EQUESTRIAN KNOWLEDGE OF ENVIRONMENTAL IMPACTS ON TRAILS

By

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IMPACTS ON TRAILS

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CHAPTER I

INTRODUCTION

Before the invention of the automobile in the late 1800s and the subsequent mass production lines in the 1920s, horses were our main mode of transportation. While horses have been used on trails for hundreds of years, only in the last decade has horseback riding made a comeback. Horseback riding has become a popular recreational activity on rural and suburban, public, and private trails. Congressman George Radanovich (R-California) stated, “Horse and saddle stock use on federal land has long been a tradition of the American culture. Riding horses is a great way to explore and experience our federal lands; we must preserve our riding heritage (Amoureux & Shapes, 2005).”

Americans are pursuing healthy exercise and outdoor recreation in unprecedented numbers. “Millions of Americans have a personal commitment to the horse industry, from the grassroots to those who compete nationally and internationally,” said David O’Conner, President of the United States Equestrian Federation and an Individual Olympic Gold Medalist (Amoureux & Shapes, 2005).

The horse industry in the United States contributes $39 billion in direct economic impact to the US economy and supports 1.4 million jobs on a full-time basis, according to a new study released by the American Horse Council (AHC) (Amoureux & Shapes, 2005). The AHC noted that when indirect and induced spending was included, the industry’s economic impact reached $102 billion. The study estimated the horse population in this country has reached 9.2 million, compared to 6.9 million in 1997. Of

the total economic impacts reported, approximately $32 billion was generated from the recreational segment. The AHC study estimated that over 3.9 million horses are involved in recreation activities.

In 2001, about 40% of the general population in Oklahoma stated they were users of recreational trails and 17% had been horseback riding (Caneday *et al.*, 2001). According to that study, city leaders across Oklahoma expressed great interest in trails as part of their communities. City leaders believed protection of Oklahoma's air, water, and land is critical at present and will become increasingly important. They also believed that conservation education must be provided for residents of the state. Such education must place emphasis on the relationship of human behaviors to the natural environment. There is still a lack of knowledge related to trails, especially in perceptions of impact on adjacent properties, potential economic benefits, and social values gained through trail environments.

Opportunities for recreational hiking and riding on trails are steadily decreasing, because trails are being lost as cities, roads, and development encroach on the countryside (Krumpe & Lucas). America has become increasingly urbanized and trail development has not kept pace with this increase in demand. The demand for trails is increasing in Oklahoma, as identified by representatives of cities and towns and present trail users (Caneday et al., 2001). Decision-making for managers is often difficult in horse trail management, because the activity represents a complex interface among people's knowledge, attitudes, and values and land use and effects of horse traffic on soil and vegetation.

Future research should contribute significantly to understanding the dynamics of trail use, maintenance, construction, and rehabilitation, as well as lead to better understanding of the millions of Americans who use and enjoy the heritage of our trails (Krumpe & Lucas). Current research has provided a better understanding of some

factors, which influence the incidence and severity of impacts due to the presence of equestrian trails in natural areas (Dehring & Mazzotti, 1997). Impacts from horses usually occur in three primary areas: a) trail head, b) the trail, and c) at camp or destination (Mink, 1998). Mink noted that the presence of horses on trails in natural areas requires managers to be knowledgeable about possible impacts. In many cases, the initial construction of the trail itself causes greater resource impact than subsequent trail use (Keller, 1990). Proper management, maintenance and design can minimize impacts on trail systems from both stock and human use (Wood, 2003).

Need for the Study

There has been little research conducted about the knowledge of the trail users of potential environmental impacts from horses on trails. Research on the visitors' knowledge and attitudes about trail impacts is limited (Lucas, 1985). The majority of research conducted on horse use on trails has focused only on environment impacts. Few studies have been focused on the knowledge of the trail user of recreational-caused environmental impacts. Although there is some information about the demographics of horse users and their impact on the environment, research is limited on the horse users' knowledge, attitudes, and values. Science is needed to provide a foundation for appropriate management of wilderness ecosystems, and land managers need research on the nature and significance of a wide variety of impacts, as well as understanding of the factors that influence impact characteristics (Cole & McCool, 2000).

Since the use of horses on trails is a factor in the land management decision-making process, for both public and private land managers, information is necessary about those who use horses on trails. Land managers need to know more about the individuals' knowledge and attitudes, so that they can be more effective in their decisions in the design and maintenance of trails.

Behavior of the trail user on environmental impacts needs to examine whether the region one lives in has an influence on the environmental impact knowledge level or the attitude of other users (Reynolds, 1991). Reynolds noted that there is a need to research other users' perceptions and knowledge of recreational impacts on trails.

This study is an attempt to replicate the questions used in a study performed by Reynolds (1991) on off-road vehicles, but modified to study the knowledge of horseback riders who ride on trails. Reynolds noted that additional studies needed to be performed on other trail users. This study is designed to: (1) attempt to identify if horse users' have a knowledge of horse impacts upon the environmental; (2) identify horse users' opinions as to whether adverse environmental impacts caused by horses on trails is an acceptable consequence; and (3) identify opinions from trail users as to whether or not the managers of the horse trails should be paid by the users.

Purpose of the Study

Before managers of any recreation area are able to make sound decisions, they must be armed with a thorough understanding of their visitors. While an in-depth review of the research literature and consultation with "experts" can reveal a wide variety of useful information, visitor contact must take place if an evaluation is to occur (Jett, 2000).

The primary intent of this study was designed to ascertain the knowledge of the horse trail user on whether horses have an impact upon the environment; evaluate their opinions as to whether an adverse impact upon the environment is an acceptable consequence of horse use; and evaluate their opinions of whether management of trail areas should be paid by the trail users.

Statement of the Problem

The purpose of this study focused on central questions based on the horseback riders' knowledge of adverse impacts on the environment made by horses varied based upon demographics; if the riders believed that any adverse impact upon the environment is an acceptable consequence of horse use; and whether or not management should be paid to maintain the trails in horse areas. The three questions below were addressed by the research instrument and measured:

1. Do horseback riders believe that horses can have an adverse impact upon the trail environment?
2. Do horseback riders agree that any adverse impacts from horse use on trails are acceptable?
2. Do horseback riders agree that they should pay for the management of trail areas that are used by horses?

The following null hypotheses were developed:

Ho_1: There is no significant difference of knowledge of potential horse impact upon the environment regardless of: date of survey, time of survey, location of survey, gender, age, race/ethnicity, employment status, household income, years of formal education, years of riding a horse, or membership in an organized club.

Ho_2: There is no significant difference of horseback riders' opinions as to whether or not management of the equine trail areas should be paid by the trail user, regardless of demographics in Ho_1.

Ho_3: There is no significant difference in acceptance of any environmental impacts from horse use on trails, regardless of demographics in Ho_1.

Limitations of the Study

This study was limited by the length of the sampling procedure and the restricted amount of funds available to the researcher. The survey was posted and made available on-line and individual surveys at four dedicated horse trails in Oklahoma were conducted on two weekends between August 1, 2005 and September 10, 2005. Although the use of on-line surveys and individual surveys at four dedicated horse trails in Oklahoma may have produced sufficient respondents, extended dates and other methods of surveying may have produced a larger sample.

This study was limited to on-line sites and visits to four trails located in Oklahoma. Only readers and/or members of the Oklahoma Horse Industry Council (OHIC) were selected for the on-line study. The readers and/or members may represent only a certain population of the horse users in Oklahoma. In an attempt to get adequate representation of this group, four dedicated equestrian trails in Oklahoma were selected for study, e.g. Bell Cow Lake, Draper Lake, Robbers Cave State Park, and Roman Nose Resort Park. All four parks are located in Oklahoma and have dedicated equestrian trails.

This study was limited to the Oklahoma Horse Industry Council web-site and to the clubs listed on that site. These sites may not be representative of the rest of the nation. This site was selected because it is well known to the majority of horseback riders in Oklahoma. Although the sample population does not represent the entire State of Oklahoma, the sample may represent both rural and urban populations.

The original instrument to gather data was developed by Reynolds (1991), to study Off-Road Vehicle (ORV) use. This researcher modified the data-gathering instrument to study the behavior and knowledge of horseback riders. Therefore, the

reliability of the data-gathering instrument was limited. Statistical analysis was applied to test for reliability.

Generalizations drawn from this study can be applied only to those horseback riders that were in Oklahoma at the time of the study, and to those horse users who visited the Oklahoma Horse Industry Council's web-site or were contacted through their equine clubs. This may serve as a point of departure for similar studies in other states. It is recognized that the horse user responding to this study may not be a State of Oklahoma resident.

This study was limited to only those responding to the questionnaire. The respondents of this study may have a different knowledge base or opinion from the remainder of the horse user population. In addition, those horseback riders who refused to respond to the questionnaire may represent a separate population trail users.

As noted in a previous study conducted by Reynolds, 1991, the conclusions of the literature provided the foundation for the current assessment instrument and may need re-evaluation or may result in reinforcement as future research accumulates. The diversity, quality, and amount of literature reviewed should minimize this limitation.

Assumptions of the Study

The researcher assumed that the subjects who responded to the questionnaire are representative of the population of trail users who ride horses in Oklahoma. The assumption was made that a representative sample would be drawn from the population of equestrians who ride horses on trails, and from the population of equestrians who visit the Oklahoma Horse Industry Council web-site and chose to respond to the study, from August 1, 2005 to September 10, 2005.

