the Oklahoma IHS area has 44 high threat, 69 moderate threat, and 21 low threat, for a total of 134 open dump sites (IHS 1998). Virtually all the tribal respondents identified open dumps as the major cause of damage, financial or cultural loss, and health problems in their

communities while only 12 percent of the grassroots considered open dumps as posing a threat in the communities in which they live. Further investigation may need to be conducted to conclude why the grassroots respondents do not consider open dumps as a high threat to the environment and health of their tribal communities in which they live.

Tribal lands across the nation, including Oklahoma, can be found on the National Priorities List (NPL) of sites that have uncontrolled hazardous wastes (EPA 2003). The NTEC study revealed that hazardous and toxic waste sites are major source and cause of critical environmental problems for many of the tribes across the Nation (Appendix B). There are 8 counties in Oklahoma listed on the NPL. All 8 counties have sites located within the tribal boundaries of Oklahoma tribes (EPA 2003, Figure 2 and 3, Table 8). Six of the tribes in this study, including the Quapaw Tribe, have NPL, superfund, sites within their tribal boundaries, yet, based on responses in this study, no one indicated their concerns.

The Quapaw tribal members live in or around Picher, Oklahoma, known as Tar Creek, America's number one EPA superfund site (Kennedy 1999). These tribal members are surrounded by large chat piles that sit outside local schoolyards and their homes. Kennedy reported in his recent research study that these residents are faced with health issues, contaminated ground and surface water and tribal lands, yet fewer than 3 percent identified any damages or health problems, only 3 percent indicated they had received any

environmental education on the issue, and only 16 identified it as cause of environmental problems in their community.

The Quapaw tribe worked with the University of Oklahoma Health Science Center to develop initiatives to educate the young children about cleanliness in relation to contamination of toxic waste. The program they developed was called Tribal Efforts Against Lead (TEAL) (Kennedy 1999, Communication, Lynch, 2000). Nearly half of the tribal respondents indicated that they had received environmental education and/or training on toxic waste, yet none indicated that they had delivered environmental education and/or training to the tribal members within their communities. The question of interest now becomes, has environmental education been attempted by the tribal professionals or has it only been conducted/attempted through university research and federal agencies such as the EPA.

According to Bullard (1994) environmental injustice occurs for several reasons: the lack of information, money, and access to the decision-making process. Others believe that environmental justice has evolved from the basic issue of “Quality of Life” for the nation’s poor and minorities’ right to safe drinking water, uncontaminated soils, and fresh air to breathe (Nance 1995). Grassroots and tribal respondents did identify some of Bullard’s reasons for environmental justice as barriers and indicated they are concerned about their health and safe drinking water. However, from the grassroots responses regarding the term environmental justice and injustice, it appears they may not have a clear

understanding the term. The tribal respondents indicated that they do, yet did not disclose the cause of environmental injustice as requested in the study.

The tribal responses regarding their awareness of environmental injustice occurring was nearly the same as the African American respondents in the Social Science Institute study, 93 and 87 percent, respectively (Appendix I). One could conclude that results of both these studies support that people who suffer from environmental injustices are often people of color, reside in rural and poverty areas, with limited income (Robinson 1994, Bullard 1994 and 1995, Brook 1998, and Hacker 1994).

Over the last few decades there has been an enormous number of Federal Acts, Executive Orders, and environmental laws and mandates issued to indicate that State and Federal agencies are moving in the right direction to address environmental issues in Indian county. Hacker (1994) reported that between 1993 and 1994, over 15 different environmental equity bills were introduced in various states to further promote environmental equity, yet the respondents in this study were not familiar with two important pieces of legislation, President Clinton's Executive Order 12898 entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" and NEPA.

Executive Order 12898 mandates that federal agencies develop strategies, programs, and education that promote environmental protection for minorities and low-income populations. It also allocated monies to federal agencies and state governments to assist communities in developing strategies

to identify and address local environmental problems (Clinton, 1994). NEPA encompasses any Federal action that might affect the environment. Relevant to the purposes of this study, NEPA encourages the preservation of historic resources and requires consideration of social impacts. A report from the Council on Environmental Quality specifically directs (but without the force of law) the solicitation of input from affected Indian tribes at the earliest possible time in the NEPA process (40 CFR 1501.2). The conclusion, if the respondents were more familiar with legislation they would be more aware of strategies, programs, and education opportunities available through federal and state agencies to address the environmental issues and educational needs identified in this study.

A specific research objective of this study was to evaluate the effectiveness of initiatives, consultation, legislation, environmental education, and outreach that have been implemented by federal, state and tribal agencies to address environmental issues among this population. The federal government instituted policies to address health issues, environmental exposures, and mandates requiring outreach and education programs with their organizations for underserved populations (Claudio 1997). The EPA has implemented programs, grants, technical assistance, and guidance to tribal governments to aid them in addressing environmental issues within their tribal communities. They established an American Indian Environmental Office and funding for tribes to develop their own environmental department to address environmental issues among their populations (Environmental Protection Agency, 2003). Federal agencies such as the NRCS have conducted face to face interviews to identify

barriers that prevent delivery of specific programs and conducted research among the African-American population of six black belt states to identify if environmental injustices are occurring from their perspective. Over the last decade many tribal governments have established their own environmental and educational departments to address the environmental issues of their tribes. Other federal and state agencies have implemented programs and strategies to meet the environmental needs of this population. The question of interest is, are the initiatives (programs, education, cultural and natural resource preservation and protection, awareness of legislation, and consultation) reaching the grassroots people? I conclude that the initiatives are not reaching the grassroots people effectively. The wheels are in "motion" to move the initiatives forward but the wheel is not "touching" the ground (grassroots). Further investigation regarding these issues should be conducted. One may need to consider an investigation on how the initiatives are implemented and/or delivered to the tribes and if the initiatives are actually delivered to the grassroots population through the tribal professionals.

Regarding the second specific research objective, I conclude that there is enough valuable information in this study to benefit tribes and other agencies. Tribal leaders and their tribal environmental and education departments, state, and federal agencies, university research and educational departments, and tribal networks should be able to utilize the results of this study to identify issues of concern among this population. Those parties with a vested interest to address the environmental and education needs of this population may want to consider

establishing a task force to work together to address the “gap” between the wheel and the ground.

A final conclusion, even through I agreed with Dillman’s support for self-administered surveys, based on his assessment that there is a lack of evidence that interviews produce a better measurement; there are circumstances in this study where interviews might have worked better (Dillman 2002). Based on DeLeeuw’s recent study, on the average face-to-face interviews achieve the highest responses reporting strong evidence and interview methods yield more socially desirable answers and respondent acquiescence than self-administered methods, interviews might have worked better for the tribal respondents (De Leeuw 1996).

Recommendations

The following recommendations are made by the researcher as a result of having conducted this study:

Recommendations of the Study

1. The data in this study should be evaluated for further statistically analyses to identify differences within and between the indigenous grassroots respondents and tribal respondents.
2. Environmental education, program delivery and technical assistance, and identified barriers should be evaluated at the tribal leader and council level

of all twelve tribes in this study and all state and federal agencies identified in this study.

Recommendations to the Methodology

1. I recommend that other studies conduct interviews with the tribal leaders and tribal professional.
2. I recommend that the questionnaires and or interviews use the same research questions on each questionnaire for efficient comparative statistical analyses.

Recommendations for Future Studies

1. I recommend that a comparative study be done using the perceptions of the grassroots and tribal respondents in this study regarding environmental issues, programs, and education and conduct interviews with their tribal leaders for analyses.
2. I recommend that a future study be conducted to evaluate the perceived barriers identified in this study.
3. I recommend that for future studies among this population that future researchers conduct preliminary research on tribal protocol and establish communication paths and permission from all tribal parties before committing or proposing research among this population.

It was my desire that this study assist the tribes and other interested parties in identifying this population's awareness and concerns regarding environmental issues within the communities in which they live. It was also my

desire that this research would provide a tool to address environmental issues and needs of this population within the boundaries of Oklahoma. That a task force of all interested parties be formed to address the issues identified in this study and it would establish a strong foundation for future research in the environmental issues identified in this study.

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APPENDIX A

Legislation and Executive Orders Regarding American Indian Cultural Resources, Consultation, and other federal mandates

Legislation and Executive Orders Regarding American Indian Cultural Resources, Consultation, and other Federal Mandates

Title	Codified
American Indian Religious Freedom Act	PL 95-341; 42 U.S.C. § 1996, § 1996 note
Antiquities Act	PL 209; 16 U.S.C. §§ 431-433
Archaeological Resources Protection Act	PL 96-95; 16. U.S.C. §§ 470aa-470mm
Historic Sites Act	16 U.S.C. §§ 461-467
National Historic Preservation Act	PL 89-665, 16 U.S.C. §§ 470-470w-6 and amendments; PL 96 515, U.S.C. 470a
National Environmental Policy Act	PL 91-190; 42 U.S.C. §§ 4321-4370c
Native American Graves Protection and Repatriation Act	PL 101-601; 25 U.S.C. §§ 3001-3013
Executive Order 11593, Protection and Enhancement of the Cultural Environment	36 Fed. Reg. 8921 (1971), reprinted in 16 U.S.C. § 470 note
Executive Order 12898	11 February 1994
White House Memorandum for the Heads of Executive Departments and Agencies	29 April 1994
Executive Order 13007. Indian Sacred Sites	24 May 1996
Native American Sacred Lands Act	1997
National Environmental Education Act	1970 & 1990
Indian Open Dump Closure Act	October 22, 1994
Radiation Exposure Compensation Act	1990
National American Indian Heritage Month PL 101-343	1990

APPENDIX B

NATIONAL REVIEW OF THE ENVIRONMENT IN INDIAN COUNTY

QUESTIONNAIRE

(NOT PUBLISHED – PRINTED WITH PERMISSION OF PEARL CAPOEMAN-BALLER)

National Tribal Environmental Council

National Review of the Environment

in Indian Country

FREQUENCIES

Albuquerque, New Mexico
July 1993

1. Name of tribe, band, pueblo or village: 149 Responses

2. Name of tribal government: --

   Address: --

   City: -- State: -- Zip Code: --

3. Number of enrolled tribal members: 0 - 30,000

4. Reservation Population: 0-250,000

5. Land area within Reservation: 0 - 2,093,000 acres

6. Indicate current land use by acres. If not applicable, circle NA:

Land Use	Land Use by Acres (per reservation)	Not Applicable
Agriculture	0-893,149 acres	NA
Forestry	0-750,000 acres	NA
Mining	0-150,000 acres	NA
Industry	0-333,000 acres	NA
Recreation	0-400,000 acres	NA
Commercial	0-62,062 acres	NA
Residential	0-175,000 acres	NA
Grazing	0-1,519,208 acres	NA
Tourism	0-189,000 acres	NA
Other *(please specify)*	0-275,934 acres	

Administrative/Community projects
Aqua culture/fish hatcheries
Undeveloped land
Roads
Hunting
Lakes/wetlands
Subsistence

7. Indicate water resource use by appropriate measurement. If not applicable, circle NA.

Water Resource Use	NO Response	Water Used	Not Applicable
Power generation	142	Dams/Lakes/Rivers	NA
Irrigation	113	Several answers	NA
Fisheries	102	Several answers	NA
Tourism/recreation	98	Several answers	NA
Transportation	126	Several answers	NA
Drinking water	55	Several answers	NA
Commercial/manufacturing	123	Several answers	NA
Other *(please specify)*	139	Fishing/wells/ricing/buffalo watering	

8. Do you have drinking water problems on your reservation? YES-75 NO-63
No response-11

If YES, to what extent are the following drinking water problems experienced on your reservation? *Circle your answer for each problem.*

Drinking Water Problems	Degree of Problem on Reservation: Nonexistent	Minor	Moderate	Severe
Elevated lead levels	N-58	M-21	MOD-10	S-1
Elevated radon levels	N-67	M-18	MOD-7	S-0
Pesticides	N-69	M-16	MOD-10	S-2
Bad taste due to sulfur, iron, etc.	N-31	M-23	MOD-24	S-14
Insufficient quantities	N-50	M-13	MOD-23	S-12
Other *(please specify)*	N-3	M-7	MOD-13	S-9

Old pipes
Asbestos lined pipes
Nitrates
Arsenic
Sodium
Unknown pollutants
Coliform bacteria
Benzene
Heavy metals

9. Do the following activities occur on the reservation? *Circle the appropriate answer.*

Activity	None	Marginal	Moderate	Extensive	Unknown
Erosion	N-16	M-40	MOD-0	E-28	U-5
Road construction	N-24	M-51	MOD-51	E-11	U-3
Pesticide use	N-63	M-41	MOD-25	E-10	U-2
Slash burning	N-90	M-25	MOD-14	E-3	U-5
Sawmilling	N-118	M-9	MOD-7	E-2	U-1
Fertilizing	N-64	M-34	MOD-27	E-11	U-4
Sanding and nutrient loading	N-68	M-27	MOD-26	E-7	U-7
Run-off	N-27	M-31	MOD-48	E-21	U-10
Well injection	N-99	M-13	MOD-10	E-3	U-7

