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The Effect of Geography and Personal Experience on Attitudes and Perceptions of the Mexican Gray Wolf Reintroduction

Erin Marchand

Erin Marchand
Candidate

Department of Geography and Environmental Studies
Department

This thesis is approved, and it is acceptable in quality and form for publication:

Approved by the Thesis Committee:

Melinda Harm Benson, Chairperson

Brad Cullen

Chris Duvall

THE EFFECT OF GEOGRAPHY AND PERSONAL EXPERIENCE ON ATTITUDES AND PERCEPTIONS OF THE MEXICAN GRAY WOLF REINTRODUCTION

by

ERIN MARCHAND

B.A. ENVIRONMENTAL SCIENCE
B.S. GEOGRAPHY
STETSON UNIVERSITY 2011

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"*Think left and think right and think low and think high. Oh, the thinks you can think up if only you try! There's no limit to how much you'll know, depending how far beyond zebra you go."* – Dr. Seuss

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By

Erin Marchand

B.A., Environmental Science, Stetson University, 2011

B.S., Geography, Stetson University, 2011

M.S., Geography, University of New Mexico 2013

ABSTRACT

This research examines the attitudes and perceptions of residents in Catron County and Harding County, New Mexico regarding the Mexican gray wolf reintroduction program under the Endangered Species Act. Catron County is within the wolf recovery zone and residents must deal with consequences of having wolves in the area. Harding County is located on the opposite side of the state and is removed from the wolf reintroduction area. Understanding the perceived concerns and benefits of the wolf reintroduction program and if those concerns change based on geographic proximity to the reintroduction can reveal whether cultural biases or personal experience with the

wolves play more important role in affecting attitudes and perceptions and why. This information can be important in designing a successful wolf reintroduction program. The initial hypothesis for this research was that proximate location to and personal experience with the wolves would influence attitudes and perceptions. This was proven incorrect. Using a blend of quantitative and qualitative data gathered from both counties through mail out surveys, results showed no significant difference existed between study areas in attitudes toward wolf reintroduction. The majority of respondents in both study areas experienced no effect from or had no personal experience with wolves yet the majority of respondents strongly disagreed with the reintroduction. Also, regression analysis showed very little to no correlation between demographic characteristics and feelings toward wolf reintroduction. Finally, qualitative text analysis showed that the perceived concerns of residents in Catron County about wolves were similar to the perceived concerns of residents in Harding County. This research concludes that the two study areas share the same attitudes and perceptions about wolves and their reintroduction, and that proximate location to and personal experience with wolves is independent of attitude regarding reintroduction. Rather, this study determined that rural cultural biases likely determine attitudes and perceptions about wolves. Management implications include a need to build trust between managing agencies and rural residents before undertaking a reintroduction and creating continuous educational programs in communities to help break down longstanding stereotypes.

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Chapter 1

Introduction

Mexican Gray wolves (*Canis lupus baileyi*) historically roamed large sections of New Mexico, Arizona, Texas, and Mexico (Figure 1). Through the twentieth century, the Mexican wolf population was decimated by the expansion of the frontier, and the species was on the verge of extinction. Under the Endangered Species Act, a bi-national program was formed to breed Mexican wolves in captivity. The captive wolves were then reintroduced into the wild beginning in 1998 (AZFG 2012). These predatory animals are keystone species that have significant influence on the ecosystem, from the number of ungulate species to aspen and willow recruitment (Ripple and Beschta 2005). When the original plan was conceived, a goal of one hundred wolves was set for 2006 (AZFG 2012).

Today, this goal is still not a reality. Just over seventy wolves remain in the wild fourteen years after initial reintroduction (USFWS 2012). The parties involved with reintroduction, including multiple federal and state agencies along with environmental and cattle interest groups, have been unsuccessful at creating a productive environment for the reintroduction efforts. This is in part because the perceptions and attitudes of stakeholders on the ground. What influences these attitudes has not been assessed. In 2011, agencies and interests reconvened to create a new reintroduction plan for the wolves, but many stakeholders have already dropped out of the process, including all groups from New Mexico.