The researcher assumed that by using a questionnaire, this was an appropriate way to measure the user's knowledge of whether horses have an impact on the

environment, to measure their opinion as to whether the management of trail areas should be paid by the user, and to measure their opinion as to whether impacts of horse use on the environment is an acceptable consequence.

Delimitations of the Study

This study was targeted to research trail users that ride horses in Oklahoma. The questionnaire was posted on the Oklahoma Horse Industry Council web-site, where horse clubs/associations linked to this site are listed and were chosen for this study. These clubs/associations are managed by independent agencies and are particularly applicable for study by public and rural land managers. In addition, four dedicated horse trails in Oklahoma were selected for study. The Bell Cow Lake, Robbers Cave State Park, Roman Nose Resort Park, and Stanley Draper Lake were chosen and are also applicable for study by land managers.

Definition of Terms

Equine – Relating to, or resembling a horse or the horse family.

Equestrian – Relating to, or featuring horseback riding.

Horse User/Horseback Rider – A person rides a horse for recreational purposes.

Multi-trails - Areas maintained and managed for the use of multiple users, such as hikers, bikers, and equestrians.

Trail – A trail serving a recreational purpose with no transportation function is a recreational trail. For example, a closed loop trail within a park or recreation area would be a recreational trail.

CHAPTER II

REVIEW OF LITERATURE

Considerable literature exists emphasizing the many facets of visitor satisfaction associated with recreation areas. However, literature on the knowledge of environmental impacts among those visitors is limited. The literature investigating environmental knowledge is generally broad-based and does not focus on the outdoor recreation experience (Jett, 2000). Knowledge of visitor behavior can only be expected to effectively address unskilled and uninformed actions, and to a lesser extent, careless actions, as these are more highly related to visitor knowledge and skill level (Hendee *et al.*, 1990).

The number of trail users is increasing geometrically (Kelley, 1998). Kelley noted that equestrian owners who keep their horses at home for recreational riding are the most frequent trail users. These riders tend to ride trails adjacent to their own property, sometimes traversing roads or private land to reach the trails. A large percentage of these riders own trucks and trailers, and will travel to use trails throughout the region. Camping with horses is extremely popular with this group.

It is important to understand more about the users. The following review discusses research that has been conducted on the issues of concern and perception of horse users about their knowledge of possible impacts of their horses upon the environment, whether horse users are concerned about environmental impacts and how they can help prevent environmental impacts.

Environmental Impacts of Horse Use

In 1935, Lowell Sumner suggested the concept of carrying capacity for outdoor recreation when he posed the question of how large a crowd can be turned loose in a wilderness without destroying its essential qualities (Manning *et al.*, 1996). According to Wagar (1964), carrying capacity is an important principle in recreation land use and wrote "Forestry, range management, and wildlife management are all based upon techniques for determining optimum use and limiting harvest beyond this point". Wagar also conceded that resource point of view would have to be modified to include the attention of human values. Wagar's point was that increased visitor use causes not only greater environmental impact as measured by destruction of vegetation, soil compaction, and related variables, but that the increased use also causes a degradation in the quality of the recreation experience (Wagar, 1964).

One article concluded that every trail user potentially causes some impact to the environment by his/her use (EnviroHorse). Compared to motorized usage, hikers, bikers, and horses have been variously described as passive, light-weight, and/or low impact trail users. The effects of passive use on trails are usually minimal. In virtually every mixed-use trail reference within the nation, the horse has been defined as a passive, low impact or light-weight user, even in the most sensitive environments.

The Edgewood Park and Natural Preserve Master Plan defines "low-intensity recreation use as, passive recreation, that will not create a direct or cumulative adverse environmental impact. Such uses include, but are not limited to, on-trail hiking, walking, jogging, horseback riding, nature observation, education, docent-led group tours, picnicking and camping…" Studies of the impact of hikers, bikers and horses have shown that they are relatively similar, compared to the impact of building the trail in the

first place. A poorly designed trail will erode more than a well-designed trail that receives heavy use by anybody (Preserve, 1997).

Impact on Soil

The types of changes in trail conditions, caused by horses, differ from those caused by hikers. The degree of surface compaction is dependent on topography, soil structure and soil moisture. Studies have shown that wet trails are more susceptible to damage than dry trails (Seney, 1990).

One aspect of protecting natural resources that is particularly relevant to multiple-use trail management is the relationship between amount of use and levels of natural resource impact (Whittaker, 1978). This study noted compared the surface impacts of hikers and horses in Great Smoky Mountain National Park, and it was noted that maintenance of trails used by horses may require different management techniques that maintenance of foot trails. Trails in the Rocky Mountain National Park were noted to be 13 to 26 percent more compacted after one season of use (Summer, 1980). Summer noted that trails remained compacted regardless of the intensity or number of years of subsequent use.

While natural erosive forces are likely to be the major alteration factors in trail erosion (EnviroHorse), soil erosion is a two-part process: soil particles are loosened largely by wind or raindrop impact and transported by the flow of wind and water. The four primary factors involved in erosion are climate, soil characteristics, topography and ground cover (Gerus, 2002). In a 5-year study, it was concluded that horse traffic was not the single dominant process active on trails (Summer, 1980, 1996). Trail degradation was a function of landform, climatic and catastrophic events, and geomorphic processes. Factors other than user type are more closely linked to trail degradation (Williams & Conway-Durver). Lightly used trails may grow over and require

more maintenance, whereas, moderate horse activity may help to maintain a multiple-use trail. Seasonal use is important in keeping the soil exposed and vegetative cover absent on trails.

Limited data suggested that foot traffic was similar to horse traffic in exposing the trail to the effects of geomorphic processes or climatic events. The physical impact of horses on trails is highly variable-dependent. In high rain regimes and certain soil types, more physical impact would be expected. Seasonal closure of some trails may be appropriate under these conditions. Activities, such as grazing or trampling, that remove the soil's vegetative cover, and thus, expose the soil surface to the energy of raindrops, water runoff, and wind, accelerate the natural process of erosion (Districts, 2002). Water should be diverted off all of the trails to prevent erosion. In order to further mitigate an impact in more susceptible areas, rocking equestrian trails may be appropriate (Quinn, 2004). Bridges are also being built across historic fords to maintain their current condition. Park managers often recommend that horses be shod due to slippery and rocky surfaces on trails. Many horses are shod to prevent stone bruising while on the trail. Some equestrians prefer to ride unshod horses, but can carry specially sized rubber boots that fit over the unshod horse's hooves for travel over (Summer, 1980, 1996)rocky and rough terrain.

Impact on Vegetation

Whittaker (1978) noted that both hikers and horses flatten vegetation significantly and both increased soil compaction. Hikers reduced vegetation height by 85 percent. Horses reduced vegetation height by 96 percent. A study done that investigated the trampling effects on vegetation along trails of North Rocky Mountain forests that were defined by both foot and horse traffic revealed that trail widths increased linearly with the log of user numbers, and trails used by horses and people were deeper than those used

by people alone and that trail depths differed little between forest and meadow sites (Dale & Weaver, 1974). Another study noted that there is a lower potential for effectively targeting unavoidable environmental impacts, however, one could argue that this is possible by shifting outdoor activities to durable surfaces, such as bare sand or bedrock, where trampling has little effect (Hendee et al., 1990).

Impact on Water Quality

Recent scientific studies and their replicates confirm that adult horse digestive systems do not significantly contain *E. coli*, Salmonella, Cryptosporidium, or Giardia, which are the organisms of most concern in water-borne spread of disease (Johnson *et al.*, 1997). Bacteriological and nutrient effects on water bodies are seldom detectable except next to stables (Williams & Conway-Durver, 1998). It is important to keep in perspective that these studies involve settings where horses live 24 hours/day next to a creek. Thus far, data have not confirmed significant adverse effects on the surface waters immediately adjacent to them. The manure from a few horses on a trail is difficult to conceive that they could adversely impact surface water nearby (Quinn, 2004). Again, most trails are not sited immediately adjacent to water bodies and Mother Nature has a marvelous buffering capacity when even as little as 10 feet of vegetation is available at the side of a trail www.ca.nrcs.usda.gov/rts/sec4.htm.

Impact on Stream Crossings

While horses can readily defecate on trails, they do not as readily urinate on trails (Gosselin, 2001). Because of their physiology, horses under saddle generally signal riders of their need or intent to urinate. Because of this behavior, it is easy for the rider to spur the horse out of a stream to avoid urination in a water body. Because the urination posture is impossible to achieve during locomotion, it will be more apt to occur with a

relaxed horse at rest (Quinn, 2004). Urination can be readily managed to avoid elimination in water bodies.

Equestrians are being educated not to allow their animals to eliminate during stream crossings. Quinn noted that equestrians are encouraged to stop prior to a crossing and allow the horse to rest, relax, and (hopefully) eliminate prior to the crossing. Simply not allowing the horse to stop in the water will also help to prevent contamination. Many horses do not like getting their feet wet and have a natural aversion to taking any more time than necessary in the water (Quinn, 2004). There is a risk of stream crossing impacts to fish and aquatic species from horses, however, as long as riders are aware of the risks, and make an effort to avoid having their horses urinate or defecate in or near the creek, the risks of fish and aquatic life (of horses making a stream crossing) are acceptable (Rugg, 1998).