10. Indicate the number of sites located on your reservation.

Sites of Concern	Number of Sites (range per reservation)	None	Unknown
Underground storage tank sites	1-400 sites	N-75	U-19
Above ground storage tank sites	1-300 sites	N-58	U-28
Hazardous waste sites	1-80 sites	N-101	U-18
Landfill sites	1-16 sites	N-77	U-6
Dump sites	1-710 sites	N-46	U-17
Airports	1-11 sites	N-92	U-2
Transformer sub-station sites	1-40 sites	N-96	U-23
Industrial facilities	1-100 sites	N-104	U-8

Sites of Concern	Number of Sites (per reservation)	None	Unknown
Recycling facilities	1-5 ____ sites	N-125	U-4
Incinerator sites	1-8 ____ sites	N-113	U-13
Radioactive waste sites	1-1 ____ sites	N-136	U-9
Industrial emission sites	1-4 ____ sites	N-116	U-17
Municipal discharge sites	1-7 ____ sites	N-94	U-16

11. Please indicate the level of air pollution arising from the following sources on or near the reservation. *Please circle appropriate answers.*

	Level of Air Pollution				
Source of Pollution	None	Marginal	Moderate	Extensive	Unknown
Mining and milling	N-112	M-13	MOD-7	E-1	U-11
Wood burning	N-34	M-65	MOD-28	E-12	U-5
Incineration	N-78	M-45	MOD-8	E-2	U-9
Industrial development	N-95	M-24	MOD-13	E-6	U-7
Power generation	N-92	M-27	MOD-8	E-6	U-10
Petroleum refineries	N-128	M-2	MOD-6	E-3	U-6
Urbanized areas	N-82	M28	MOD-22	E-7	U-7

12. Do these sources exist on your reservation? If so, are they sources of water pollution? *Circle the appropriate answers.*

Source of Pollution	Exist	Do not exist	Pollution Source	Not a Pollution Source
Sewage treatment plants	E-8	DE76	PS-29	NPS-27
Water treatment plants	E-12	DE-79	PS-5	NPS-47

Source of Pollution	Exist	Do not exist	Pollution Source	Not a Pollution Source
Oxidation ponds	E-3	DE-108	PS-15	NPS 13
Pulp and paper mills	E-0	DE -135	PS-7	NPS-0
Landfills	E-13	DE-61	PS-45	NPS-20
Municipal discharges	E-7	DE-82	PS-30	NPS-13
Industrial discharges	E-7	DE-107	PS-18	NPS-3
Urban run-off	E-6	DE-87	PS-36	NPS-7
Agricultural run-off	E-7	DE-80	PS-38	NPS-9
Construction run-off	E-9	DE-81	PS-29	NPS-14
Mining timber	E-6	DE-100	PS-20	NPS-8
Domestic wastes	E-8	DE-44	PS-63	NPS-20
Oil spills	E-8	DE-87	PS-39	NPS-3
Hazardous materials spills	E-5	DE -97	PS-27	NPS-4
Other *(please specify)* Sewage disposal Asbestos Sawmills; stock piles; cars	E-3	DE-0	PS -10	NPS-1

13. Does the tribe have a program for hazardous substance emergencies?
No response - 4 YES-37 NO-108

14. Are there significant threats to the tribal environment due to military installations?
No response - 17; Yes - 25; No - 107

15. Does your tribe have sufficient information to address solid waste issues on your reservation? No response- 6 YES-76 NO-67

If NO, what resources do you need? Staff, training, information, funding ar grants, studies, recycling

16. In which of the following areas does the tribe exercise its regulatory powers and by what means? *Circle the appropriate answers.*

Areas of Concern	Power Exercised	Code	*If yes,* Type of Regulation: Regulation	Ordinance	Resolution	Other
Water resource planning	70– YES 70– NO	C	REG	ORD	RES	O
Drinking water	76– YES 63– NO	C	REG	ORD	RES	O
Discharges to surface water	35– YES 105– NO	C	REG	ORD	RES	O
Control of non-point source	24– YES 115– NO	C	REG	ORD	RES	O
Underground injection control	17– YES 119– NO	C	REG	ORD	RES	O
Control of stationary air pollution emissions	15– YES 123– NO	C	REG	ORD	RES	O
Control of ambient air quality	14– YES 126– NO	C	REG	ORD	RES	O
Control of motor vehicle fuel quality and additives	5– YES 135– NO	C	REG	ORD	RES	O
Fugitive dust control	11– YES 130– NO	C	REG	ORD	RES	O
Siting of facilities	54– YES 86– NO	C	REG	ORD	RES	O
Radon control	15– YES 123– NO	C	REG	ORD	RES	O
Municipal solid waste management	58– YES 83– NO	C	REG	ORD	RES	O
Hazardous waste management	34– YES 105– NO	C	REG	ORD	RES	O
Underground storage tank management	32– YES 108– NO	C	REG	ORD	RES	O
Medical waste management	48– YES 90– NO	C	REG	ORD	RES	O
Pesticides operator certification	23– YES 119– NO	C	REG	ORD	RES	O
Asbestos	21– YES 119– NO	C	REG	ORD	RES	O
Polychlorinated biphenyls (PCBs)	14 YES 125– NO	C	REG	ORD	RES	O
Lead	23– YES 115– NO	C	REG	ORD	RES	O
Other *(please specify)* _____		C	REG	ORD	RES	O

17. Would your tribe have access to adequate technical, environmental and financial information to make an informed decision on siting a commercial solid, toxic or hazardous waste facility on your reservation?

No response-13 YES -66 NO-70

If NO, what additional information would the tribe need to access?

Financial resources, environmental studies, geologic testing, expertise and education, staff

18. How adequate are the tribe's resources to accomplish its environmental management goals in the following categories? *Circle the appropriate answers.*

	Level of Current Adequacy			
Resource	**Nonexistent**	**Very Inadequate**	**Somewhat Inadequate**	**Adequate**
Technical/ scientific staff	N-56	VI -22	SI-47	A -18
Administrative/ clerical staff	N-33	VI -22	SI-48	A -39
Enforcement staff	N-69	VI -32	SI-24	A -20
Financial support	N-52	VI -55	SI-29	A -8
Legal support	N-51	VI -29	SI-31	A -32

19. Does the tribe have monitoring data for the following areas? If NO, is i desired? *Please circle appropriate answer.*

Area of Concern	**Yes**	**No**	NO AND **Desired**
Air quality	Y -22	N-54	D -67
Air pollution emissions sources	Y -13	N-69	D -61
Indoor air quality	Y -6	N -67	D -7(
Radon levels	Y -30	N-56	D -5
Surface water quality	Y -43	N-30	D -6

Area of Concern	Yes	No	NO AND Desired
Sources discharging to water bodies	Y -37	N-35	D -61
Drinking water quality	Y -75	N -14	D -44
Sewage treatment/disposal facilities	Y -62	N -26	D -47
Underground storage tanks	Y -29	N -62	D -46
Landfills	Y -42	N -47	D -51
Hazardous waste discharges	Y -18	N -69	D -50
Special/natural areas	Y -34	N -47	D -52
Endangered species	Y -41	N -45	D -50
Other *(Please specify)* _____	Y -5	N -0	D -6

Weeds, forestry,wetlands, lead, land use

20. Please rate your tribe's experience in dealing with EPA, BIA, and IHS on environmental issues and programs -- *circle the number on each scale that best fits your tribe's experience with the staff from the agency based on the pairs of key words provided.*

	AVERAGES						
Environmental Protection Agency:							
Cooperative	2.14	1	2	3	4	5	Antagonistic
Competent	2.25	1	2	3	4	5	Incompetent
Helpful	2.23	1	2	3	4	5	Not at all helpful
Culturally sensitive	2.55	1	2	3	4	5	Culturally insensitive
Bureau of Indian Affairs:							
Cooperative	2.35	1	2	3	4	5	Antagonistic
Competent	2.65	1	2	3	4	5	Incompetent
Helpful	2.57	1	2	3	4	5	Not at all helpful
Culturally sensitive	2.33	1	2	3	4	5	Culturally insensitive
Indian Health Service:							
Cooperative	2.35	1	2	3	4	5	Antagonistic
Competent	2.43	1	2	3	4	5	Incompetent
Helpful	2.46	1	2	3	4	5	Not at all helpful
Culturally sensitive	2.43	1	2	3	4	5	Culturally insensitive

Other federal agency *(Please specify)*:						(this varied for different agencies)
Cooperative	1	2	3	4	5	Antagonistic
Competent	1	2	3	4	5	Incompetent
Helpful	1	2	3	4	5	Not at all helpful
Culturally sensitive	1	2	3	4	5	Culturally insensitive

21. What are the top three environmental challenges facing your tribe?
(1) Water quality issues mentioned 119 times.
(2) Solid and hazardous waste issues mentioned 83 times.
(3) Education, training, regulatory issues mentioned 37 times.

22. From what sources and by what methods does your tribe currently obtain information about developing and managing environmental programs? What methods are preferred?
Sources: Various agencies, tribal agencies and organizations, publication
Methods: Publications, agencies, conferences, tribal staff
Preferred methods: Direct contact with agencies, tribe to tribe exchange, mailings, training

23. What approaches work for your tribe in addressing environmental challenges?
1) Lobbying/politics, getting involved, meetings, research
2) Agency cooperation, tribal communication, awareness
3) Funding, staff

24. With regard to your tribe's environmental program, what are your most crucial funding priorities?
Water quality issues mentioned 58 times.
Staff, education, training mentioned 45 times.
Funding, grants mentioned 21 times.

25. What changes at the federal level are needed to prevent environmental degradation in Indian Country?
1) Funding mentioned 65 times.
2) Policy changes/changes in regulatory status mentioned 31 times.
3) Technical assistance/information/education mentioned 23 times.

26. Does the tribe currently have an environmental protection program? No response -13 YES -56 NO -80

27. How many FTEs (full-time equivalents) are assigned to the environmental protection program? _____ FTEs From 0 to 14. Average of 2.75; Mean of 2.

28. Within what department does the environmental management/protection program function? Real estate, none, Fish and Game, Tribal Operations, Tr: Elders, Natural Resources, Solid Waste, Planning, Administration, Water Res Environment, Housing, Health, Judicial, Development.

APPENDIX C

PHONE CONTACT RESULTS AND CALENDAR OF TRIBAL CELEBRATIONS, FESTIVALS AND POW WOWS

PHONE CONTACTS RESPONES: TRIBAL OFFICIALS

Tribe	Q1	Q2	Q3	Q4	Q5
Absentee Shawnee	Yes	Yes	Yes	Yes	Committee
Alabama Quassarte	Yes	Yes	Yes	Yes	None
Apache	Yes	Yes	Yes	Yes	Council
Caddo	Yes	Yes	Yes	Yes	Tribal Elder
Cherokee	Yes	Yes	Yes	Yes	Committee
Cheyenne-Arapaho	Yes	Yes	Yes	Yes	Committee
Chickasaw	Yes	Yes	Yes	Yes	Festival Director
Choctaw Nation	Yes	Yes	Yes	Yes	Council
Citizen Potawatomi Nation	Yes	Yes	Yes	No	Closed
Comanche	Yes	Yes	Yes	Yes	Council
Delaware Nation	Yes	Yes	Yes	Yes	Committee
Delaware Tribe of Indians	Yes	Yes	Yes	Yes	None
Eastern Shawnee	Yes	Yes	Yes	Yes	None
Fort Sill Apache	Yes	Yes	Yes	Yes	None
Iowa Tribe	Yes	Yes	Yes	Yes	Pow Wow committee
Kaw Nation	Yes	Yes	Yes	Yes	Committee
Kialegee tribal Town	Yes	Yes	Yes	No	Join other tribes
Kickapoo Tribe	Yes	Yes	Yes	Yes	None
Kiowa	Yes	Yes	Yes	Yes	None
Miami Nation	Yes	Yes	Yes	No	Join other tribes
Modoc Tribe	Yes	Yes	Yes	No	We don’t have
Muscogee (Creek) Nation	Yes	Yes	Yes	No	Celebration Director
Osage Nation	Yes	Yes	Yes	Yes	Committee
Otoe-Missouria	Yes	Yes	Yes	Yes	Council
Ottawa Tribe	Yes	Yes	Yes	Yes	None
Pawnee Tribe	Yes	Yes	Yes	Yes	Council
Peoria Tribe	Yes	Yes	Yes	Yes	None
Ponca Tribe	Yes	Yes	Yes	Yes	Committee
Quapaw Tribe	Yes	Yes	Yes	Yes	Tribal Leader
Sac & Fox Nation	Yes	Yes	Yes	Yes	Committee
Seminole Nation	Yes	Yes	Yes	Yes	Committee
Seneca-Cayuga	Yes	Yes	Yes	Yes	None
Shawnee	Yes	Yes	Yes	Yes	None
Thlopthlocco Tribal Town	Yes	Yes	Yes	Yes	None
Tonkawa Tribe	Yes	Yes	Yes	Yes	Committee
United Keetoowah Cherokees	Yes	Yes	Yes	Yes	Join Cherokee
Wichita & Affiliated Tribes	Yes	Yes	Yes	Yes	Committee
Wyandotte Nation	Yes	Yes	Yes	Yes	None
Yuchi (Euchee) Tribe	Yes	Yes	Yes	No	None