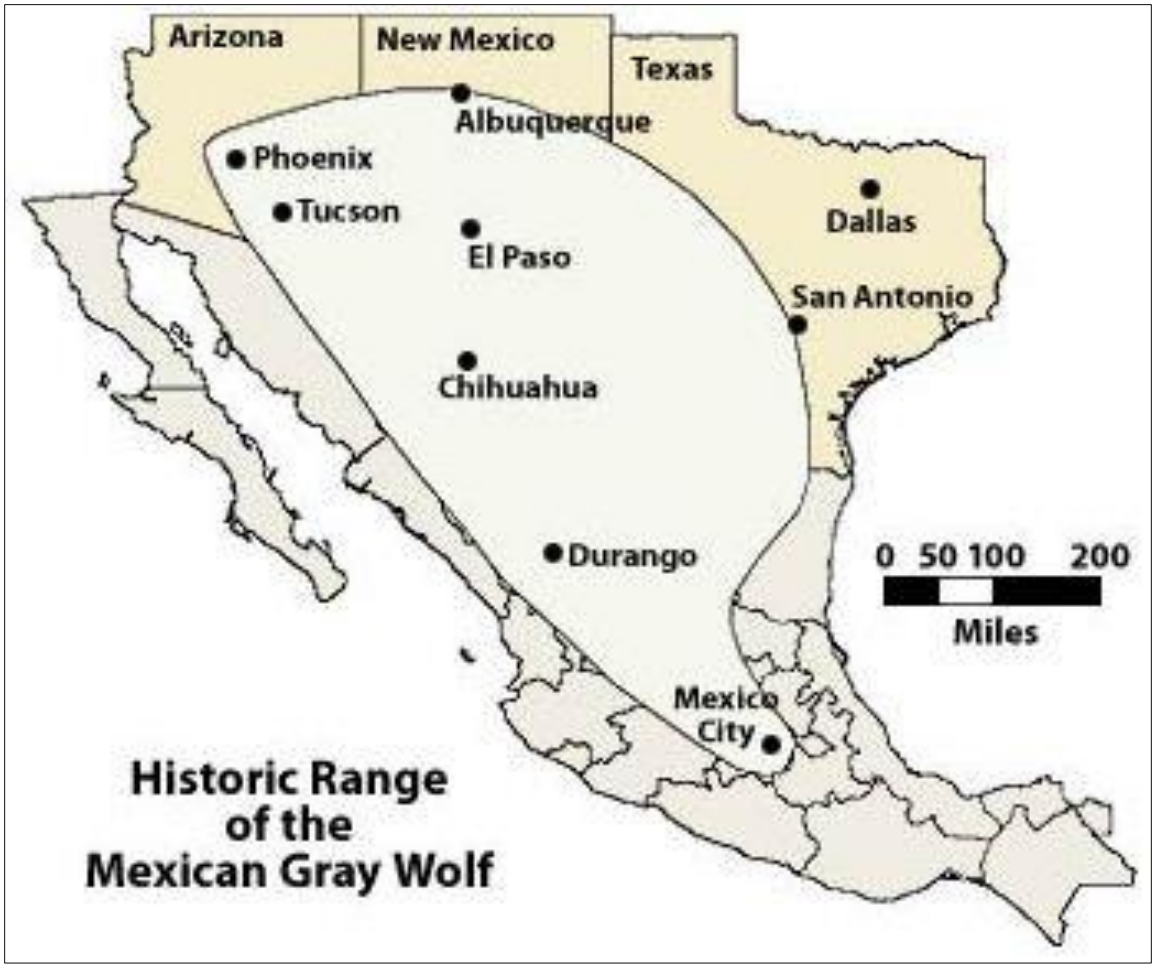

Figure 1: Historic range of the Mexican gray wolf. Source: Wolf Song of Alaska 2013.