Impact on Wildlife

One extensive review of recreation effects on birds noted that disturbance from recreation has only temporary effects on behavior and movement of birds (Bennett & Zuelke, 1999). This study stated that direct approaches caused greater disturbance than the tangential approach; rapid movements by joggers were more disturbing than slower hikers; children and photographers were especially disturbing, and passing or stopping vehicles were less disturbing than human foot traffic.

According to a study performed by EnviroHorse, it was noted that wildlife recognizes horses as prey (non-threatening) animals, even when a person is sitting on their back (EnviroHorse). This study noted that an approaching horse that passes along a trail provides sound rhythms in the cadence of a four-footed hoofed prey animal to wildlife, which informs wildlife of a non-threatening presence. For reptiles, rodents, and other terrestrial life forms, the percussion pulse of the approaching horse provides

warning. Being warned diminishes the flushing response that consumes wildlife. Horses rarely step on lizards, mice and other fast moving wildlife (EnviroHorse). Sporadic human use can disturb wildlife; however, “many animals are less afraid of horseback riders than hikers (Bennett & Zuelke, 1999).”

Environmental Concerns

Environmental concerns must play a large role in guiding the ways we enjoy the outdoors. Proliferation of trails and campsites has alarmed both resource managers and travelers across North America (Reed, 2003). Visitors generally share the trails without conflicts. However, some conflict is inevitable. The most common user conflict occurs between those on foot and those riding bicycles, horses, or in-line skating (Guide to Trail Management). Kelley (1998) noted that in some people’s minds, horses and bikers are unable to co-exist on trails together. In some areas, safety concerns and environmental sensitivity, may not allow bicycles and/or horse trail areas. Cyclists punch on the issue of erosion. Equestrians indicate that bikers somehow cause too much damage and destroy trails. However, land managers, have found that the actual number of significant incidents involving horses and cyclists are few, relative to historical use of all users (Kelley, 1998). The world’s wildlands are diverse and beautiful but they are also fragile and considerable damage could be prevented if trail users were better informed (Reed, 2003).

Education and Volunteerism of Horse Users

Shared trails benefit both equestrians and mountain bikers. Literature suggests that it is in the best interest of all groups to work together and encourage land managers to develop and open multiple use trails. Equestrians who ride horses on trails have been noted to be dedicated and energetic volunteers and advocacy groups for trails.

A survey performed on multi-use trails noted that of particular interest was the code of ethics or rules of the trail, which are advocated by bicyclist, equestrian, and other organizations (Gambill, 1998). Gambill stated that many of the user-group organizations appear to be interested in the promotion of courteous trail use and environmental issues among their membership. How a person rides and behaves on a trail can determine his/her enjoyment in the wilderness along with the safety of him/herself, their horse and other trail users (Swinker *et al.*, 2000). Swinker noted that trail users need to educate themselves on trail etiquette, Leave No Trace and other ways to reduce trail user conflicts and environmental impacts.

Effective communication is the best way to prevent user dissatisfaction and conflict (McCoy & Stoner, 1992). Education is advocated as the key to solving problems and for promoting trail-user etiquette (Ryan, 1993). Whether the behavior being promoted is called trail etiquette, trail ethics, trail courtesy, or trail sharing, information and education efforts are almost universally supported as an essential strategy for providing opportunities for high-quality recreation experiences (Moore, 1994).

Social Demographics of Horse Users

There is an indication that educational interventions are effective in increasing visitor knowledge and altering visitor behaviors. On the basis of gender, age, ethnicity, and level of income, horse users are decisively different from the general public (Reid & Marion, 2002). It has been noted that when a community or state is more rural, there are more horses in relation to the population. Future research on equestrian behavior on trails will have greater importance as demand for outdoor recreation increases. Research has shown that there is a need to improve our knowledge of users' characteristics, behavior, and information needs (McKown, 2002). McKown noted that better studies are needed on the behavior of the user and their environmental impact of

various trail activities in different environments and under different conditions. However, it was noted that there is some concern that such research could fuel destructive arguments about “who causes the most damage.” It is important for researchers to establish a better understanding of who uses the trails, frequency of use, and length of stay can help determine when damage occurs. McKown noted that this information could provide valuable insight for designing and targeting physical and management strategies to minimize the impact of trail users.

CHAPTER III

METHODOLOGY

Chapter Overview

The methods for this study were developed in a logical procession derived from the purpose and objectives of this study. Methods used were within the norms of what other researchers have done in similar reviews. The present study examined the behavior of the equine trail user and their knowledge of any adverse impact upon the environment from horse use; identified their opinion as to whether an adverse impact upon the environment was an acceptable consequence of horse use; and identified their opinion as to whether management of the horse use areas should be paid for by the horse users. To accomplish the purpose of the research, a data collection instrument was developed, the sites and subjects to study were selected, the instrument was administered and statistical procedures were applied to analyze the data.

Development of the Data Collection Instrument

The data collection instrument used for this study was a questionnaire developed by Mark A. Reynolds (1991), modified by the researcher to study the behavior and knowledge of horseback riders, and reviewed by a panel of experts from Oklahoma State University. The questionnaire contained three sections.

The first section of the questionnaire contained a consent statement. This informed the subject that participation was voluntary, and that no information gathered can be personally identifiable with the individual (see Appendix A).

The second section of the questionnaire contained questions concerning the demographics of the subject (see Appendix A). Participants were asked to answer questions on their gender, age, marital status, race/ethnicity, level of education, employment status, household income, present residence, and zip code. The researcher filled in the date, time, and location that they survey was completed.

In the application of this section, questions #10 through #19 ask the respondent to note whether they were a member of an horse club, the number of years they have ridden or owned horses, how many trail riding trips were taken in the last year, length of stay, use of pack animals and number of pack animals used, number of riders in a group, and number of children 18 or younger in the group, indicate importance of environmental issues, and to rank trail needs. This design was chosen to compensate for the lack of published information on the knowledge of horse users on environmental impacts on trails.

The next part of the questionnaire asked the subject to respond to twenty-two statements on a Likert Scale. In the application of this section, questions #20 through #41 asked the respondent to "indicate whether they strongly agree, agree, are undecided, disagree, or strongly disagree with each statement." In the design of the statements, relevant literature provided a basis for each statement. This design was created by Reynolds (1991), and modified by the researcher to study the horse user's knowledge of environmental impacts on trails.

The participants were asked to respond to statements concerning any adverse impacts as an acceptable consequence of horse use. These consequences included:

(1) soil erosion, (2) loss of vegetation, (3) loss of wildlife, and (4) any impact from horse use, with the assumption that horses did cause an impact upon the environment.

When the researcher had modified the questionnaire to study trail users who ride horses, a panel of professionals from the Oklahoma State University, with experience in recreation and leisure and an extensive background in research, examined the questionnaire. Incorporated into the final preparation of the questionnaire, were the recommendations of these professionals. Every member was asked to review the questions and statements, and make corrections based on the following criteria noted in the study performed by Reynolds (1991):

1. Is each question and statement accurate in subject matter?
1. Is each question and statement properly stated and easy to understand?
1. Is the questionnaire well organized and concise?
1. Is each question and statement neutral so as not to indicate a desired or preferred answer?
1. Is each question and statement important enough to be asked, and are there any major omissions?

The questionnaire was then assembled for the Institutional Review Board (IRB) of Oklahoma State University to review and was approved on July 14, 2005 (see Appendix).

Selection of Subjects

The respondents in this study were current members of equestrian clubs, and/or participants in trail riding. The sample population was drawn from the Oklahoma Horse Industry Council (OHIC) by on-line surveys and by one-on-one sampling at four lakes/parks in Oklahoma that have equestrian trails. The research worker contacted the board members of the on-line council by e-mail and/or in person and explained the

purpose of the study. The research worker also took samples one-on-one at four lakes/parks in Oklahoma. The sample population was found at equestrian campsites or arriving to/from the trail-head on horseback. In addition, permission was requested to include the group members in the data collection. Once approval was received, the researcher initiated the data collection.

A non-random, non-probability purposive technique was used for this research project. A non-random sample of men and women were identified as equestrian trail riders over the age of 18 in each group. The race/ethnicity, gender, income status, education level, and number of years of riding experience were noted in the study.

The selection of subjects at each lake/park followed a consistent routine. The researcher started surveying at noon at each site. The survey continued until 6:00 p.m. Each person that was over the age of 18 and in an equestrian camp was asked to participate in the study.

Research Instruments

A pilot study was not performed as this interview guide was implemented in 1991 to study ORV users. The first part of the survey explored basic demographic issues such as age, marital status, ethnicity, education, and membership in a club.

The second part of the survey consisted of questions regarding the participant's level of riding and trail experience. These questions were designed to assess the importance of trail issues and ranking of trail needs by equestrians. Questions similar to the following two examples were asked. (1) How long have you ridden or owned horses? (2) In the last year, how many trail riding trips did you take in Oklahoma? (3) What was the average length of stay for your last trail ride?

The third part of the survey contained questions pertaining to the participant's knowledge of environmental impacts. Questions similar to the following two examples

were asked. (1) Equine use on trails causes no harm to the environment, and (2) Any impacts from horse use on trails are acceptable? Because some questions in the questionnaire were introduced for the first time, the reliability and validity of this study will have to be assessed at a later date.