PHONE SURVEY RESPONSES: TRIBAL CULTURAL RESOURCES DEPARTMENT, ELDERS, AND CELEBRATIONS COMMITTEES AND ORGANIZERS

Tribe	Q1	Q2
Absentee Shawnee	Yes	Cultural resources
Alabama Quassarte	No	No
Apache	Yes	Council
Caddo	Yes	Tribal Elder
Cherokee	Yes	Committee
Cheyenne-Arapaho	Yes	Yes, Cultural Resources
Chickasaw	No	Committee Director
Choctaw Nation	No	Tribal leader & Committee
Citizen Potawatomi Nation	Not allowed	No allowed
Comanche	No	Yes, 1 hour before celebration
Delaware Nation	Yes	Committee & Council
Delaware Tribe of Indians	No	None
Eastern Shawnee	No	None
Fort Sill Apache	No	None
Iowa Tribe	Yes	Pow wow chairman
Kaw Nation	Yes	Tribal Council
Kialegee Tribal Town	No	None
Kickapoo Tribe	No	No
Kiowa	No	No
Miami Nation	Yes	Yes, committee
Modoc Tribe	None	None
Muscogee (Creek) Nation	Yes	Yes, cultural resources dept.
Osage Nation	Yes	Yes, Passing of Drum Family
Otoe-Missouria	Yes	Committee and Elder
Ottawa Tribe	Yes	No
Pawnee Tribe	Yes	Committee
Peoria Tribe	No	None
Ponca Tribe	Yes	Committee
Quapaw Tribe	No	Tribal leader
Sac & Fox Nation	Yes	Committee & Council
Seminole Nation	Yes	Committee
Seneca-Cayuga	No	None
Shawnee	No	None
Thlopthlocco Tribal Town	No	None
Tonkawa Tribe	No	Committee
United Keetoowah Cherokees	No	None
Wichita & Affiliated Tribes	Yes	Committee
Wyandotte Nation	No	None
Yuchi (Euchee) Tribe	No	None

PHONE CONTACT RESPONSES: TRIBAL ENVIRONMENTAL DEPARTMENTS

Tribe	Q1	Q2	Q3
Iowa Tribe Perkins, OK	Yes	Yes	Yes
Otoe-Missouria Red Rock, OK	Yes	Yes	Yes
Pawnee Tribe Pawnee, OK	Yes	Yes	Yes
Quapaw Tribe Quapaw, OK	Yes	Yes	Yes
Caddo Tribe Binger, OK	Yes	Yes	Yes
Comanche Tribe Lawton, OK	Yes	Yes	Yes
Creek Nation Okmulgee, OK	Yes	Yes	Yes
Cherokee Nation Tahlequah, OK	Yes	Yes	Yes
Osage Nation Pawhuska, OK	Yes	Yes	Yes
Chickasaw Nation Ada, OK	Yes	Yes	Yes
Choctaw Nation Durant, OK	Yes	Yes	Yes
Cheyenne-Arapaho Concho, OK	Yes	Yes	Yes

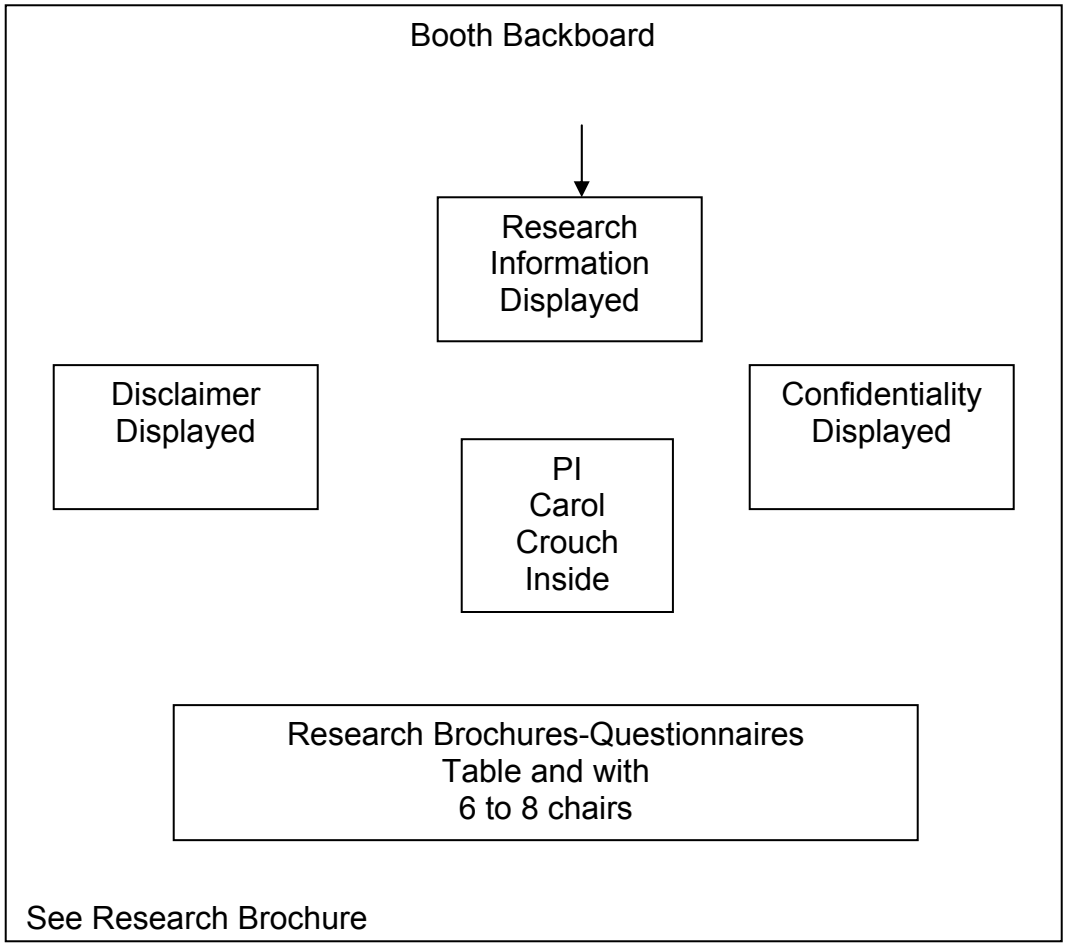
CALENDAR OF TRIBAL CELEBRATIONS, FESTIVALS, AND/OR POW WOWS

Tribe	Month	Dates	Contact Number
Delaware Tribe of Indians	May	25	918-336-5272
Miami Tribe	May	31	918-542-1445
Kialegee Tribal Town	June	1	405-452-3262
Peoria Tribe	June	21	918-540-2535
Muscogee (Creek) Nation	June	14-15	918-758-3262
Iowa Tribe of Oklahoma	June	14-15	405-547-2402
Apache Tribe	June	21	405-247-9493
Osage Tribe (Hominy)	June	20-21	918-287-1128
Osage Tribe (Pushata)	June	27-28	918-287-1128
Citizen Potawatomi Nation	June	28-29	405-275-3121
Quapaw Tribe	July	4-5-6-7	918-542-1853
Pawnee Nation	July	4-5	918-762-3621
Otoe-Missouria Tribe	July	18-19	580-723-4466
Sac & Fox Nation	July	13	918-968-3887
Kaw Nation	August	3	580-269-2552
Senca-Cayuga	August	5-11	918-542-6609
Kickapoo Tribe	August	10-11	405-964-2075
Wichita & Affiliated Tribes	August	15-18	405-247-2425
Ottawa Tribe	August	30-2	918-540-1536
Shawnee Tribe	August	30-2	918-666-2435
Cherokee Nation	August	30-2	918-456-0671
Choctaw Nation	August	30-2	580-924-8280
Seminole	September	6-8	405-257-6205
Fort Sill Apache	September	21-22	580-588-2298
Eastern Shawnee	September	21	918-666-2435
Chickasaw Nation	September	29-30	580-436-4287
Chickasaw Nation	October	1-5	580-436-4287
Euchee (Yuchi)	November	2-3	918-224-3065

APPENDIX D

RESEARCH BOOTH LAYOUT

AN INVESTIGATION OF PERCEPTIONS, AWARENESS,
AND CONCERN ON ENVIRONMENTAL ISSUES AMONG AMERICAN INDIANS
MAY 25 THROUGH OCTOBER 31, 2002
OKLAHOMA INDIAN TRIBES
POW WOWS, FESTIVAL, AND CELEBRATIONS



APPENDIX E

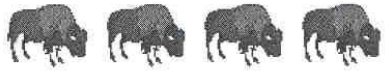
RESEARCH INVESTIGATION INFORMATION FOR PARTICIPANTS

Confidentiality

All of your answers will be treated confidentially and no information about individual responses will be shared publicly or used for commercial activities. The information you provide on the survey form will be used for educational and research purposes only and your answers will be treated confidentially and anonymously. If you have no problems with these terms, please complete the survey. By accepting *and* completing this survey form you are verifying that you are at least 18 years of age. Thank you very much for your time patience and participation.

Contact Information

Carol Vallee Crouch
Phone: 405-624-6036
IRB Executive Secretary
Oklahoma State University
203 Whitehurst
Stillwater, Oklahoma 74074



Research Project

AN INVESTIGATION OF PERCEPTIONS, AWARENESS, AND CONCERN ON ENVIRONMENTAL ISSUES AMONG AMERICAN INDIANS

Oklahoma State University
Ph.D. Candidate
Carol Vallee Crouch

Research Information

Survey is designed primarily to identify environmental issues among American Indians. The aim is to find out how environmental and outreach programs are reaching the Native American population. Identify what environmental issues and concerns that currently exist. Find out how tribal governments, federal, state, and University disciplines can target environmental issues, awareness, and assistance.

Research Institution

- Oklahoma State University
- Environmental Science Institution

Research Procedure

- Voluntary Participation
- Survey/Questionnaire
- 7 to 10 minutes
- No foreseeable risks or discomfort

Research Benefit

Your participation in this survey will provide further knowledge so that environmental issues and concerns, outreach programs, and educational desires could be improved to benefit the underserved population, American Indians.

What will happen to the Survey?

- Each completed survey sheet will be placed in an envelope and sealed until entered into a computer.

How long will you keep it?

- The survey sheet will be placed in a locked file cabinet until the research project is complete.
- Estimated date to complete research is December, 2003.

How will you destroy the survey sheets?

- Once the research project is completed each survey sheet will be shredded and discarded.

Public Notice

Research Project

AN INVESTIGATION OF PERCEPTIONS, AWARENESS, AND CONCERN ON ENVIRONMENTAL ISSUES AMONG AMERICAN INDIANS

Research conducted through Oklahoma State University, by
Ph.D. Candidate, Carol Vallee Crouch, through the Environmental Science Institution

The purpose of the research survey is to gather information on the perception of American Indian regarding environmental issues, awareness, education and knowledge of assistance.

Voluntary Participation Survey

Disclaimer: The use of the information obtained in this survey is part of dissertation and will be made available for public view. No names will be indicated on the survey and data will be used only as it relates to this research project.

APPENDIX F

AMERICAN INDIAN SCIENCE AND ENGINEERING SOCIETY SURVEY, NOVEMBER 2001

Environmental Issues Among American Indian College Students: Perceptions, Awareness, Concerns, and Knowledge of Assistance

Survey **November 2001**

Your response to this survey will help assess the environmental issues of Native American college students. Provide insight on the student's perception, awareness, concerns, and knowledge of available assistance to address environmental issues. Thank you for taking the time to fill out this survey. All responses are confidential.

Issues

1. Please rank the importance of the following issues in your community using 1 for the least important and 5 for the most important.