This project aims to examine the perceptions and attitudes of one of the main stakeholders in the reintroduction process, the public in New Mexico. Understanding the perceived concerns and benefits of the wolf reintroduction program and if those concerns change based on geographic proximity to the reintroduction can reveal whether cultural biases or personal experience with the wolves play more important role and why. This information can be important in designing a successful wolf reintroduction program. It can be used to determine and address the issues experienced in the reintroduction process. Questions regarding whether the public is upset because their cows are being killed or because they have been culturally taught to hate wolves can be answered. Identifying the problem is key to finding a working solution. This research helps identify where some problems in the Mexican Gray wolf reintroduction lie and will hopefully contribute to a successful reintroduction.

1.1 Project Description

This project aims to understand the influences of geography and personal experience on attitudes and perceptions of members of the public in Catron County and Harding County. Based on Chavez et al. (2005), this project aims to compare counties both within and outside of the wolf reintroduction area to understand how, or if, these variables influence the attitudes of stakeholders. This knowledge can be used in the Mexican gray wolf reintroduction project, as gaining the support and trust of the social system and involving the local community is central in creating a positive reintroduction atmosphere (Kleiman 1989). Understanding the reasons and influences behind stakeholder attitudes will allow for successful problem solving and facilitate wolf and other carnivore reintroductions in the future.

1.2 Research Question

- How do geography and personal experience affect individual attitudes and perceptions of the Mexican gray wolf reintroduction?

Chapter 2

Background

2.1 Species Description and Historic Range

Mexican gray wolves are the smallest and most distinct of the North American gray wolf species, with a length of about five and one half feet from head to tail, and a weight between fifty and eighty pounds (AGFD 2012). Their coat has unique colorings, including buff, rust, tan, and black colors, distinguishing them from their northern relations. Historically, the Mexican gray wolf occupied the mountainous regions from central Mexico, through southeastern Arizona, southern New Mexico, and southwestern Texas (USFWS 2012). They live in complex, extended family groups which consist of a mated pair and their offspring; in total about three to five wolves per pack (AGFD 2012). Mexican gray wolves rarely live to be ten years old, with about a forty-five percent mortality rate for yearlings and about a ten percent mortality rate for adults. For their survival, wolves require a territory of anywhere from 150-250 square miles (depending on prey density), ungulate prey, and "human-caused mortality rates that are not excessive" (U.S. Fish and Wildlife Service 2011). These requirements were, and still are, being taxed by the sprawl of people and food production areas. In fact, human-related activities such as gunshots and vehicle collisions account for the highest cause of mortality for reintroduced wolves (fifty-six percent) (USFWS 2012).

Each pack requires approximately 150-250 square miles for cooperatively hunting prey, which historically has consisted of elk, mule deer, and white-tailed deer (AGFD 2012). Today, scat analysis reveals that about seventy-five percent of their diet is elk,

eleven percent small mammals or unknown, and ten percent is deer. The additional four percent is livestock that graze in areas where wolves hunt. While this percentage is fairly small, in other areas where grey wolves coexist with livestock such as Minnesota, Montana, and Canada, wolves take an average of less than one-tenth of one percent (<0.1) of the available livestock (USFWS 2012).

Wolves also cause significant ecosystem effects. Because they are apex predators, they have the ability to change the types of plants and animals that are present considerably, a phenomenon known as a trophic cascade (Hairston et al. 1960). Through hunting, wolves limit existing prey populations. This actually reduces the overall stress of prey populations by keeping populations within the capacity of the habitat to support them, which in turn enhances the health of prey animals, resulting in good reproductive and survival rates in the population (AGFD 2012). Through limiting ungulate populations that feed on certain types of infant trees, wolves may also have the ability to stimulate tree growth in particular areas (Leopold 1944).