Research Data and Design

The sites sampled were selected from within the State of Oklahoma. To identify those areas used by horse users, the Oklahoma Horse Industry Council (OHIC) web-site was used. This web-site listed ten OHIC Organization Memberships and five Farm/Business Memberships and all fifteen were notified that the survey was available for their readers and members. The questionnaire was e-mailed to the OHIC for inclusion on their web-site from August 1 to September 10.

Data were collected between August 1, 2005 and September 10, 2005, through on-line surveys, in person, and by e-mail using an interview guide designed by Reynolds (1991) and modified by the researcher for this study. A pilot study was not performed as the initial interview guide had indicated that the reliability of the statements was satisfactory.

The researcher made site visits on one day of each weekend in August, weather permitting. Because of the limited time for this study and budgetary constraints, all participants over the age of 18 at the horse camps and those coming from the horse trails were given the interview guide. Four sites were selected for sampling: Bell Cow Lake, Draper Lake, Robbers Cave State Park, and Roman Nose Resort Park.

1. Bell Cow Lake Area. Located in Chandler, Oklahoma, right off the Turner Turnpike (I-44) between Oklahoma City and Tulsa.
1. Draper Lake Area. Located in Oklahoma City off Hwy I-240 and Midwest Blvd.

1. Robbers Cave State Park Area. Located four miles North of Wilburton on State Highway 2 in Southeastern Oklahoma.
2. Roman Nose State Park Area. Located eight miles North of Watonga and 81 miles Northwest of Oklahoma City.

In the event of inclement weather or lack of participants to survey, alternate days were selected. Inclement weather was considered weather that was dangerous to the researcher or the horse user, such as thunderstorms, tornado watches or warnings, hail, or flood conditions.

Methods for Reporting Data

Data obtained from the interviews were categorically sorted and coded into themes that showed similarities between two responses. This procedure was designed to yield sample-specific patterns in responses. The data were entered into the computer program Excel and ACCESS to tabulate the responses. The data were then calculated using Chi-square test for Independence to establish the statistical significance of each statement.

CHAPTER IV

FINDINGS

The data collected for this study were derived from the collection instrument in Chapter III. The data provided by the collection instrument obtained demographic information about horse users from the Oklahoma Horse Industry Council (OHIC) website who responded to the survey. The instrument collected information about the horse users knowledge of the environmental impact of horses, the horse users' acceptance of the potential the horses' adverse impact upon the environment, and their opinion concerning whether horse users should pay for the management of areas designated for horse activities. The data were analyzed using statistical procedures in contingency tables and charts created in Excel.

Data Related to Survey Information

Forty-one days were allocated to on-line sampling and four days were allocated to the designated equestrian trail sites. Due to the limited funding of the researcher and the severe weather on weekends, only two sites were sampled. However, the two days spent at designated equestrian trail sites produced no respondents. The first site was sampled after noon at Draper Lake. The weather was overcast and drizzling rain and yielded no respondents. The second site, Bell Cow Lake, was sampled before noon on the Monday of Labor Day weekend due to wet weather conditions earlier in the weekend. The campsites were wet with only two horse trailers in the parking lot. This second site yielded no respondents.

E-mails were sent to the clubs/associations listed on the Oklahoma Horse Industry Council (OHIC) website with little response. The researcher received a couple of e-mails and phone calls from members of equine clubs and organizations who wanted to know more about "why" this survey was being done. They expressed concerns about whether or not this was "another environmental" survey that would be used against the trail riders in some way. After a detailed explanation of why this survey was being done and how it was going to be used, the researcher was invited to attend one of the club meetings to meet some of the trail riders and to hand out the surveys one-on-one. The club members also requested that an e-mail with the information about the survey be sent to all the members known to the Oklahoma Horse Industry Council with a notation of their support, so that the readers would be better informed and more likely to complete the survey. A total of 65 surveys were completed in person or returned to the researcher by mail or e-mail. These results were tabulated and are reported in Tables with frequency and percentage measures of the respondents.

Tables I through IX were designed to show the frequency and percentage measures of respondents for gender, age, race/ethnicity, education, employment, income, residence, member of equine club, and number of years having ridden or owned a horse(s).

TABLE I

GENDER
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
MALE	7	11
FEMALE	55	84
NO RESPONSE	3	5
TOTAL	65	100%

The respondents to this survey were predominately female (55 of 65 responses). The ratio of male respondents to female respondents was 7 to 55, or 11 percent to 84 percent. The “No Response” to this question was from respondents who did not want to answer “personal” questions in their e-mail (see Table I).

TABLE II

AGE IN YEARS
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
18 - 45	21	32
46 AND OLDER	41	63
NO RESPONSE	3	5
TOTAL	65	100%

For ease of understanding, the responses to age were grouped into three categories. The three missing responses were from those that did not want their age known. Sixty-three percent of the respondents were age 46 or older with 32 percent being age 45 or younger. The oldest respondents were over the age of 56 and the youngest respondents were 18 to 25 based on a median of 44 years old (see Table II).

TABLE III

RACE/ETHNICITY
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
WHITE	60	91
OTHER	2	4
NO RESPONSE	3	5
TOTAL	65	100%

The race/ethnicity of the respondents in the study appears in Table III. The percentage of whites is 91 percent. Non-white horse users represented only 4 percent of the respondents in this study. The three missing responses were from respondents who did not want their personal information known.

TABLE IV

EDUCATION STATUS
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
HIGH SCHOOL/ SOMECOLLEGE	29	44
COLLEGE GRADUATE	33	51
NO RESPONSE	3	5
TOTAL	65	100%

The respondents reported an education level of some high school at 0 percent (not shown), high school graduate and/or some college at 44 percent, and college graduate at 51 percent. The respondents to this survey appear to be an academically educated group (see Table IV).

TABLE V

EMPLOYMENT STATUS
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
FULL-TIME	39	59
PART-TIME	7	11
SELF-EMPLOYED	6	9
HOME MAKER	0	0
STUDENT/RETIRED	2	4
NO RESPONSE	11	17
TOTAL	65	100%

The number of respondents appearing to be employed full time was 39 or 59 percent. The number reporting to be employed part-time was 7 or 11 percent; self-employed was 6 or 9 percent, student 1 or 2 percent, retired 1 or 2 percent; missing responses were 11 or 17 percent, and unemployed and homemakers were 0 (see Table V). While the average percent of Americans who are unemployed fluctuates, 5.4 percent in 1998, the percent unemployed in this study was below average. The majority of the respondents appeared to be employed either full-time or in some capacity.

TABLE VI

INCOME LEVEL
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
0-25,000	8	12
25,001-45,000	26	41
45,001-65,000	10	15
65,001-85,000	3	5
85,001 +	12	18
NO RESPONSE	6	9
TOTAL	65	100%

Fifty-nine respondents answered the question regarding income level by marking selected ranges indicated one's income, however, it is difficult to determine if the respondent noted their individual or total family income level. For ease of understanding, the responses to income were grouped into six categories (see Table VI).

TABLE VII

RESIDENT OF OKLAHOMA
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
RESIDENT	55	85
NON-RESIDENT	10	15
NO RESPONSE	0	0
TOTAL	65	100%

Sixty-five respondents were asked to answer the question regarding their residential status. Fifty-five respondents or 85 percent reported that they lived in Oklahoma. Ten respondents or 15 percent stated they resided outside of Oklahoma (see Table VII).

TABLE VIII

EQUINE CLUB MEMBER
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
MEMBER	54	83
NON-MEMBER	11	17
NO RESPONSE	0	0
TOTAL	65	100%

In response to the question of whether the subject belonged to an organized club, 54 respondents or 83 percent reported that they did belong to an equine club. Eleven or 17 percent responded that they did not belong to an equine club (see Table VIII).

TABLE IX

NUMBER OF YEARS HAVING RIDDEN OR OWNED A HORSE(S)
FREQUENCY AND PERCENTAGE MEASURES OF RESPONDENTS

	FREQUENCY	PERCENTAGE
0-1	0	0
2-5	7	11
6-10	3	5
11-15	5	8
16+	48	73
NO RESPONSE	2	3
TOTAL	65	100%

The number of years a respondent reported to have ridden or owned a horse(s) appeared to start at two years or 11 percent, and forty-eight respondents or 73 percent stated they had ridden or owned horses for over 16 years. Two respondents did not answer this question (see Table IX).

Data Related to Opinions of Horse Users Who Ride on Trails

Respondents were asked to check the appropriate response to statements that were designed to identify their knowledge and acceptance of environmental impacts from horse use on trails, and whether horse users should pay for management of specific areas used by horses. Questions #21, #37 and #41 are reported in this study. These responses were tabulated using the method performed by Reynolds (1991). Responses to statements, frequency measures and percentages are shown in Tables X through XII. The tables include the “Strongly Agree,” “Agree,” “No Opinion,” “Disagree,” “Strongly Disagree,” and the “No Response” responses.

TABLE X

RESPONSES, FREQUENCY, AND PERCENTAGE MEASURES FOR STATEMENT #21: "EQUINE USE CAUSES NO HARM TO THE ENVIRONMENT."

RESPONSE	FREQUENCY	PERCENT
Strongly Agree	12	18
Agree	24	37
No Opinion	7	11
Disagree	22	34
Strongly Disagree	0	0
TOTAL	65	100

Statement #21 was, "Equine use causes no harm to the environment." Sixty-five or 100 percent of respondents answered this question. Thirty-six or 55 percent of respondents appeared to "Agree" with this statement. Seven or 11 percent of the respondents appeared to answer "No Opinion" to this statement. Twenty-one respondents 34 percent appeared to "Disagree" with the statement (see Table X).