   123 Income 118 Health 137 Environmental Quality

   117 Employment 141 Education

2. How serious do you think the following environmental issues are in your community? (Mark 1 for not serious up to 5 for extremely serious.)

a. air pollution 61	1	2	3	4	5
b. water pollution 57	1	2	3	4	5
c. groundwater 33	1	2	3	4	5
d. flooding 16	1	2	3	4	5
e. natural resources 131	1	2	3	4	5
f. cultural resource 140	1	2	3	4	5
g. occupational hazards 30	1	2	3	4	5
h. toxic waste 73	1	2	3	4	5
i. preservation of land 140	1	2	3	4	5
j. agriculture practices 87	1	2	3	4	5

3. Do you think any of the issues in question 2 is related to the availability of education in your community?

   141 Yes 16 No 6 Not Sure

   If yes, circle all that apply:

   a. b. c. d. e. f. g. h. i. j.

   141 38 43 18 16 41 37 53 137 56

4. Are you interested in higher education?

   ☐ Yes 131 ☐ No 9

5. Is your higher education interest in one of the following areas?

   ☐ Engineering 61

   ☐ Ag/Biosystems 88

   ☐ Other 6

   ☐ Environmental Sciences 112

   ☐ Natural Resources 67

   ☐ Environmental Health & Safety 31

   ☐ Environmental Management/Justice/Policy 41

6. Do you think the following issues are impacted due to the lack of education? (Mark 1 for no impact up to 5 for greater impact.)

Human Health 141	1	2	3	4	5
Property 67	1	2	3	4	5
Jobs 114	1	2	3	4	5
Assistance 71	1	2	3	4	5

7. How would you rank your educational experience regarding general environmental issues for preservation and quality?

   0 Poor
   0 Below Average
   7 Average
   141 Above Average
   19 Excellent

8. What area do you feel more educational and outreach programs would benefit your community?

   33 Air pollution
   69 Water pollution
   131 Health
   16 Industry
   54 Farming
   117 Hazardous waste
   8 Deforestation

Awareness

9. Do you think the current environmental regulations are adequate to protect at a level that is desirable to you and your community?
   13 Yes 151 No 2 Not Sure

   If yes, what kind **NEPA, NAGPRA, NHPA**

10. Who would you contact in your community regarding an environmental issues or problem?
    132 Tribal 21 State 13 Federal 0 No One

11. Is there environmental education in your community?
    3 Yes 157 No 7 Not Sure

12. Are you familiar with the term environmental justice?
    167 Yes 0 No

13. Do you think environmental justice is an issue in your community?
    159 Yes 7 No 1 Not Sure

14. Do you think environmental education in your area is?
    4 Adequate 121 None 42 Needs to be enhanced

15. Rate how beneficial information on program assistance would be to you and your family?
    152 High 11 Medium 4 Low □ Zero

16. How important is education to you and your family?
    111 High 51 Medium 5 Low □ Zero

17. Please rate the importance of environmental education to you.
    164 High 3 Medium □ Low □ Zero

18. What are three ways in which you would prefer to receive? information regarding assistance and education?
    151 Newsletter 151 Group/community training
    □ Television/video □ Conservation/tribal fairs
    □ Family/friends □ Printed materials
    151 personal visit

19. Are you aware of outreach programs in our community?
    33 Yes 132 No 2 Not Sure

    If yes, do you think the outreach programs are?
    6 Adequate 11 None 150 Needs to be enhanced

Demographics

20. Please indicate your gender:
    79 Male 88 Female

21. Please indicate age:
    132 Under 25 29 25-35 4 36-55 2 55-Over

22. Please indicate the highest level of education you have completed:
    □ Some high school 167 High School
    167 Some College 4 College Grad
    0 Professional degree 4 Graduate school
    0 Technical school

23. Currently enrolled in higher education?
    167 Yes ☐ No
    If yes, what area? **ENVIRONMENTAL SCIENCE/ENGINEERING**

    Is it graduate school?
    4 Yes ☐ No
    If yes what area? **ENVIRONMENTAL SCIENCE/ENGINEERING/lAW**

24. Which describes the area in which you live?
    7 City 11 Town 9 Suburb 39 Farm
    133 Rural area 83 Indian Reservation
    111 Tribal Land

25. Please indicate your ethnic background:
    163 American Indian
    3 African-American/Black-BOTH
    1 Hispanic **BOTH**
    □ Other_____

Confidentially

All of your answers will be treated confidentially and no information about individual responses will be shared publicly or used for commercial activities. The information you provide on the survey form will be used for educational and research purposes only and your answers will be treated confidentially and anonymously. The only information shared publicly will be aggregated results in the form of tables and graphs. If you have no problems with these terms, please complete the survey. By accepting and completing this survey form you are verifying that you are at least 18 years of age. Thank you very much for your time patience and participation.

Contact: Carol Crouch 110 E. Lakeview Rd. Apt G-9 Stillwater, Oklahoma or IRB @ Oklahoma State University

Perceptions of Envir 2

APPENDIX G

OKLAHOMA STATE UNIVERISTY INSTITIONAL REVIEW BOARD APPROVAL

FOR PILOT STUDY AT AISES CONFERENCE

Oklahoma State University
Institutional Review Board

Protocol Expires: 11/8/02

Date: Tuesday, November 13, 2001 IRB Application No AG0214

Proposal Title: ENVIRONMENTAL ISSUES AMONG NATIVE AMERICANS: PERCEPETIONS, AWARENESSS, CONCERNS, AND KNOWLEDGE OF ASSISITANCE

Principal Investigator(s):

Carol Vallee Crouch
110 Lakeview Road, Apt G-9
Stillwater, OK 74075

Mike Smolen
218 AG
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the IRB procedures or need any assistance from the Board, please contact Sharon Bacher, the Executive Secretary to the IRB, in 203 Whitehurst (phone: 405-744-5700, sbacher@okstate.edu).

Sincerely,

Carol Olson

Carol Olson, Chair
Institutional Review Board

APPENDIX H

QUESTIONNAIRES AS PRESENTED TO PARTICIPANTS, FREQUENCY COUNTS AND RESULTS OF OPEN ENDED QUESTIONS

Environmental Perceptions, Awareness, and Concerns Among Environmental Professionals of the Oklahoma Indian Tribes

Self-Administered Questionnaire **2002**

Your response to this survey will help assess the environmental issues of American Indians. It will provide feedback on your perceptions, awareness, concerns, and knowledge of available programs.

Confidentiality

All of your answers will be treated confidentially and no information about individual responses will be shared publicly or used for commercial activities. The information you provide on the survey form will be used for educational and research purposes only and your answers will be treated confidentially and anonymously. If you have no problems with these terms, please complete the survey.

By accepting and completing this survey form you are verifying that you are at least 18 years of age.

Issues *Means

1. From your perspective, rank from most important to least important the issues in your tribal community. **(Mark 1 for most important and 6 for least important.)**

42 Income **42** Health **42** Environmental Quality
*3.97 *2.02 *3.19
42 Employment **42** Education **42** Crime
*2.73 *3.57 *5.40

2. How serious do you think the following environmental issues are in your tribal community? **(Mark 1 for not serious up to 5 for extremely serious.)**

a) Air pollution **42** ***2.23**	1	2	3	4	5
b) Water pollution **42** *3.62	1	2	3	4	5
c) Groundwater contamination **42** ***2.14**	1	2	3	4	5
d) Flooding **42** ***1.57**	1	2	3	4	5
e) Conservation of natural resources **42** ***3.04**	1	2	3	4	5
f) Preservation of cultural resources **42** ***3.14**	1	2	3	4	5
g) Occupational hazards **42** ***2.66**	1	2	3	4	5
h) Toxic waste **42** ***2.04**	1	2	3	4	5
i) Poor agricultural practices **42**	1	2	3	4	5

3. Of the issues in question 2, on which have you received environmental education or training? **(Mark all that apply)**

a.	b.	c	d.	e.	f	g.	h.	i.
40	**42**	**23**	**4**	**37**	**42**	**32**	**17**	**40**

4. Of the issues in question 2, on which have you or other agencies delivered environmental education to your tribal community? **(Mark all that apply)**

a.	b.	c	d.	e.	f	g.	h.	i.
17	**39**	**5**	**2**	**5**	**22**	**15**	**0**	**9**

5. Compared to other communities in your state how would you rate the general environmental quality in your tribal community. **(Mark one)**

   14 Poor
   20 Below Average
   5 Average
   0 Above Average
   0 Excellent

6. Please choose from the following list those you perceive to be the major causes of environmental problems in your tribal community. **(Mark all that apply)**

   5 Toxic waste **39** Open dumps
   5 Sanitation Systems **24** Mining, Oil, & Gas
   4 Farming (Livestock/Crops)

7. Indicate which of these problems may have caused damage, loss, or health problems that you are aware of in your tribal community

   5 Toxic waste **39** Open dumps
   5 Sanitation Systems **23** Mining, Oil, & Gas
   29 Farming (Livestock/Crops)

8. Mark any of the following educational topics that you feel could improve the present conditions in your tribal community. (Mark all that apply.)

   35 Safe Drinking Water
   39 Laws (environmental protection)
   39 Agriculture related
   39 Solid waste
   39 Preservation (cultural, land)

9. Has your tribal community experienced any of the following problems in the last 5 years? **(Mark all that apply)**

   16 Unhealthy drinking water
   33 Sewer backups
   5 Faulty septic tank
   38 Trash/dumps
   3 Livestock facilities

10. Has your tribal community experienced any of the following air quality problems on a regular basis? **(Mark all that apply)**

    20 Unpleasant Odor from livestock
    1 Industrial smoke
    39 Dust
    4 Chemicals in the air
    0 None
    Other **NONE**

11. Are there industrial activities occurring in your tribal community that endanger (threaten) tribal cultural resources?

    5 Yes **37** No ☐ Not Sure

    11a. If yes, indicate type of activity

    Oil and Gas Activities

12. Are there governmental activities occurring in your tribal community that endanger (threaten) tribal cultural resources?

    8 Yes **31** No 0 Not Sure

    12a. If yes, indicate type of activity

    Agriculture

13. Are there agricultural activities occurring in your tribal community that endanger (threaten) tribal cultural resources?

    3 Yes **36** No 0 Not Sure

    13a. If yes, indicate type of activity

    Leasing and Burns

14. Are there recreational activities occurring in your tribal community that endanger (threaten) tribal cultural resources?

    4 Yes **35** No 0 Not Sure

    14a.If yes, indicate type of activity

    Trespassing & Hunting Tribal Lands

Awareness

15. Which agency are tribal members most likely to contact if they became aware of an industrial, governmental, or agricultural activity that could pose a threat in your community? **42-Contact tribe: either council, police, or OEH**

---

16. From your perspective, how would you rate the level of environmental education in your tribal community? **(Mark 1)**

4 High
21 Medium
14 Low
0 Zero

17. Do you think the current environmental regulations are adequate to protect your tribal community?

5 Yes **34** No **3** Not Sure

18. Does the tribe or another agency offer environmental education to your tribal community?

39 Yes **0** No 0 Not Sure

18a.If yes, please indicate who provides the education

EPA, NRCS and Oklahoma Conservation Commission

19. Do you think environmental justice is an issue for your tribal community?

39 Yes **0** No **3** Not Sure

20. From the list below, indicate the laws, orders, public laws, and standards that your tribal community should be familiar with. **(Mark all that apply)**

39 Clean Water Act
39 National Historic Preservation Act (NHPA)
25 Clean Air Act
10 Executive Order 12898
24 National Environmental Policy Act (NEPA)
41 Native American Graves Protection and Repatriation Act (NAGPRA)
41 National American Indian Heritage Month (Public Law 101-343)
39 State Drinking Water Standards

21. Is there sufficient enforcement of environmental laws or regulations in your tribal community?

☐ Yes **39** No 0 Not Sure

22. How would you rate the awareness of environmental and conservation programs in your tribal community? **(Mark one)**

☐ high **39** medium **3** low ☐ zero

23. Which of the following federal, state, or local agencies have programs that your tribal community has utilized. (Mark all that apply)

24 **Natural Resource Conservation Service**
10 Colleges and Universities
5 Conservation Districts
5 Extension Office (in your community)
39 Environmental Protection Agency
5 Department of Environment Quality
41 Indian Health Service

24. If your tribal community has utilized the assistance programs of any of the agencies indicated in question #23, how would you rate their delivery. (Mark all that apply)

☐ Natural Resource Conservation Service
5 High **19** Medium ☐ Low
☐ Colleges and Universities
4 High **1** Medium **5** Low
☐ Conservation Districts
☐ High **5** Medium ☐ Low
☐ Extension Office (in your community)
☐ High **1** Medium **4** Low
☐ Environmental Protection Agency
19 High **4** Medium **15** Low
☐ Department of Environment Quality
1 High **4** Medium ☐ Low
☐ Indian Health Service
4 High **19** Medium **23** Low

25. In your tribal programs, which of the following barriers, if any, pose problems for your tribal community when seeking or receiving assistance? (Mark all that apply)

34 Program accessibility
0 Discrimination
24 Lack of Interest (agency)
3 Awareness of programs
25 Lack of education regarding program guidelines

26. Based on your awareness of **state programs**, which of the following barriers, if any, pose problems for your tribal community when seeking or receiving assistance? **(Mark all that apply)**

23 Program accessibility
25 Discrimination
42 Lack of Interest (agency)
9 Awareness of programs
38 Lack of education regarding program guidelines

27. Based on your awareness of **federal programs**, which of the following barriers, if any, pose problems for your tribal community when seeking or receiving assistance? **(Mark all that apply)**

42 Program accessibility
5 Discrimination
24 Lack of Interest (agency)
9 Awareness of programs
20 Lack of education regarding program guidelines

28. What are three ways in which your tribal community would prefer to receive information regarding assistance and education? **(Mark three)**

☐ newsletter **42** group/community training
☐ television/video **10** conservation/tribal fairs
18 family/friends **38** printed materials
29 personal visit ☐ Pow wows

Demographics

29. Please indicate your gender:
9 Male **29** Female

30. Please indicate your age group:
1 under 25 **24** 25-35 **14** 36-55
3 55-over

31. Please indicate the highest level of education you have completed:

☐ Some high school **15** High School Grad
☐ Some College **19** College Grad
2 Professional degree **4** Graduate school
☐ Technical school

Please indicate your job title(s)

Environmental Department, Cultural Resources, Education, Grazing Lands, Realty, Land Management

32. Please indicate if there are any environmental issues, environmental educational training, or outrea needs that have not been identified in this survey.