TABLE XI

RESPONSES, FREQUENCY, AND PERCENTAGE MEASURES FOR STATEMENT #37: "HORSE USERS SHOULD PAY FOR MANAGEMENT OF SPECIFIC AREAS TO BE USED BY THEIR HORSES."

RESPONSE	FREQUENCY	PERCENT
Strongly Agree	3	5
Agree	38	58
No Opinion	12	16
Disagree	7	11
Strongly Disagree	4	6
No Response	1	2
TOTAL	65	100

Statement #37 was, "Horse users should pay for management of specific areas to be used by their horses." Forty-one respondents or 63 percent appeared to "Strongly Agree" or "Agree" with the statement. Twelve respondents or 16 percent had "No Opinion" and one respondent or 2 percent did not answer the question. Eleven

respondents or 17 percent appeared to “Disagree” or “Strongly Disagree” with the statement (see Table XI).

TABLE XII

RESPONSES, FREQUENCY, AND PERCENTAGE MEASURES FOR STATEMENT #41: “ANY IMPACTS FROM HORSE USE ON TRAILS ARE ACCEPTABLE.”

RESPONSE	FREQUENCY	PERCENT
Strongly Agree	4	6
Agree	16	25
No Opinion	14	22
Disagree	27	42
Strongly Disagree	3	5
TOTAL	65	100

Statement #41 was, “Any impacts from horse use on trails are acceptable.” Twenty respondents or 31 percent appeared to “Strongly Agree” or “Agree” with the statement. Thirty respondents or 47 percent appeared to “Disagree” or “Strongly Disagree” with the statement. Fourteen respondents or 22 percent appeared to have “No Opinion” (see Table XII).

Data Results Related to Hypothesis Testing

Chi Squared tests for Independence were calculated using InStat software were performed on statements #21, #37, and #41 to determine if there were any significant differences in knowledge of potential horse impact upon the environment regardless of: time and date of the survey, location of survey, gender, age, race/ethnicity, employment status, household income, years of formal education, membership in an organized club, and number of years of riding a horse (see Table XIII through Table XXVII). The data were analyzed using X^2 critical (.05, 2) = 5.9915. This is estimated with an $\propto$ = .05.

The time, date, and location of the survey, gender, race/ethnicity, and club membership were not calculated due to limitations of the study.

TABLE XIII

EFFECT OF AGE BY RESPONSES TO STATEMENT #21
"EQUINE USE CAUSES NO HARM TO THE ENVIRONMENT"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
18 – 45 YEARS	9	8	3	20
46 AND OLDER	21	14	4	39
COLUMN TOTAL	30	22	7	59

Chi-Squared Test for Independence = 0.5139 with 2 df p value is 0.7734

Responses from effect of age and Statement #21, "Equine use causes no harm to the environment," were calculated to determine if the respondent's effect of age and their answer to the statement would produce a significant frequency. Fifty-nine, out of sixty-five, respondents appeared to have answered both questions. Responses did not vary based on the age of the respondent (see Table XIII).

TABLE XIV

EFFECT OF EMPLOYMENT STATUS BY RESPONSES TO STATEMENT #21
"EQUINE USE CAUSES NO HARM TO THE ENVIRONMENT"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
EMPLOYED	25	22	2	49
NOT EMPLOYED	2	0	1	3
COLUMN TOTAL	27	22	3	52

Chi-Squared Test for Independence = 5.673 with 2 df p value is 0.0586

Responses from effect of employment status and Statement #21, “Equine use causes no harm to the environment,” were calculated to determine if the respondent’s effect of employment and the statement would produce a significant frequency. Fifty-two out of sixty-five respondents appeared to have answered both questions. Responses did not vary based on the employment status of the respondent (see Table XIV).

TABLE XV

EFFECT OF HOUSEHOLD INCOME LEVEL BY RESPONSES TO STATEMENT #21 “EQUINE USE CAUSES NO HARM TO THE ENVIRONMENT”

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
LESS THAN $45,000	17	13	3	33
GREATER THAN $45,001	13	6	3	22
COLUMN TOTAL	30	19	6	55

Chi-Squared Test for Independence = 0.9503 with 2 df p value is 0.6218

Responses from household income level and Statement #21, “Equine use causes no harm to the environment,” were calculated to determine if the respondent’s level of education and their answer to knowledge of environmental impact from horse use would produce a significant frequency. Fifty-five out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based on the household income level of the respondent (see Table XV).

TABLE XVI

EFFECT OF EDUCATION LEVEL BY RESPONSES TO STATEMENT #21 "EQUINE USE CAUSES NO HARM TO THE ENVIRONMENT"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
HIGH SCHOOL GRAD/ SOME COLLEGE	13	12	3	28
COLLEGE GRAD	16	8	3	27
COLUMN TOTAL	29	20	6	55

Chi-Squared Test for Independence = 1.093 with 2 df p value is 0.5791

Responses from education level and Statement #21, "Equine use causes no harm to the environment," were calculated to determine if the respondent's education level and their answer to the statement would produce a significant frequency. Fifty-five out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based on the education level of the respondent (see Table XVI).

TABLE XVII

EFFECT OF NUMBER OF YEARS RIDDEN OR OWNED A HORSE BY RESPONSES TO STATEMENT #21: "EQUINE USE CAUSES NO HARM TO THE ENVIRONMENT"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
10 YEARS OR LESS	5	4	1	10
11 YEARS OR MORE	30	17	6	53
COLUMN TOTAL	35	21	7	63

Chi-Squared Test for Independence = 0.2377 with 2 df p value is 0.8879

Responses from number of years ridden or owned a horse and Statement #21, "Equine use causes no harm to the environment," were calculated to determine if the respondent's level of education and the statement would produce a significant frequency. Sixty-three out of a possible sixty-five respondents appeared to have

answered both questions. Responses did not vary based on the number of years ridden or owned a horse (see Table XVII).

TABLE XVIII

EFFECT OF AGE BY RESPONSES TO STATEMENT #37:
"HORSE USERS SHOULD PAY FOR MANAGEMENT OF SPECIFIC AREAS TO BE USED BY THEIR HORSES"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
18 – 45 YEARS	13	2	6	21
46 AND OLDER	28	6	6	40
COLUMN TOTAL	41	8	12	61

Chi-Squared Test for Independence = 1.738 with 2 df p value is 0.4193

Responses from effect of age and Statement #37, "Horse users should pay for management of specific areas to be used by their horses," were calculated to determine if the respondent's effect of age and their answer to the statement would produce a significant frequency. Sixty-one out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon age of the respondent (see Table XVIII).

TABLE XIX

EFFECT OF EMPLOYMENT STATUS BY RESPONSES TO STATEMENT #37:
"HORSE USERS SHOULD PAY FOR MANAGEMENT OF SPECIFIC AREAS TO BE USED BY THEIR HORSES"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
EMPLOYED	35	5	7	47
NOT EMPLOYED	1	0	2	3
COLUMN TOTAL	36	5	9	50

Chi-Squared Test for Independence = 5.181 with 2 df p value is 0.0750

Responses from effect of employment status and Statement #37, “Horse users should pay for management of specific areas to be used by their horses,” were calculated to determine if the respondent’s effect of employment and their answer to the statement would produce a significant frequency. Fifty out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon the employment status of the respondent (see Table XIX).

TABLE XX

EFFECT OF HOUSEHOLD INCOME LEVEL BY RESPONSES TO STATEMENT #37: “HORSE USERS SHOULD PAY FOR MANAGEMENT OF SPECIFIC AREAS TO BE USED BY THEIR HORSES”

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
LESS THAN $45,000	20	5	7	32
GREATER THAN $45,001	15	2	4	21
COLUMN TOTAL	35	7	11	53

Chi-Squared Test for Independence = 0.5593 with 2 df p value is 0.7561

Responses from effect of household income and Statement #37, “Horse users should pay for management of specific areas to be used by their horses,” were calculated using Chi Square tests to determine if the respondent’s effect of household income and their answer to the statement would produce a significant frequency. Fifty-three out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon the household income level of the respondent.

TABLE XXI

EFFECT OF EDUCATION LEVEL BY RESPONSES TO STATEMENT #37: "HORSE USERS SHOULD PAY FOR MANAGEMENT OF SPECIFIC AREAS TO BE USED BY THEIR HORSES"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
H.S. GRAD AND/OR SOME COLLEGE	21	4	4	29
COLLEGE GRADUATE	18	5	8	31
COLUMN TOTAL	39	9	12	60

Chi-Squared Test for Independence = 1.610 with 2 df p value is 0.4470

Responses from effect of education level and Statement #37, "Horse users should pay for management of specific areas to be used by their horses," were calculated to determine if the respondent's effect of education level and their answer to the statement would produce a significant frequency. Sixty out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon the education level of the respondent.

TABLE XXII

EFFECT OF NUMBER OF YEARS RIDDEN OR OWNED A HORSE BY RESPONSE TO STATEMENT #37: "HORSE USERS SHOULD PAY FOR MANAGEMENT OF SPECIFIC AREAS TO BE USED BY THEIR HORSES"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
10 YEARS OR LESS	10	1	3	14
11 YEARS OR MORE	29	9	9	47
COLUMN TOTAL	39	10	12	61

Chi-Squared Test for Independence = 1.137 with 2 df p value is 0.5665

Responses from effect of number of years ridden or owned a horse status and Statement #37, "Horse users should pay for management of specific areas to be used by

their horses" were calculated to determine if the respondent's effect of number of years they had ridden or owned a horse and their answer to the statement would produce a significant frequency. Sixty-one out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon the number of years ridden or owned a horse (see Table XXII).

TABLE XXIII

EFFECT OF AGE BY RESPONSES TO STATEMENT #41
"ANY IMPACTS FROM HORSE USE ON TRAILS ARE ACCEPTABLE"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
18 – 45 YEARS	6	12	2	20
46 AND OLDER	12	18	11	41
COLUMN TOTAL	18	20	13	51

Chi-Squared Test for Independence = 2.497 with 2 df p value is 0.2869

Responses from effect of age and Statement #41, "Any impacts from horse use on trails are acceptable," were calculated to determine if the respondent's effect of age and the statement would produce a significant frequency. Fifty-one out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon age of respondent (see Table XXIII).

TABLE XXIV

EFFECT OF EMPLOYMENT STATUS BY RESPONSES TO STATEMENT #41:
"ANY IMPACTS FROM HORSE USE ON TRAILS ARE ACCEPTABLE"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
EMPLOYED	13	25	11	49
NOT EMPLOYED	1	2	0	3
COLUMN TOTAL	14	27	11	52

Chi-Squared Test for Independence = 0.8553 with 2 df p value is 0.6520

Responses from effect of employment status and Statement #41, “Any impacts from horse use on trails are acceptable,” were calculated to determine if the respondent’s effect of employment and the statement would produce a significant frequency. Fifty-two out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon the employment status of the respondent (See Table XXIV).

TABLE XXV

EFFECT OF HOUSEHOLD INCOME LEVEL BY RESPONSES TO STATEMENT #41: “ANY IMPACTS FROM HORSE USE ON TRAILS ARE ACCEPTABLE”

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
LESS THAN $45,000	9	18	5	32
GREATER THAN $45,001	7	10	4	21
COLUMN TOTAL	16	28	9	53

Chi-Squared Test for Independence = 0.3802 with 2 df p value is 0.8269

Responses from effect of household income and Statement #41, “Any impacts from horse use on trails are acceptable,” were calculated using Chi Square tests to determine if the respondent’s effect of household income and the statement of would produce a significant frequency. Fifty-three out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon household income level (see Table XXV).

TABLE XXVI

EFFECT OF LEVEL OF EDUCATION BY RESPONSES TO STATEMENT #41: "ANY IMPACTS FROM HORSE USE ON TRAILS ARE ACCEPTABLE"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
H.S. DIPLOMA OR SOME COLLEGE	7	16	6	29
COLLEGE DEGREE	11	12	6	29
COLUMN TOTAL	18	28	12	58

Chi-Squared Test for Independence = 1.460 with 2 df p value is 0.4818

Responses from effect of level of education status and Statement #41, "Any impacts from horse use on trails are acceptable," were calculated to determine if the respondent's effect of education level and the statement would produce a significant frequency. Fifty-eight out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon education level of the respondent (See Table XXVI).

TABLE XXVII

EFFECT OF NUMBER OF YEARS RIDDEN OR OWNED A HORSE BY RESPONSE TO STATEMENT #41:"ANY IMPACTS FROM HORSE USE ON TRAILS ARE ACCEPTABLE"

	AGREE	DISAGREE	NO OPINION	ROW TOTAL
10 YEARS OR LESS	3	2	5	10
11 YEARS OR MORE	16	26	9	51
COLUMN TOTAL	19	28	14	61

Chi-Squared Test for Independence = 5.566 with 2 df p value is 0.0618

Responses from effect of number of years ridden or owned a horse status and Statement #41, "Any impacts from horse use on trails are acceptable," were calculated to determine if the respondent's effect of number of years they had ridden or owned a

horse and the statement would produce a significant frequency. Sixty-one out of a possible sixty-five respondents appeared to have answered both questions. Responses did not vary based upon number of years ridden or owned a horse (See Table XXVII).

Analysis of Data

The collection of the data and the analysis from the horse users appeared to show that there was no significant difference of opinions based on the demographics of the knowledge of a horses' impact upon the environment; there was no significance difference in the horse users' opinions based on demographics of whether management of horse trail areas should be paid for by the user; and based on demographics, there was no significant difference in the horse users' acceptance of any adverse environmental impacts on trails by horse use.

The data appeared to demonstrate that the over 50 percent of the respondents were primarily white females living in Oklahoma, between 46 and 55 years of age, and they work full time with an average income $45,000 or less. Typically, the respondents primarily were college graduates, members of an equine club, and had owned or ridden horses for 16 or more years.

The data appeared to show that respondents had knowledge that horses can cause an adverse impact to the environment and there was a high level of non-acceptance regarding any adverse impacts from horse use on trails. The horse users appeared to be supportive of management charging a fee for specific trail areas to be used by their horses.

The data appeared to show that horse users have an awareness and commitment to resolve and prevent environmental problems on trails. For specific suggestions and details relative to the data that is presented in this chapter, see Chapter 5.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The number of people involved with horses continues to increase every year. In 2005, a study showed the horse population in the United States had reach 9.2 million, compared to 6.9 million in 1997. There are over 3.9 million horses involved in recreation activities in the U.S. Horse users can be identified as individuals in a distinct group. Public and private land managers note that it is important to have information concerning different types of trail users.

This study was designed to: 1) establish the horse users' knowledge of a horses' impact upon the environment on trails; 2) identify the horse users' opinions about whether management of horse trail areas should be paid for by the user; 3) identify the horse users' acceptance of whether an adverse impact upon the environment is an acceptable consequence of horse use; and 4) to ascertain if any demographic variables have a relationship to the factors mentioned earlier in this study.

The literature indicated that horses are considered a low-impact user. However, there is limited literature on the horse users' knowledge of environmental impacts. Future research on equestrian behavior on trails will have greater importance as demand for outdoor recreation increases. Research has shown that there is a need to improve our knowledge of users' characteristics, behavior, and information needs. This

study is an attempt to establish a baseline of the users' knowledge of environmental impacts from horses.

A questionnaire was used as the data collection instrument for this study. The first part of the questionnaire pertained to the demographics of the subject. The second part of the questionnaire asked the subjects to respond to questions in an effort to:

(1) Establish the horse users' knowledge of a horses' impact upon the environment on trails.

(2) Identify the horse users' opinions about whether management of horse trail areas should be paid for by the user.

(3) Identify the horse users' acceptance on whether an adverse impact upon the environment is an acceptable consequence of horse use.

(4) To ascertain if any demographic variables have a relationship to the factors mentioned earlier in this study.

Subjects were non-randomly notified by club sponsors of the Oklahoma Horse Industry Council (OHIC) that the survey was available on the (OHIC) web-site and asked for their participation. Four locations that have horse trails were selected in Oklahoma to collect samples from subjects. Due to weather conditions and financial constraints, two locations were not sampled. However, the two locations selected provided no subjects, possibly due to the high cost of gasoline fuel and weather conditions.

Statistical procedures were applied after the data was collected. The three hypothesis were tested for significance utilizing the $\propto = 0.05$ level with 2 df and Chi-square Tests for Independence performed with the program InStat. The statistical analysis results provided the following findings to the problem statements defined in Chapter I.

1. Relative to the statement “Equine use causes no harm to the environment,” 55 percent agreed with the statement, 34 percent disagreed, and 11 percent had no opinion.
2. Relative to the statement “Horse users should pay for management of specific areas to be used by their horses,” 63 percent appeared to agree with the statement, 17 percent disagreed, 16 percent had no opinion, and 2 percent did not answer the question.
3. Relative to the statement “Any impacts from horse use on trails are acceptable,” 31 percent agreed, 47 percent disagreed, 22 percent had no opinion, and 5 percent did not answer the question.
4. There is insufficient evidence to lead to the conclusion that there is a significant difference of knowledge of potential horse impact upon the environment regardless of: age, employment status, household income, years of formal education, and years of riding a horse, therefore, the alternative hypothesis is rejected.
5. There is insufficient evidence to lead to the conclusion that there is a significant difference of horseback riders’ opinions as to whether or not management of the equine trail areas should be paid by the trail user, regardless of user demographics, with the exception of employment status, therefore, the alternative hypothesis is rejected.
6. There is insufficient evidence to lead to the conclusion that there is a significant difference in acceptance of any adverse environmental impacts from horse use on trails, regardless of user demographics, therefore, the alternative hypothesis is rejected.

Conclusions

Most of the respondents to this study expressed concerns and suspicion about whether or not this “another environmental” survey that would be used against the trail riders. There was suspicion that this was an attempt to have trails taken away from the equestrian users. Many trails have already been closed for the development of commercial and residential communities. After a detailed explanation, and in some instances a one-on-one visit or with the membership of a club, on why this survey was being done, the researcher was successful in obtaining sixty-five completed surveys. Taking into consideration the statistical data results of the study, the following conclusions were made.