Hire staff with degrees in the environmental field
Do not hire family, hire qualified
Training: Education: water quality-environmental education-wet/wild
Hire training to be done from outside the tribe or EPA

Thank you for your participation

Carol Vallee Crouch
Ph.D. Candidate
Oklahoma State University
Environmental Institute

An Investigation of Perceptions, Awareness, and Concern on Environmental Issues Among Oklahoma American Indians

Self-Administered Questionnaire **2002**

Your response to this survey will help assess the environmental issues of American Indians. It will provide feedback on your perceptions, awareness, concerns, and knowledge of available programs.

Confidentiality

All of your answers will be treated confidentially and no information about individual responses will be shared publicly or used for commercial activities. The information you provide on the survey form will be used for educational and research purposes only and your answers will be treated confidentially and anonymously. The only information shared publicly will be aggregated results in the form of tables and graphs. If you have no problems with these terms, please complete the survey.

By accepting and completing this survey form you are verifying that you are at least 18 years of age.

Issues

1. From your perspective, rank from most important to least important the issues in your tribal community. **(Mark 1 for most important and 6 for least important.)**

609 ☐ Income **612** ☐ Health **608** ☐ Environmental Quality
611 ☐ Employment **608** ☐ Education **607** ☐ Crime

2. How serious do you think the following environmental issues are in your tribal community? **(Mark 1 for not serious up to 5 for extremely serious.)**

a.	Air pollution **617**	**1**	**2**	**3**	**4**	**5**
b.	Water pollution **618**	**1**	**2**	**3**	**4**	**5**
c.	Groundwater contamination **616**	**1**	**2**	**3**	**4**	**5**
d.	Flooding **616**	**1**	**2**	**3**	**4**	**5**
e.	Conservation of natural resources **618**	**1**	**2**	**3**	**4**	**5**
f.	Preservation of cultural resources **617**	**1**	**2**	**3**	**4**	**5**
g.	Occupational hazards **616**	**1**	**2**	**3**	**4**	**5**
h.	Toxic waste **618**	**1**	**2**	**3**	**4**	**5**
i.	Poor agricultural practices **616**	**1**	**2**	**3**	**4**	**5**

3. Do you think any of the issues in question 2 have been addressed as topics of environmental education programs in your community?

   ☐ Yes **75** ☐ No **336** ☐ Not Sure **180**

   If yes, check all that apply:

   a. b. c d. e. f. g. h. i.
   ☐ **18** ☐ **60** ☐ **23** ☐ **11** ☐ **24** ☐ **29** ☐ **20** ☐ **9** ☐ **11**

4. Of the following issues in question 2, on which have you received environmental education? **(Mark all that apply)**

   a. b. c. d. e. f. g. h. i.
   ☐**14** ☐ **55** ☐ **18** ☐ **7** ☐ **9** ☐ **58** ☐**14** ☐ **6** ☐5

5. Compared to other communities in your state how would you rate the general environmental quality in your community. **(Mark one)**

   113 ☐ Poor **No answer =59**
   239 ☐ Below Average
   201 ☐ Average
   26 ☐ Above Average
   7 ☐ Excellent

6. Please choose from the following list those you perceive to be the major causes of environmental problems in your community. **(Mark all that apply)**

   103 ☐ Toxic waste **280** ☐ Open dumps
   62 ☐ Sanitation Systems **261** ☐ Mining, Oil, & Gas
   326 ☐ Farming (Livestock/Crops)

7. Indicate which of these problems you may have received some environmental education? **(Mark all that apply)**

   ☐ Toxic waste **20** ☐ Open dumps **30**
   ☐ Sanitation Systems **28** ☐ Mining, Oil, & Gas **24**
   ☐ Farming (Livestock/Crops) **22**

8. Indicate which of these problems may have caused you some damage, loss, or health problems?

   ☐ Toxic waste **15** ☐ Open dumps **72**
   ☐ Sanitation Systems **82** ☐ Mining, Oil, & Gas **27**
   ☐ Farming (Livestock/Crops) **62**

9. Has anyone in your household purchased or paid for any of the following in the past 10 years? **(Mark all that apply)**

   ☐ New water well **26**
   ☐ Septic tank pumping **49**
   ☐ Water purification system **9**
   ☐ Air purification system **23**

☐ Bottled drinking water **365**

10. Where do you get your drinking water?

☐ Private well **207**
☐ Bottled water **36**
☐ Public water supply **371**
☐ Pond **5**
Other **See list**

11. Mark any of the following topics that you feel could improve the present conditions in your community. **(Mark all that apply.)**

☐ Safe Drinking Water **401**
☐ Laws (environmental protection) **265**
☐ Agriculture related **209**
☐ Solid waste **168**
☐ Preservation (cultural, land) **343**

12. Have you experienced any of the following problems in the last 5 years? **(Mark all that apply)**

☐ Unhealthy drinking water **83**
☐ Sewer backups **138**
☐ Faulty septic tank **45**
☐ Trash/dumps **143**
☐ Livestock facilities **71**

13. Do you experience any of the following air quality problems on a regular bases? **(Mark all that apply)**

☐ Unpleasant Odor from livestock **96**
☐ Industrial smoke **27**
☐ Dust **323**
☐ Chemicals in the air **96**
☐ None **171**
Other **See List**

14. Are there industrial activities occurring in your community that endanger (threaten) your cultural resources?
☐ Yes **58** ☐ No **283** ☐ Not Sure **243**

14a. If yes, indicate type of activity **See List**

15. Are there governmental activities occurring in your community that endanger (threaten) your cultural resources?
☐ Yes **71** ☐ No **264** ☐ Not Sure **249**

15a. If yes, indicate type of activity **See List**

16. Are there agricultural activities occurring in your community that endanger (threaten) your cultural resources?

☐ Yes **40** ☐ No **261** ☐ Not Sure **282**

16a. If yes, indicate type of activity **See List**

17. Are there recreational activities occurring in your community that endanger (threaten) your cultural resources?

☐ Yes **15** ☐ No 296 ☐ Not Sure **270**

17a.If yes, indicate type of activity **See List**

Awareness

18. Which agency would you contact if you were aware of an industrial, governmental, or agricultural activity that could pose a threat in your community?

See List

19. From your perspective, how would you rate the level of environmental education in your community? (**Mark 1)**

☐ High **36**
☐ Medium **228**
☐ Low **223**
☐ Zero **94**

20. Do you think the current environmental regulations are adequate to protect you and your community?

☐ Yes **34** ☐ No **209** ☐ Not Sure **340**

21. Are you aware of environmental education programs offered in your community?

☐ Yes **21** ☐ No **327** ☐ Not Sure **234**

21a.If yes, please indicate who provides the education

See List

22. Are you familiar with the term environmental justice?

☐ Yes **388** ☐ No **241**

23. Do you think environmental justice is an issue your community?

☐ Yes **81** ☐ No **136** ☐ Not Sure **361**

24. From the list below, indicate the laws, orders, public laws, and standards you are familiar with. **(Mark all that apply)**

☐ Clean Water Act **396**
☐ National Historic Preservation Act (NHPA) **181**
☐ Clean Air Act **79**
☐ Executive Order 12898 **46**
☐ National Environmental Policy Act (NEPA) **76**
☐ Native American Graves Protection and Repatriation Act (NAGPRA) **198**
☐ National American Indian Heritage Month (Public Law 101-343) **440**
☐ State Drinking Water Standards **158**

25. Is there sufficient enforcement of environmental laws or regulations in your community?

☐ Yes **83** ☐ No **200** ☐ Not Sure **289**

26. How would rate the awareness of environmental and conservation programs in your community? **(Mark one)**

☐ high **38** ☐ medium **178** ☐ low **264** ☐ zero **76**

27. Which of the following federal, state, local, and tribal agencies or organizations have programs that you or your family has utilized. **(Mark all that apply)**

☐ Natural Resource Conservation Service **81**
☐ Colleges and Universities **111**
☐ Conservation Districts **71**
☐ Extension Office (in your community) **155**
☐ Tribal Offices **368**
☐ Department of Environment Quality **27**
☐ Indian Health Service **477**

28. If you or your family has utilized one of the programs indicated in question #27, how would you rate the delivery of the program in which you received assistance? **(Mark one)**

☐ High **99**
☐ Medium **277**
☐ Low **191**

29. Based on your awareness of **tribal programs**, choose from the following list of barriers any that pose problems for you and your family regarding receiving assistance? **(Mark all that apply)**

☐ Program accessibility **227**
☐ Discrimination **44**
☐ Lack of Interest (agency) **78**
☐ Awareness of programs **219**
☐ Lack of education regarding program guidelines **174**

30. Based on your awareness of **state programs**, choose from the following list of barriers any that pose problems for you and your family regarding receiving assistance? **(Mark all that apply)**

☐ Program accessibility **216**
☐ Discrimination **82**
☐ Lack of Interest (agency) **103**
☐ Awareness of programs **267**
☐ Lack of education regarding program guidelines **481**

31. Based on your awareness of **federal programs**, choose from the following list of barriers any that pose problems for you and your family regarding receiving assistance? **(Mark all that apply)**

☐ Program accessibility **215**
☐ Discrimination **90**
☐ Lack of Interest (agency) **119**
☐ Awareness of programs **278**
☐ Lack of education regarding program guidelines **180**

32. What are three ways in which you would prefer to receive information regarding assistance and education? **(Mark all that apply)**

330 ☐ newsletter **230** ☐ group/community training
153 ☐ television/video **98** ☐ conservation/tribal fairs
145 ☐ family/friends **144** ☐ printed materials
238 ☐ personal visit **97** ☐ Pow Wows

Demographics

33. Please indicate your gender:

351 ☐ Male **251** ☐ Female

34. Please indicate your age group:

84 ☐ under 25 **60** ☐ 25-35 **223** ☐ 36-55 **296** ☐ 55-over

35. Please indicate the highest level of education you have completed:

188 ☐ Some high school **249** ☐ High School Grad
122 ☐ Some College **48** ☐ College Grad
13 ☐ Professional degree **15** ☐ Graduate school
47 ☐ Technical school

36. Which describes the area in which you live?

106 ☐ city **108** ☐ town **29** ☐ suburb **89** ☐ farm

296 ☐ rural area **48**☐ tribal land **21**☐ allotted land

37. Please indicate your tribal affiliation(s).

See List

38. Please indicate your zip code

See List

Confidentiality Statement

All of your answers will be treated confidentially and no information about the individual responses will be shared publicly or used for commercial activities. The information you provide on the survey form will be used for educational and research purposes only. The only information shared publicly will be aggregated results in the form of tables and graphs. By accepting and completing this survey form, you are verifying that you are at least 18 years of age.