1. Over half of the horse users that replied to this study appeared to agree with the statement “equine use causes no harm to the environment.”
2. The majority of horse users appeared to agree that “any” adverse environmental impacts from horse use on trails were not acceptable.
3. The majority of horse users appeared to agree that the horse users should pay for management of specific areas to be used by their horses.
4. Individual demographics did not appear to have any relationship on whether a trail user that rides horses on trails have knowledge that equine use can have an impact on trails.
5. Individual demographics did not appear to have any relationship on whether a trail user should pay for the management of trails used by horses.
6. Individual demographics did not appear to have any relationship on whether or not horse users believed that environmental impacts caused from horse use on trails are an acceptable consequence of horse use.

7. In order to achieve adequate response levels in future studies, researchers should develop relationships with members of horse clubs and organizations to ensure that the respondents understand the intent and purpose of the study, in order to alleviate any suspicions or concerns that they might have about the study.

Recommendations

This study revealed attributes that could make opportunities available for managers of trails to create relationships and tap into the resources available within the equine community in order to keep and to build better trails. The findings and conclusions of this study led to the following recommendations:

1. The managers of trail areas that allow horses should be made aware of the users' demographics, knowledge level, and attitudes about environmental impacts. Managers should consider how to change in order to meet customer expectations. As part of the decision-making process, managers can use this information as a baseline study so they can be more effective in their decisions in the design and maintenance of trails.
2. The managers of trail areas can use this information as a baseline to understand that trail users who ride horses on trails appear to be concerned about environmental impacts from horses on trails. The managers can use this information to build relationships with trail users, get them involved, and educate and encourage them to be part of the decision-making processes.
3. The users who ride horses on trails should be informed of the potential for adverse environmental impacts from horses. Education of both the equestrian and the conservation communities should be developed to form trail partnerships. This could be done through an educational program using printed

media and formal meetings to educate users on Leave No Trace and encourage them to become partners and trail maintenance volunteers.

4. This study should be replicated for further analysis and serve as a stepping-stone for researchers interested in problem solving processes of the visitor's knowledge and acceptance of adverse environmental impacts on trails.
5. The researcher has opened the door for further research to be done with different populations. The knowledge level and opinion of users that ride horses on trails could be important when compared with the non-horse users' knowledge level and opinions.

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APPENDICES

APPENDIX A

DATA COLLECTION MATERIALS

Equestrian Knowledge of Environmental Impacts on Trails

SURVEY

CONSENT: Your participation in this survey on behalf of equestrian trail users is voluntary, and is extremely important in determining your knowledge of environmental impacts on trails. Your response represents the interests of equestrian trail users. Your response will be reported in aggregate form only and will not be personally identified, nor reported in association with any special interest group.

Please complete this survey by August 30, 2005 and return it in person, by mail or e-mail to billingst@omrf.ouhsc.edu. If you have any questions about this research you may contact University Research Services at Oklahoma State University (405-744-5700) or the principal investigator on this project – **Teresa Billings, 3352 N Choctaw Road, Choctaw, OK 73020**, (405) 205-7970. The following items will help us understand more about the demographics and needs of equestrian trail users.

DATE:_____ Location of Survey:_____

1. Gender of respondent: __7__Male __55__Female

2. What is your age: _(3)_18-25 _(3)_26-35 _(15)_36-45 _(27)_46-55 _(14)_56 or older

3. Marital status: _9__Single _42__Married _9__Divorced _2__Widow _0__Widower

4. What best describes your race?

   _60__White _0__Black _0__Asian or Pacific Islander _1_American Indian _1__Hispanic

5. What is the highest level of education you have achieved?

   _0__Some high school _10__High school graduate __19_Some College
   _16_College graduate _16__Graduate degree __12_Post-graduate

6. What is your employment status?

   _39_full-time _7_part-time _6_self-employed _0_un-employed _0_homemaker
   _1_student __1_retired

7. What is your level of income?

   _5__Under $15,000 __3_$15,001 to $25,000 _14__$25,001 to $35,000
   _12_$35,001 to $45,000 __5_$45,001 to $55,000 __5__$55,001 to $65,000
   _1__$65,000 to $75,000 __2_$75,001 to $85,000 _12__$85,001 or more

8. Do you live in Oklahoma? _55__Yes _10_No

9. What is your Zip Code?_____

10. Do you belong to an equine club? _54_Yes _11_No

11. How long have you ridden or owned horse(s)?

_(0)_0-1 year _(7)_2-5 years _(3)_6-10 years (5)_10-15 years _(48)_16 years or more

12. In the last year, how many trail riding trips did you take in the Oklahoma?
_(7)_0 _(42)_1-3 _(13)_4-6 _(5)_7-9 _(21)_10 or more

13. What was the average length of stay (days) for your last trail ride?
_(7)_0 _(42)_1-3 _(8)_4-6 _(3)_7-9 _(1)_10-15 _(0)_16 + _(1)_Other:_____

14. Did you use pack animals? _3__Yes _62__No

15. If you answered yes to #14, how many pack animals did you use:
_(1)_1-3 _(0)_4-6 _(1)_7-9

16. How many riders were in your group? _(39)_1-5 _(28)_5-10 _(2)_11-15 _(10)_16+

17. Were there any children 18 or younger in the group? _30__Yes _32__No

18. Please use the following guide to indicate the importance of the following issues by using:

Very Important	Undecided	Not Important	
23	17	22	Lack of support of amenities along the trail
28	19	16	Too many different users on trail
37	17	9	Conflict in type of use on trail
37	18	7	Security at the trail head
44	14	5	Accessible or barrier-free trails
50	10	4	Lack of directional signs on/to trails
51	9	3	Lack of trail etiquette or ethics
51	9	3	Lack of maintenance on trails
52	9	2	Lack of funding for trails
53	9	0	Too much litter or trash along trails
53	18	3	Erosion or deterioration of trial

19. Please rank the below trail needs from your perspective using:

Very Important	Undecided	Not Important	
11	15	22	Provide landscaping along trails
18	22	7	Provide law enforcement
22	19	9	Develop support facilities along trails
32	14	5	Provide education/safety information for trail users
36	10	5	Develop support facilities at trail heads
41	7	4	Enforce rules and regulations on established trails
41	8	2	Acquire land for trail access
45	6	1	Renovation of deteriorated trails
45	9	2	Acquire land for new trails
46	0	1	Provide trail information, maps, etc.
49	3	1	Mitigate or repair damage to existing trails
51	6	0	Keep trails clean of litter and trash
54	4	1	Develop new trails dedicated to equestrian use
58	4	1	Maintain the existing trails

The following items will help us understand more about the participant's knowledge and use of trails. (check one)

20. Equine use in designated areas has little effect on non-equine users?

_18_Strongly Agree _24_Agree _4_No Opinion _14_Disagree _4_Strongly Disagree

21. Equine use causes no harm to the environment?

_12_Strongly Agree _24_Agree _7_No Opinion _22_Disagree _0_Strongly Disagree

22. Equine use on trails has little effect on the trail surface?

_7_Strongly Agree _14_Agree _4_No Opinion _38_Disagree _2_Strongly Disagree

23. The noise from horses and their riders drive wildlife from the area?

_1_Strongly Agree _8_Agree _4_No Opinion _30_Disagree _21_Strongly Disagree

24. Horses have no effect on the soil's ability to absorb water?

_10_Strongly Agree _14_Agree _13_No Opinion _26_Disagree _0_Strongly Disagree

25. Horses destroy vegetation by walking/running over the stems and roots?

_3_Strongly Agree _26_Agree _9_No Opinion _20_Disagree _6_Strongly Disagree

26. Horses can only harm animals by stepping on or running over the animals?

_7_Strongly Agree _23_Agree _9_No Opinion _21_Disagree _3_Strongly Disagree

27. Horses ridden on wet trails can lead to erosion?

_5_Strongly Agree _37_Agree _11_No Opinion _10_Disagree _1_Strongly Disagree

28. Horses can cause accelerated soil erosion even on flat land?

_2_Strongly Agree _32_Agree _17_No Opinion _8_Disagree _5_Strongly Disagree

29. Horses ridden on a river bed have little effect on the environment of the river.

_5_Strongly Agree _20_Agree _16_No Opinion _21_Disagree _0_Strongly Disagree

30. Horses and their riders can only harm birds when those birds are nesting?

_1_Strongly Agree _7_Agree _25_No Opinion _25_Disagree _5_Strongly Disagree

31. Small groups of riders, large groups of riders, and riders with pack animals all have similar impacts on the environment?

_3_Strongly Agree _12_Agree _12_No Opinion _32_Disagree _5_Strongly Disagree

32. Unshod horses cause more damage to the natural environment than shod horses?

_1_Strongly Agree _1_Agree _13_No Opinion _37_Disagree _12_Strongly Disagree

33. Horses strip vegetation from the soil?

_2_Strongly Agree _23_Agree _6_No Opinion _26_Disagree _7_Strongly Disagree

34. Assuming that horses cause soil erosion, this is an acceptable consequence of horse use?

_7_Strongly Agree _28_Agree _10_No Opinion _16_Disagree _3_Strongly Disagree

35. Assuming that horses cause loss of vegetation, I believe this is an acceptable consequence of horse use?

_7_Strongly Agree _29_Agree _10_No Opinion _15_Disagree _3_Strongly Disagree

36. Assuming that horses and their riders causes the loss of wildlife in an area, I believe this is an acceptable consequence of horse use?

_6_Strongly Agree _24_Agree _9_No Opinion _20_Disagree _3_Strongly Disagree

37. Horse users should pay for management of specific areas to be used by their horses?

_3_Strongly Agree _38_Agree _12_No Opinion _7_Disagree _4_Strongly Disagree

38. Horse users should research the rules and guidelines for that particular trail?

_21_Strongly Agree _39_Agree _3_No Opinion _2_Disagree _0_Strongly Disagree

39. Horse users should practice the recommended rules/guidelines/etiquette on trails?

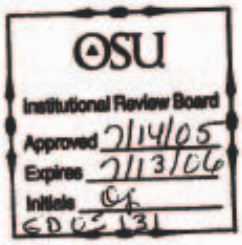
_41_Strongly Agree _24_Agree _0_No Opinion _0_Disagree _0_Strongly Disagree

40. Horse users should volunteer to maintain or build trails?

_23_Strongly Agree _35_Agree _3_No Opinion _3_Disagree _1_Strongly Disagree

41. Any impacts from horse use on trails are acceptable?

_4_Strongly Agree _16_Agree _14_No Opinion _27_Disagree _3_Strongly Disagree



(Recruitment of subjects from e-mail, on-line surveys, and recruitment by personal contact)

I am a graduate student under the direction of Professor Christine Cashel in the School of Applied Health and Educational Psychology at Oklahoma State University. I am conducting a research study of the equestrian's knowledge of environmental impacts on trails. I am recruiting subjects to complete a survey, which will take approximately 20 – 30 minutes. The survey will need to be completed and returned by August 30, 2005.

Your participation in this survey on behalf of equestrian trail users is voluntary, and is extremely important in determining the behavior and knowledge of environmental impacts on Oklahoma's horse trails. Your response represents the interests of equestrian trail users throughout the State of Oklahoma. Your response will be reported in aggregate form only and will not be personally identified, nor reported in association with any special interest group.

(This paragraph for e-mail and on-line surveys will be added)
Would your club/association be interested in posting the survey on your web-site for your readers? The survey will need to be completed and returned by August 30, 2005.

If you have any questions concerning the research study, please call me at (405) 205-7970.

Best regards,
Teresa Billings
3352 N Choctaw Road
Choctaw, OK 73020

APPENDIX B

OSU INSTITUTIONAL REVIEW

BOARD APPROVAL FORM

Oklahoma State University Institutional Review Board

Date:	Thursday, July 14, 2005
IRB Application No	ED05131
Proposal Title:	Equestrian Knowledge of Environmental Impacts on Trails
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved **Protocol Expires: 7/13/2006**

Principal Investigator(s

Teresa M. Billings
3352 N. Choctaw Road
Choctaw, OK 73020

Christine Cashel
434 Willard Hall
Stillwater, OK 74078

The IRB application referenced above has been approved. 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.

☑ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

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 protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 415 Whitehurst (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Sue C Jacobs

Sue C. Jacobs, Chair
Institutional Review Board

APPENDIX C

COMMENTS FROM PARTICIPANTS

We must work together to build and maintain trails and keep them open.

This is also a consideration for bike, dirt bike and 4-wheelers, the public lands must be multiuse and everyone's responsibility.

Hikers, bikers and campers should also be responsible for day use/camping fees, park permits, etc.

Vegetate disturbed edges with native species of low-maintenance shrubs without thorns and groundcover layer.

The problem with "designating" equine use, without an allowance for compatible multi-use, is, said nice facility or set of trails disallows compatible passive open space users (hikers, folks with strollers, etc.) Other passive open space users, in fact most of them, enjoy seeing the horses while enjoying their thing.

The grasslands and their associated areas have supported horses for, well, a very long time; but again, average use. Remember, we practically wouldn't have trails at all if even normal populations of deer didn't go hither and thither, leaving a nice trail for us all to enjoy. Notice how smartly they make switchbacks, actually generating trails with low-maintenance slopes that will not break down over time! The instincts of the deer rule. No personal agendas with deer.

The definition of "harm" here is unclear to me. Consider a herd of horses. They are spooked by something and they run for a mile, typical behavior for flight animals, and then turn, snorting, to consider what is was that ailed them to begin with and is the perceived threat impending still. Have they been "harmed"? My surmise is no; animals are predated. Their instincts drive them to avoid or flee most predated efforts upon them. In so doing, I would say, their health is actually improved\perpetuated\maintained, as applicable. In brief, I find the questions with the XXX that I placed in front of them difficult to provide a straight answer for without airing the variables.

Again, numbers are important here. Is it a bad thing for the water bed if a horse steps into a river or stream bed, takes a drink, walks around a bit, perhaps splashing itself or even rolling? Common sense, observation and science would tell you "no"; instinctively, many animals roll in the water and horses are one of them. Is 2-6 group rides in a year, of say 30-40 horses each time, going to cause irreversible harm? Again, I would say, on the average, no, seasonal considerations with analysis in hand. Should the practice go on 5 days a week with a local equine tourist outfit with 30 horses a day at the same water hole, then yes, irreversible damage will happen to the bed, the banks, the aquatic life, both flora and fauna, and eventually the dissolved oxygen in that spot and the quality of the water itself. Very bad thing.

The thing to remember here is that the environment is symbiotic and "disturbances" are a very important part of a healthy ecosystem.

Obviously, management should limit the number of organized, large group rides over repeated terrain; passive land users, however, in small numbers, with seasonal discretion are actually an asset to trail maintenance.

I don't believe that horses cause loss of wildlife in an area.

Many of these questions need more explanation by users than these simple responses. I have worked actively with two riding groups for 25 years, developing and maintaining trails, also seeking to inform the riding public. Horseback riding is a wonderful family activity. People living close to a riding area should be willing to volunteer work on the trails, as regular maintenance is an unending, although fun, job. Horse use on the trails varies considerably in impact, pending to some degree on the nature of the soil.

I've been riding trails for 44 years and horse people are very conscious about preserving and taking care of the trails. The 4-wheelers do more damage than horses could ever do and hikers and campers litter more than any horse people. We pay taxes and deserve to `

On Question #18, maybe the term "neutral" or "not a problem" or "not applicable" would have been better than "undecided."

I believe in multi-use, it can exist without conflict.

Provide landscaping to prevent further erosion, etc.

Of course a horse can hurt something it steps on, but I think they try to avoid it at all costs. I don't think they hurt animals in other ways.

I don't think horses ever harm birds.

VITA

Teresa Mary Billings

Candidate for the Degree of

Master of Science

Thesis: EQUESTRIAN KNOWLEDGE OF ENVIRONMENTAL IMPACTS ON TRAILS

Major Field: Leisure Studies

Biographical:

Personal Data: Born in Oklahoma City, Oklahoma on September 28, 1960, daughter of Rayford Harold, Jr. and Beatrice K. Trammell

Education: Graduated from Choctaw High School, Choctaw, Oklahoma in May 1978; received an Associates in Applied Arts degree from Rose State College in May 1999; and received a Bachelor of Science degree in Organizational Leadership from Southern Nazarene University, Bethany, Oklahoma in August, 2000. Completed the requirements for the Master of Science degree with a major in Leisure Studies at Oklahoma State University in December 2005.

Experience: Employed part-time by Trail Blazer Magazine as a writer for the Trail Saver column, 2005 to present. Employed full-time by Oklahoma Medical Research Foundation as an Executive Assistant to five medical researchers, 2000 to present. Employed part-time by Oklahoma State University, Outdoor Adventures as an out-door leader, Nov. 2003; Employed by Children's Hospital of Oklahoma, as an Administrative Assistant to the Vice President, 1998-2000. Employed by Presbyterian Hospital, Oklahoma City, Oklahoma as a Cancer Registrar in 1996-1998 and as a secretary, 1981-1996.

Professional Memberships: Community Emergency Response Team, Oklahoma Recreation and Parks Society, National Recreation and Parks Association, Southwest Parks, Recreation Training Institute, Wilderness Education Association, American Quarter Horse Association, Oklahoma Foundation Quarter Horse Registry, National Foundation Quarter Horse Registry

Name: Teresa Mary Billings Date of Degree: December 2005

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: EQUESTRIAN KNOWLEDGE OF ENVIRONMENTAL IMPACTS ON TRAILS

Pages in Study: 62 Candidate for the Degree of Master of Science

Major Field: Leisure Studies

Scope and Method of Study:

The purpose of this study was to examine the relationships between the demographics and the knowledge of horse users of environmental impacts on trails, the opinion of horse users as to whether management of equine trail areas should be paid by the user and to determine if there was a significant difference in acceptance of any environmental impacts form horse use on trails. Participants in the study were 65 people who had ridden horses on trails. The three hypothesis were tested for significance utilizing the $\propto = 0.05$ level and Chi-square Test for Independce performed with the program InStat.

Findings and Conclusions: There was sufficient evidence that led to the following conclusions: 1) There was no significant difference of knowledge of potential horse impact upon the environment. 2) There was no significant difference in acceptance of any environmental impacts from horse use on trails. 3) There was no significant difference of horseback riders' opinions as to whether management of equine trail areas should be paid by the trail user, regardless of: age, employment status, household income, years of formal education, and years of riding a horse.

Over half of the horse users that replied to this study appeared to agree with the statement "equine use causes no harm to the environment," however, the majority of horse users did not appear to believe that "any" impacts from horse use on trails are acceptable. The majority of horse users also appear to agree that the horse users should pay for management of specific areas to be used by their horses.

ADVISER'S APPROVAL: Christine Cashel, Ed.D.