Thank you for your participation
Carol Vallee Crouch
Ph.D. Candidate Oklahoma State University
Environmental Institute

Listings of Open-Ended Responses

Questions 14, 15, 16, and 17

Industrial Q.14	Government Q.15	Agricultural Q.16	Recreational Q.17
Cement Company	Dams	Chemicals	Jet skiing
Oil/Gas	Farming	Dust Cropping	Boating
Tire Industry	Mining	Farming	Everywhere
Hog Farms	Roads	Livestock	City Expansions
Poultry Farms	Don't Care	Poultry Farming	Hunting
Mining	Every where	Water Quality	Lakes
Farming	Too many	Every where	River sporting
Superfund Site			
Tree Cutting			
Water Plant			
Sewage plant			
Every where			

Question 13 – Indigenous Grassroots Respondents

Response	Frequency	Percent	
No opened-ended	642	99.5	99.5
Mining	1	.2	99.7
Conoco (Gas)	1	.2	99.8
Sewers	1	.2	100.0

Question 18 and 21 – Indigenous Grassroots Respondents

Responses Q.21	Number	Responses Q.18	Number
Tribe	11	Tribal Leaders	187
EPA	2	Tribal Elders	4
OSU Extension	1	Tribal OEH	14
County Fairs	1	Tribal Police	10
Conservation District	2	Tribal Housing	3
		Family	6
		BIA	5
		Federal Government	7
		Local Government	11
		EPA	57
		Local Police	35
		Conservation District	1
		USDA/NRCS/SCS	3
		Don’t Know	26
		Source	9
		Health Department	18

APPENDIX I

USDA SOCIAL SCIENCE INSITITUTE QUESTIONNAIRE

(USDA. 2000)

our responses to this survey will help the Southern
`vstems Education Consortium assess the
.nental issues in the southern United States.
ıank you for taking the time to fill out this survey. All
sponses are confidential.

MARKING INSTRUCTIONS

- Use a No. 2 pencil or a blue or black ink pen only.
- Do not use pens with ink that soaks through the paper.
- Make solid marks that fill the response completely.
- Make no stray marks on this form.

CORRECT: ● INCORRECT: ⊘ ⊗ ◒ ◔

ıSUES

Please rank the importance of the following issues in
ıur community using 1 for the least important and 6 for
e most important.

_Income __Education __Employment
_Environmental quality __Health __Crime

How serious do you think the following environmental
sues are in your community? (Mark 1 for not serious up
5 for extremely serious.)

	1	2	3	4	5
Air pollution	○	○	○	○	○
Water pollution	○	○	○	○	○
Groundwater contamination	○	○	○	○	○
Flooding	○	○	○	○	○
Soil erosion	○	○	○	○	○
l ·ing resources (wildlife)	○	○	○	○	○
ıal waste	○	○	○	○	○
.land loss	○	○	○	○	○
Cropland degradation	○	○	○	○	○
Deforestation	○	○	○	○	○

Do you think any of the issues in question 2 are
ılated to the availability of jobs in your community?

) Yes ○ No ○ Not sure
If yes, please mark all that apply.
a. b. c. d. e. f. g. h. i. j.
○○○○○○○○○○

Which of the issues in question 2 are most important
you? (Please mark three)
a. b. c. d. e. f. g. h. i. j.
○○○○○○○○○○

To what extent do you think the issues in
ıestion 2 impact each of the following? (Mark 1
r no impact up to 5 for great impact.)

	1	2	3	4	5
u..ı health	○	○	○	○	○
roperty	○	○	○	○	○
nimal Health	○	○	○	○	○
usiness	○	○	○	○	○

6. The following water systems may or may not be polluted in your community. (Mark 1 for not serious up to 5 for extremely serious.)

	1	2	3	4	5
Drinking water	○	○	○	○	○
Stream water	○	○	○	○	○
Lake (if any)	○	○	○	○	○
Ocean	○	○	○	○	○
Well	○	○	○	○	○
Underground water	○	○	○	○	○
Other _____	○	○	○	○	○

7. Compared to other communities in your state how would you rate the general environmental quality in your community?

○ Poor
○ Below Average
○ Average
○ Above Average
○ Excellent

8a. Please choose from the following list what you perceive to be the major environmental problems in your community. (Mark all that apply.)

○ Air pollution ○ Water pollution
○ Deforestation ○ Crop degradation
○ Soil erosion ○ Other _____

8b. Please choose from the following list what you perceive to be the major causes of environmental problems in your community. (Mark all that apply.)

○ Chemical runoff ○ Flooding ○ Farms
○ Industry ○ Other _____

9. Have you experienced any damage or loss resulting from the environmental problems in question 8a?

○ Yes
○ No
If yes, what kind _____
_____

10. If your answer to question 9 is yes, please estimate the value of the damage or loss during the last 5 years.

$ _____

11. To what extent have environmental changes over the last 3 years adversely affected the following recreation activities? (Mark 1 for no effect up to 5 for great effect.)

	1	2	3	4	5
hunting	○	○	○	○	○
fishing	○	○	○	○	○
animal watching	○	○	○	○	○
boating	○	○	○	○	○
swimming	○	○	○	○	○
hiking	○	○	○	○	○

12. Has anyone in your household purchased any of the following?

	Yes	No
Water purification system	○	○
Air purification system	○	○
Bottled water	○	○
Other _____	○	○

13. Where do you get your drinking water?

○ Private well ○ Public water supply
○ Bottled water ○ Pond
○ Other _____

14. Have you experienced any of the following problems in the last 3 years?
○ Yes ○ No If yes, mark all that apply.

○ unhealthy drinking water ○ improper wastewater
○ faulty septic tank ○ increase in livestock facilities
○ excess pesticide usage ○ sedimentation
○ flooding ○ mud slides
○ sewer backups ○ all of the above

15. Have you experienced any of the following water quality problems in the last 3 years?
○ Yes ○ No If yes, mark all that apply.

○ unpleasant taste ○ foul odor (from) _____
○ chemicals in water ○ harmful bacteria in water
○ discoloration ○ high iron content
○ all of the above

16. Have you experienced any of the following air quality problems in the last 3 years?
Yes ○ No If yes, mark all that apply.

foul odor from:
○ hogs ○ dust
○ chickens ○ excess smoke from industries
○ cattle ○ chemicals in the air
○ all the above

17. Has your family experienced any of the following health problems in the last 3 years?
○ Yes ○ No If yes, mark all that apply.

○ unexplained illness ○ unexplained deaths
○ birth defects ○ infant deaths
○ miscarriages ○ still births
○ premature births ○ mental retardation
○ seizures ○ cancer # _____
○ high death rates # ____ ○ breathing problems
○ stomach problems ○ elimination problems
○ all of the above

Awareness

18. Do you think the current environmental regulations are adequate to protect the environment at a desired level?

○ Yes ○ No ○ Don't know

19. Who would you contact concerning environmental pollution problems in your community?

_____
_____
_____

20. Are you familiar with local, state, and Federal agencies that deal with environmental issues?

○ Yes ○ No ○ Not sure

21. Is there a lack of enforcement of environmental laws or regulations in your community?

○ Yes ○ No ○ Not sure

22. Do you know what the term environmental justice means?

○ Yes ○ No ○ Don't know

23. Do you think environmental justice is an issue in your community?

○ Definitely an issue
○ Somewhat an issue
○ Slightly an issue
○ Definitely not an issue

24. Have you ever been contacted by the USDA's Natural Resources Conservation Service (formerly the Soil Conservation Service) in any of the following ways: (Mark all that apply.)

○ telephone ○ mail
○ demonstration ○ fair
○ personal visit ○ never been contacted

25. How familiar are you with the following NRCS services? (Mark 1 for unfamiliar up to 5 for very familiar.)

	1	2	3	4	5
soil survey	○	○	○	○	○
on control	○	○	○	○	○
al waste management	○	○	○	○	○
financial/cost-share	○	○	○	○	○
streambank restoration	○	○	○	○	○
flood prevention	○	○	○	○	○
irrigation systems	○	○	○	○	○
drainage systems	○	○	○	○	○

26. Please rate the effectiveness of the following conservation systems in your community. (Mark 1 for not effective up to 5 for very effective.)

	1	2	3	4	5
animal waste facilities	○	○	○	○	○
water management	○	○	○	○	○
irrigation systems	○	○	○	○	○
erosion control	○	○	○	○	○
drainage systems	○	○	○	○	○

Assistance

27. Please rate the following organizations in servicing your community relative to environmental justice issues. (Mark 1 for poor up to 5 for excellent.)

	1	2	3	4	5
Environmental Protection Agency	○	○	○	○	○
tment of Agriculture	○	○	○	○	○
	○	○	○	○	○
conservation district	○	○	○	○	○
colleges and universities	○	○	○	○	○
church/religious organizations	○	○	○	○	○

28. The following may or may not be a barrier to NRCS in providing assistance to customers? (Mark 1 for a barrier up to 5 for a benefit.)

	1	2	3	4	5
interest from agency	○	○	○	○	○
interest from community	○	○	○	○	○
agency information	○	○	○	○	○
agency visibility	○	○	○	○	○
program accessibility	○	○	○	○	○
discrimination	○	○	○	○	○
program guidelines	○	○	○	○	○

29. What are your 3 most preferred ways for receiving information.

- ○ group training session
- ○ computer program
- ○ video
- ○ printed materials
- ○ onal visit from S staff
- ○ radio
- ○ on-line computer
- ○ television
- ○ newsletter
- ○ compact disks
- ○ on-farm demonstration
- ○ conservation fair
- ○ family

30. How beneficial are the following NRCS services to you? (Mark 1 for no benefit up to 5 for great benefit.)

	1	2	3	4	5
soil survey	○	○	○	○	○
water monitoring	○	○	○	○	○
animal waste management	○	○	○	○	○
financial/cost-share	○	○	○	○	○
streambank restoration	○	○	○	○	○
flood prevention	○	○	○	○	○
environmental remediation	○	○	○	○	○
restoration of parks	○	○	○	○	○
marketing of agricultural products	○	○	○	○	○

Demographics

31. Please indicate your gender: ○ Male ○ Female

32. Please indicate your age:
○ under 25 ○ 25–29 ○ 30–34 ○ 35–44 ○ 45–49 ○ 50–54 ○ 55–59 ○ 60–64 ○ 65–69 ○ over 70

33. Please indicate your ethnic background:
○ Caucasian/White ○ African-American/Black ○ Hispanic ○ Asian-American ○ American Indian ○ Other _____

34. Please indicate your martial status:
○ Married ○ Single

35. Please indicate the highest level of education you have completed:
○ Some high school ○ High School ○ Some College ○ College grad ○ Graduate school ○ Professional degree ○ Technical school

36. Which best describes where you live?
○ city ○ town ○ suburb ○ farm ○ rural area (not farm, the country)

37. Please indicate the state you live in:
○ AL ○ AR ○ FL ○ GA ○ LA ○ MS ○ NC ○ SC ○ TN ○ TX ○ VA

38. Please indicate your household income:
○ less than $20,000 ○ $20,000 to $29,999 ○ $30,000 to $39,999 ○ $40,000 to $49,999 ○ $50,000 and above

Thank you for your participation!

PLEASE DO NOT WRITE IN THIS AREA

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APPENDIX J

OKLAHOMA STATE UNIVERISTY INSTITIONAL REVIEW BOARD APPROVAL

FOR INVESTIGATION QUESTIONNAIRES

Oklahoma State University
Institutional Review Board

Protocol Expires: 11/8/02

Date : Monday, April 15, 2002 IRB Application No: AG0214

Proposal Title: ENVIRONMENTAL ISSUES AMONG NATIVE AMERICANS: PERCEPETIONS, AWARENESSS, CONCERNS, AND KNOWLEDGE OF ASSISITANCE

Principal Investigator(s) :

Carol Vallee Crouch
110 Lakeview Road, Apt G-9
Stillwater, OK 74075

Mike Smolen
218 AG
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s) : Approved **Modification**

Please note that the protocol expires on the following date which is one year from the date of the approval of the original protocol:

Protocol Expires: 11/8/02

Signature :

Carol Olson, Director of University Research Compliance

Monday, April 15, 2002
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

Oklahoma State University
Institutional Review Board

Protocol Expires: 11/8/02

Date : Tuesday, May 28, 2002 IRB Application No: AG0214

Proposal Title: ENVIRONMENTAL ISSUES AMONG NATIVE AMERICANS: PERCEPETIONS, AWARENESSS, CONCERNS, AND KNOWLEDGE OF ASSISITANCE

Principal Investigator(s) :

Carol Vallee Crouch
110 Lakeview Road, Apt G-9
Stillwater, OK 74075

Mike Smolen
218 AG
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s) : Approved **Modification**

Please note that the protocol expires on the following date which is one year from the date of the approval of the original protocol:

Protocol Expires: 11/8/02

Signature : Carol Olson

Carol Olson, Director of University Research Compliance

Tuesday, May 28, 2002
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board

Oklahoma State University
Institutional Review Board

Protocol Expires: 11/8/2002

Date : Tuesday, September 24, 2002 IRB Application No AG0214

Proposal Title: ENVIRONMENTAL ISSUES AMONG NATIVE AMERICANS: PERCEPETIONS, AWARENESSS, CONCERNS, AND KNOWLEDGE OF ASSISITANCE

Principal Investigator(s) :

Carol Vallee Crouch
110 Lakeview Road, Apt G-9
Stillwater, OK 74075

Mike Smolen
218 AG
Stillwater, OK 74078

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s) : Approved **Modification**

Please note that the protocol expires on the following date which is one year from the date of the approval of the original protocol:

Protocol Expires: 11/8/2002

Signature Carol Olson

Carol Olson, Director of University Research Compliance

Tuesday, September 24, 2002
Date

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

APPENDIX K

QUESTIONNAIRE REVIEW COMMITTEE

Questionnaire Review Committee

Michael D. Smolen, Ph.D.
Oklahoma State University
218 Ag Hall
Stillwater, OK 74078-6021
http://waterquality.okstate.edu

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Stillwater, Oklahoma 74078

Darrel Dominick
State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
100 USDA, Suite 206
Stillwater, Oklahoma 74074

Misty Blevins
Salish Kootenai Tribes of the Flathead Reservation
1518 Country Club Drive
Sulphur, Oklahoma 73086

APPENDIX L

SPSS ANALYSIS: ONE-WAY ANOVA FOR $H_0 1$

Oneway ANOVA Q5. Environmental Quality/Conditions

	Sum of Squares	df	Mean squares	F	Sig.
Between Groups	24.558	11	2.333	3.109	<.001
Within Groups					
Total					

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Q5. Environmental Quality/Conditions
LSD

(I) Group	(J) Group	Mean Difference (1-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.32*	.161	.049	.00	.64
	3.00	-.04	.173	.806	-.38	.30
	4.00	-.20	.178	.249	-.55	.14
	5.00	-.10	.173	.554	-.44	.24
	6.00	-.20	.180	.263	-.55	.15
	7.00	-.06	.189	.749	-.43	.31
	8.00	.13	.163	.444	-.20	.45
	9.00	-.31	.164	.063	-.63	.02
	10.00	.04	.168	.803	-.29	.37
	11.00	-.13	.201	.526	-.52	.27
	12.00	-.48*	.193	.013	-.86	-.10
2.00	1.00	-.32*	.161	.049	-.64	.00
	3.00	-.36*	.157	.022	-.67	-.05
	4.00	-.52*	.162	.001	-.84	-.20
	5.00	-.42*	.157	.008	-.73	-.11
	6.00	-.52*	.165	.002	-.84	-.20

	7.00	-.38*	.174	.030	-.72	-.04
	8.00	-.19	.146	.186	-.48	.09
	9.00	-.63*	.148	.000	-.92	-.34
	10.00	-.28*	.152	.068	-.57	.02
	11.00	-.45*	.188	.018	-.81	-.08
	12.00	-.80*	.179	.000	-1.15	-.45
3.00	1.00	.04	.173	.806	-.30	.38
	2.00	.36*	.157	.022	.05	.67
	4.00	-.16	.174	.352	-.50	.18
	5.00	-.06	.169	.723	-.39	.27
	6.00	-.16	.176	.369	-.50	.19
	7.00	-.02	.185	.924	-.38	.35
	8.00	.17	.159	.293	-.15	.48
	9.00	-.26	.161	.101	-.58	.05
	10.00	.08	.164	.607	-.24	.41
	11.00	-.08	.198	.668	-.47	.30
	12.00	-.44*	.190	.022	-.81	-.06
4.00	1.00	.20	.178	.249	-.14	.55
	2.00	.52*	.162	.001	.20	.84
	3.00	.16	.174	.352	-.18	.50
	5.00	.10	.174	.557	-.24	.44
	6.00	.00	.181	.984	-.35	.36
	7.00	.14	.189	.446	-.23	.52
	8.00	.33*	,164	.045	.01	.65
	9.00	-.10	.165	.539	-.43	.22
	10.00	.25	.169	.145	-.09	.58
	11.00	.08	.202	.701	-.32	.47
	12.00	-.27	.194	.158	-.66	.11
5.00	1.00	.10	.173	.554	-.24	.44
	2.00	.42*	.157	.008	.11	.73

	3.00	.06	.169	.723	-.27	.39
	4.00	-.10	.174	.557	-.44	.24
	6.00	-.10	.176	.576	-.44	.25
	7.00	.04	.185	.820	-.32	.41
	8.00	.23	.159	.154	-.09	.54
	9.00	-.20	.161	.205	-.52	.11
	10.00	.14	.164	.379	-.18	.47
	11.00	-.02	.198	.900	-.41	.36
	12.00	-.38*	.190	.048	-.75	.00
6.00	1.00	.20	.180	.263	-.15	.55
	2.00	.52*	.165	.002	.20	.84
	3.00	.16	.176	.369	-.19	.50
	4.00	.00	.181	.984	-.36	.35
	5.00	.10	.176	.576	-.25	.44
	7.00	.14	.191	.462	-.24	.52
	8.00	.33	.167	.051	.00	.65
	9.00	-.11	.168	.531	-.43	.22
	10.00	.24	.171	.156	-.09	.58
	11.00	.07	.204	.717	-.33	.47
	12.00	-.28	.196	.156	-.66	.11
7.00	1.00	.06	.189	.749	-.31	.43
	2.00	.38*	.174	.030	.04	.72
	3.00	.02	.185	.924	-.35	.38
	4.00	-.14	.189	.446	-.52	.23
	5.00	-.04	.185	.820	-.41	.32
	6.00	-.14	.191	.462	-.52	.24
	8.00	.19	.176	.293	-.16	.53
	9.00	-.25	.177	.165	-.59	.10
	10.00	.10	.180	.571	-.25	.46
	11.00	-.07	.211	.751	-.48	.35
	12.00	-.42*	.204	.041	-.82	-.02
8.00	1.00	-.13	.163	.444	-.45	.20

	2.00	.19	.146	.186	-.09	.48
	3.00	-.17	.159	.293	-.48	.15
	4.00	-.33*	.164	.045	-.65	-.01
	5.00	-.23	.159	.154	-.54	.09
	6.00	-.33	.167	.051	-.65	.00
	7.00	-.19	.176	.293	-.53	.16
	9.00	-.43*	.150	.004	-.73	-.14
	10.00	-.08	.154	.589	-.39	.22
	11.00	-.25	.189	.183	-.62	.12
	12.00	-.60*	.181	.001	-.96	-.25
9.00	1.00	.31	.164	.063	-.02	.63
	2.00	.63*	.148	.000	.34	.92
	3.00	.26	.161	.101	-.05	.58
	4.00	.10	.165	.539	-.22	.43
	5.00	.20	.161	.205	-.11	.52
	6.00	.11	.168	.531	-.22	.43
	7.00	.25	.177	.165	-.10	.59
	8.00	.43*	.150	.004	.14	.73
	10.00	.35*	.155	.025	.04	.65
	11.00	.18	.190	.347	-.19	.55
	12.00	-.17	.182	.342	-.53	.18
10.00	1.00	-.04	.168	.803	-.37	.29
	2.00	.28	.152	.068	-.02	.57
	3.00	-.08	.164	.607	-.41	.24
	4.00	-.25	.169	.145	-.58	.09
	5.00	-.14	.164	.379	-.47	.18
	6.00	-.24	.171	.156	-.58	.09
	7.00	-.10	.180	.571	-.46	.25
	8.00	.08	.154	.589	-.22	.39
	9.00	-.35*	.155	.025	-.65	-.04
	11.00	-.17	.193	.381	-.55	.21
	12.00	-.52*	.186	.005	-.89	-.16

11.00	1.00	.13	.201	.526	-.27	.52
	2.00	.45*	.188	.018	.08	.81
	3.00	.08	.198	.668	-.30	.47
	4.00	-.08	.202	.701	-.47	.32
	5.00	.02	.198	.900	-.36	.41
	6.00	-.07	.204	.717	-.47	.33
	7.00	.07	.211	.751	-.35	.48
	8.00	.25	.189	.183	-.12	.62
	9.00	-.18	.190	.347	-.55	.0.19
	10.00	.17	.193	.381	-.21	.55
	12.00	-.35	.216	.103	-.78	.07
12.00	1.00	.48*	.193	.013	.10	.86
	2.00	.80*	.179	.000	.45	1.15
	3.00	.44*	.190	.022	.06	.81
	4.00	.27	.194	.158	-.11	.66
	5.00	.38*	.190	.048	.00	.75
	6.00	.28	.196	.156	-.11	.66
	7.00	.42*	.204	.041	.02	.82
	8.00	.60*	.181	.001	.25	.96
	9.00	.17	.182	.342	-.18	.53
	10.00	.52*	.185	.005	.16	.89
	11.00	.35	.216	.103	-.07	.78

* The mean difference is significant at the level .05 level.

Oneway ANOVA Q19. Environmental Education Differences

	Sum of Squares	df	Mean squares	F	Sig.
Between Groups	22.975	11	2.089	3.212	<.001
Within Groups	369.986	569			
Total	392.960	580			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Q19. Environmental Education Differences
LSD

(I) Group	(J) Group	Mean Difference (1-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.43*	.153	.006	.13	.73
	3.00	.25	.165	.134	-.08	.57
	4.00	.27	.170	.115	-.07	.60
	5.00	.28	.166	.090	-.04	.61
	6.00	.26	.171	.127	-.07	.60
	7.00	.34	.178	.054	-.01	.69
	8.00	.56*	.155	.000	.25	.86
	9.00	-.09	.157	.589	-.39	.22
	10.00	.26	.161	.108	-.06	.58
	11.00	.00	.191	.997	-.37	.38
	12.00	-.05	.184	.788	-.41	.31
2.00	1.00	-.34*	.153	.006	-.73	-.13
	3.00	-.18	.150	.228	-.47	.11
	4.00	-.16	.156	.308	-.46	.15
	5.00	-.15	.151	.331	-.44	.15

6.00	-.17	.157	.289	-.47	.14
7.00	-.08	.164	.610	-.41	.24
8.00	.13	.139	.356	-.15	.40
9.00	-.51*	.142	.000	-.70	-.23
10.00	-.17	.146	.250	-.45	.12
11.00	-.43*	.178	.017	-.78	-.08
12.00	-.48*	.171	.005	-.81	-.14

Multiple Comparisons

Dependent Variable: Q19 perspective

LSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
3.00	1.00	-.25	.165	.134	-.57	.08
	2.00	.18	.150	.228	-.11	.47
	4.00	.02	.167	.896	-.31	.35
	5.00	.03	.162	.835	-.28	.35
	6.00	.01	.168	.932	-.31	.34
	7.00	.10	.175	.580	-.25	.44
	8.00	.31*	.152	.042	.01	.61
	9.00	-.33*	.154	.031	-.63	-.03
	10.00	.01	.158	.936	-.30	.32
	11.00	-.25	.188	.191	-.62	.12
	12.00	-.30	.181	.102	-.65	.06
4.00	1.00	-.27	.170	.115	-.60	.07
	2.00	.16	.156	.308	-.15	.46
	3.00	-.02	.167	.896	-.35	.31
	5.00	.01	.167	.943	-.32	.34
	6.00	-.01	.173	.966	-.35	.33
	7.00	.07	.180	.677	-.28	.43
	8.00	.29	.157	.068	-.02	.60
	9.00	-.35*	.159	.027	-.67	-.04
	10.00	-.01	.163	.956	-.33	.31
	11.00	-.27	.193	.165	-.65	.11
	12.00	-.32	.186	.087	-.68	.05
5.00	1.00	-.28	.166	.090	-.61	.04
	2.00	.15	.151	.331	-.15	.44
	3.00	-.03	.162	.835	-.35	.28
	4.00	-.01	.167	.943	-.34	.32
	6.00	-.02	.168	.908	-.35	.31
	7.00	.06	.176	.720	-.28	.41
	8.00	.28	.153	.072	-.02	.57
	9.00	-.37*	.155	.018	-.67	-.06
	10.00	-.02	.158	.894	-.33	.29
	11.00	-.28	.189	.139	-.65	.09
	12.00	-.33	.182	.069	-.69	.03
6.00	1.00	-.26	.171	.127	-.60	.07
	2.00	.17	.157	.289	-.14	.47
	3.00	-.01	.168	.932	-.34	.31
	4.00	.01	.173	.966	-.33	.35
	5.00	.02	.168	.908	-.31	.35
	7.00	.08	.181	.649	-.27	.44
	8.00	.29	.159	.063	-.02	.61
	9.00	-.35*	.161	.031	-.66	-.03
	10.00	.00	.164	.992	-.32	.32
	11.00	-.26	.194	.179	-.64	.12
	12.00	-.31	.187	.096	-.68	.06

Multiple Comparisons

Dependent Variable: Q19 perspective

LSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
7.00	1.00	-.34	.178	.054	-.69	.01
	2.00	.08	.164	.610	-.24	.41
	3.00	-.10	.175	.580	-.44	.25
	4.00	-.07	.180	.677	-.43	.28
	5.00	-.06	.176	.720	-.41	.28
	6.00	-.08	.181	.649	-.44	.27
	8.00	.21	.166	.201	-.11	.54
	9.00	-.43*	.168	.011	-.76	-.10
	10.00	-.08	.171	.624	-.42	.25
	11.00	-.34	.200	.087	-.74	.05
	12.00	-.39*	.193	.042	-.77	-.01
8.00	1.00	-.56*	.155	.000	-.86	-.25
	2.00	-.13	.139	.356	-.40	.15
	3.00	-.31*	.152	.042	-.61	-.01
	4.00	-.29	.157	.068	-.60	.02
	5.00	-.28	.153	.072	-.57	.02
	6.00	-.29	.159	.063	-.61	.02
	7.00	-.21	.166	.201	-.54	.11
	9.00	-.64*	.144	.000	-.92	-.36
	10.00	-.30*	.148	.045	-.59	-.01
	11.00	-.56*	.180	.002	-.91	-.20
	12.00	-.61*	.172	.000	-.94	-.27
9.00	1.00	.09	.157	.589	-.22	.39
	2.00	.51*	.142	.000	.23	.79
	3.00	.33*	.154	.031	.03	.63
	4.00	.35*	.159	.027	.04	.67
	5.00	.37*	.155	.018	.06	.67
	6.00	.35*	.161	.031	.03	.66
	7.00	.43*	.168	.011	.10	.76
	8.00	.64*	.144	.000	.36	.92
	10.00	.34*	.150	.022	.05	.64
	11.00	.09	.182	.637	-.27	.44
	12.00	.04	.174	.837	-.31	.38
10.00	1.00	-.26	.161	.108	-.58	.06
	2.00	.17	.146	.250	-.12	.45
	3.00	-.01	.158	.936	-.32	.30
	4.00	.01	.163	.956	-.31	.33
	5.00	.02	.158	.894	-.29	.33
	6.00	.00	.164	.992	-.32	.32
	7.00	.08	.171	.624	-.25	.42
	8.00	.30*	.148	.045	.01	.59
	9.00	-.34*	.150	.022	-.64	-.05
	11.00	-.26	.185	.162	-.62	.10
	12.00	-.31	.178	.082	-.66	.04

Multiple Comparisons

Dependent Variable: Q19 perspective
LSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
11.00	1.00	.00	.191	.997	-.38	.37
	2.00	.43*	.178	.017	.08	.78
	3.00	.25	.188	.191	-.12	.62
	4.00	.27	.193	.165	-.11	.65
	5.00	.28	.189	.139	-.09	.65
	6.00	.26	.194	.179	-.12	.64
	7.00	.34	.200	.087	-.05	.74
	8.00	.56*	.180	.002	.20	.91
	9.00	-.09	.182	.637	-.44	.27
	10.00	.26	.185	.162	-.10	.62
	12.00	-.05	.205	.807	-.45	.35
12.00	1.00	.05	.184	.788	-.31	.41
	2.00	.48*	.171	.005	.14	.81
	3.00	.30	.181	.102	-.06	.65
	4.00	.32	.186	.087	-.05	.68
	5.00	.33	.182	.069	-.03	.69
	6.00	.31	.187	.096	-.06	.68
	7.00	.39*	.193	.042	.01	.77
	8.00	.61*	.172	.000	.27	.94
	9.00	-.04	.174	.837	-.38	.31
	10.00	.31	.178	.082	-.04	.66
	11.00	.05	.205	.807	-.35	.45

*. The mean difference is significant at the .05 level.

Oneway ANOVA Q26

Oneway

ANOVA

26

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.439	11	1.676	2.759	.002
Within Groups	330.575	544	.608		
Total	349.014	555			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Q26
LSD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	.19	.148	.205	-.10	.48
	3.00	.10	.161	.536	-.22	.42
	4.00	.07	.164	.657	-.25	.40
	5.00	.13	.160	.431	-.19	.44
	6.00	.03	.167	.879	-.30	.35
	7.00	-.01	.172	.935	-.35	.32
	8.00	.21	.152	.159	-.08	.51
	9.00	-.17	.157	.266	-.48	.13
	10.00	.43*	.163	.008	.12	.75
	11.00	-.02	.185	.903	-.39	.34
	12.00	-.36*	.179	.046	-.71	-.01
2.00	1.00	-.19	.148	.205	-.48	.10
	3.00	-.09	.147	.545	-.38	.20
	4.00	-.12	.150	.444	-.41	.18
	5.00	-.06	.146	.668	-.35	.22
	6.00	-.16	.154	.290	-.46	.14
	7.00	-.20	.159	.203	-.51	.11
	8.00	.03	.136	.852	-.24	.29
	9.00	-.36*	.142	.011	-.64	-.08
	10.00	.25	.148	.097	-.05	.54
	11.00	-.21	.173	.222	-.55	.13
	12.00	-.55*	.167	.001	-.87	-.22

Multiple Comparisons

Dependent Variable: Q26

' SD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
3.00	1.00	-.10	.161	.536	-.42	.22
	2.00	.09	.147	.545	-.20	.38
	4.00	-.03	.163	.871	-.35	.29
	5.00	.03	.158	.868	-.28	.34
	6.00	-.07	.166	.655	-.40	.25
	7.00	-.11	.171	.505	-.45	.22
	8.00	.11	.150	.446	-.18	.41
	9.00	-.27	.155	.078	-.58	.03
	10.00	.34*	.161	.038	.02	.65
	11.00	-.12	.183	.506	-.48	.24
	12.00	-.46*	.178	.010	-.81	-.11
4.00	1.00	-.07	.164	.657	-.40	.25
	2.00	.12	.150	.444	-.18	.41
	3.00	.03	.163	.871	-.29	.35
	5.00	.05	.162	.744	-.27	.37
	6.00	-.05	.169	.778	-.38	.28
	7.00	-.09	.174	.616	-.43	.25
	8.00	.14	.154	.360	-.16	.44
	9.00	-.25	.159	.120	-.56	.06
	10.00	.36*	.164	.028	.04	.68
	11.00	-.10	.186	.608	-.46	.27
	12.00	-.43*	.181	.017	-.79	-.08
5.00	1.00	-.13	.160	.431	-.44	.19
	2.00	.06	.146	.668	-.22	.35
	3.00	-.03	.158	.868	-.34	.28
	4.00	-.05	.162	.744	-.37	.27
	6.00	-.10	.165	.543	-.42	.22
	7.00	-.14	.170	.410	-.47	.19
	8.00	.09	.149	.556	-.20	.38
	9.00	-.30	.154	.052	-.60	.00
	10.00	.31	.160	.054	-.01	.62
	11.00	-.15	.183	.417	-.51	.21
	12.00	-.48*	.177	.006	-.83	-.14
6.00	1.00	-.03	.167	.879	-.35	.30
	2.00	.16	.154	.290	-.14	.46
	3.00	.07	.166	.655	-.25	.40
	4.00	.05	.169	.778	-.28	.38
	5.00	.10	.165	.543	-.22	.42
	7.00	-.04	.177	.823	-.39	.31
	8.00	.19	.157	.230	-.12	.50
	9.00	-.20	.162	.217	-.52	.12
	10.00	.41*	.167	.015	.08	.74
	11.00	-.05	.189	.800	-.42	.32
	12.00	-.38*	.184	.037	-.75	-.02

Multiple Comparisons

Dependent Variable: Q26

' SD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
7.00	1.00	.01	.172	.935	-.32	.35
	2.00	.20	.159	.203	-.11	.51
	3.00	.11	.171	.505	-.22	.45
	4.00	.09	.174	.616	-.25	.43
	5.00	.14	.170	.410	-.19	.47
	6.00	.04	.177	.823	-.31	.39
	8.00	.23	.162	.160	-.09	.55
	9.00	-.16	.167	.337	-.49	.17
	10.00	.45*	.172	.009	.11	.79
	11.00	-.01	.193	.965	-.39	.37
	12.00	-.34	.188	.068	-.71	.03
8.00	1.00	-.21	.152	.159	-.51	.08
	2.00	-.03	.136	.852	-.29	.24
	3.00	-.11	.150	.446	-.41	.18
	4.00	-.14	.154	.360	-.44	.16
	5.00	-.09	.149	.556	-.38	.20
	6.00	-.19	.157	.230	-.50	.12
	7.00	-.23	.162	.160	-.55	.09
	9.00	-.39*	.146	.008	-.68	-.10
	10.00	.22	.152	.146	-.08	.52
	11.00	-.24	.175	.178	-.58	.11
	12.00	-.57*	.170	.001	-.91	-.24
9.00	1.00	.17	.157	.266	-.13	.48
	2.00	.36*	.142	.011	.08	.64
	3.00	.27	.155	.078	-.03	.58
	4.00	.25	.159	.120	-.06	.56
	5.00	.30	.154	.052	.00	.60
	6.00	.20	.162	.217	-.12	.52
	7.00	.16	.167	.337	-.17	.49
	8.00	.39*	.146	.008	.10	.68
	10.00	.61*	.157	.000	.30	.92
	11.00	.15	.180	.398	-.20	.51
	12.00	-.18	.175	.292	-.53	.16
10.00	1.00	-.43*	.163	.008	-.75	-.12
	2.00	-.25	.148	.097	-.54	.05
	3.00	-.34*	.161	.038	-.65	-.02
	4.00	-.36*	.164	.028	-.68	-.04
	5.00	-.31	.160	.054	-.62	.01
	6.00	-.41*	.167	.015	-.74	-.08
	7.00	-.45*	.172	.009	-.79	-.11
	8.00	-.22	.152	.146	-.52	.08
	9.00	-.61*	.157	.000	-.92	-.30
	11.00	-.46*	.185	.014	-.82	-.09
	12.00	-.79*	.179	.000	-1.15	-.44

Multiple Comparisons

Dependent Variable: Q26

SD

(I) GROUP	(J) GROUP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
11.00	1.00	.02	.185	.903	-.34	.39
	2.00	.21	.173	.222	-.13	.55
	3.00	.12	.183	.506	-.24	.48
	4.00	.10	.186	.608	-.27	.46
	5.00	.15	.183	.417	-.21	.51
	6.00	.05	.189	.800	-.32	.42
	7.00	.01	.193	.965	-.37	.39
	8.00	.24	.175	.178	-.11	.58
	9.00	-.15	.180	.398	-.51	.20
	10.00	.46*	.185	.014	.09	.82
	12.00	-.34	.200	.093	-.73	.06
12.00	1.00	.36*	.179	.046	.01	.71
	2.00	.55*	.167	.001	.22	.87
	3.00	.46*	.178	.010	.11	.81
	4.00	.43*	.181	.017	.08	.79
	5.00	.48*	.177	.006	.14	.83
	6.00	.38*	.184	.037	.02	.75
	7.00	.34	.188	.068	-.03	.71
	8.00	.57*	.170	.001	.24	.91
	9.00	.18	.175	.292	-.16	.53
	10.00	.79*	.179	.000	.44	1.15
	11.00	.34	.200	.093	-.06	.73

*. The mean difference is significant at the .05 level.

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
TRIBE * Q26	556	86.2%	89	13.8%	645	100.0%

TRIBE * Q26 Crosstabulation

Count

		Q26				Total
		0	1	2	3	
TRIBE	C&A	5	19	23	6	53
	Caddo	3	5	21	3	32
	Cherokee	5	22	15	2	44
	Chickasaw	9	21	16	3	49
	Choctaw	9	36	14	3	62
	Comanche	12	25	8	1	46
	Creek	12	36	16	5	69
	Iowa	5	22	15	4	46
	Osage	1	32	15	0	48
	Otoe	2	16	8	3	29
	Pawnee	7	13	12	5	37
	Quapaw	6	17	15	3	41
Total		76	264	178	38	556

VITAE

Carol Vallee Crouch

Candidate for the Degree of

Doctoral of Philosophy

Dissertation: An Investigation of Perceptions, Concerns, and Awareness of Environmental Issues among American Indians

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Biographical:

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Experience: Worked in the health and dental profession for17 years. Internships with the Environmental Protection Agency, Chickasaw Nation and the Natural Resource Conservation Service, Tribal Land Protection Scholarship and Internship. Currently working for the Natural Resources Conservation Service (NRCS).

Professional Memberships: American Indian Science and Engineering Society, American Indian and Alaska Native Employees Association for NRCS, Oklahoma Clean Lakes Association, American Industrial Hygiene Association, and Soil and Water Conservation Society.