2.2 Historical Interactions between Colonists and Wolves

Coming from Europe, new settlers to the Americas did not have much experience with large carnivores as many of them such as bears and wolves had already been hunted almost to extinction in Europe. Wolves were "especially despised" as they were "viewed as a threat to personal safety and an impediment to progress and civilization" (Kellert et al. 1996, 978). This last part is essential. It represents the application of European cultural values, namely the Christian ethic of subduing and becoming master of the land and the new American landscape (Cronon 1983). These values are employed throughout the history of the United States as an excuse to remove wild and uncontrollable elements

from the land. It positions humans and human interests as above nature, which is reflected throughout the history of human-wolf interactions (Lopez 1978).

Early European-American settlers expressed this ethic by expanding into the frontier and subduing wild places and creatures, reflecting the "moral duty" to "dominate the land and transform it for economic use" (Kellert et al. 1996, 978). This subjugation was not just of wolves, but of many large native species encountered on the Manifest Destiny march West (Dunlap 1998). Buffalo were slaughtered indiscriminately, along with other ungulates such as antelope and deer. Initially, because the settlers tended to leave the carcasses of the animals where they shot them, this wholesale slaughter allowed wolves to flourish as there was an abundance of food (Dunlap 1988). However, when wolves turned their attention to the domestic animals such as cattle and sheep that replaced the large game herds, livestock owners took notice and began the steady decimation of the wolf populations (Lopez 1978).

By the time that cattle ranching operations became big-business in the West, ranchers were blaming more and more of their problems on the wolf. While other predatory animals such as bobcats, coyotes, and mountain lions caused problems, none seemed to insight the rage that wolves did. Lopez (1978, 180) notes that "the wolf was not the cattleman's only problem. There was weather to contend with, disease, fluctuating beef prices, hazards of trail drives, and the cost of running such enormous operations…but more and more the cattlemen blamed any economic shortfall on the wolf." This native predatory animal became a scapegoat for the ranchers.

Due to this attitude, bounties for dead wolves soon became common. Montana, the "center of the cattle-raising industry in the northern plains in the late nineteenth

century," passed a law in 1884 offering "one dollar for a dead wolf" (Lopez 1978, 181). Similar wildly successful laws were in effect in the Dakotas, Wyoming, and Colorado. Clearly, a nation that wanted to eat beef had to control predation, but as Lopez (1978, 180) notes, "it didn't have to, as it did, kill every last wolf." People were fanatic over ridding the land of these animals, which they viewed as "possessing little ecological, recreational, or ethical value" (Kellert et al. 1996, 980). Wolves were "trapped, shot, clubbed, and poisoned by private individuals and government agents" (USFWS 2012). Over the late nineteenth century and most of the twentieth century, the ranchers became too successful at controlling the wolf population, and became a major cause in their near extinction.

2.3 Wolves and the Endangered Species Act

By the mid-late twentieth century, wolf populations had nearly disappeared (Dunlap 1988). These dramatic reductions of populations in the United States were due in part to a tandem assault of local and federal laws. Local laws, such as the previously mentioned bounty law in Montana, were complemented by federal legislation, such as the 1915 law authorizing the "Bureau of Biological Survey to eliminate the remaining wolves and other predators" (Ripple and Beschta 2005, 614). Because of these long term attacks on their populations, wolves were in dire need of legal protection.

Due to a new environmental ethic that developed in the 1960s and 1970s, the general population began to realize an aesthetic and intrinsic, not just economic, value in animals and land. This led to passing the Endangered Species Act (ESA) in 1973 under President Richard Nixon. The ESA "provides a program for the conservation of

threatened and endangered plants and animals and the habitats in which they are found" (Endangered Species Act of 1973).

Shortly after the ESA was introduced, people realized wolves were severely endangered. Therefore, in "1974 the United States Fish and Wildlife Service (USFWS) protected wolves in the contiguous United States under the Endangered Species Act" (Chavez et al. 2005, 517). Mexican wolves were added in 1976 (USFWS 2012).

Normally, under the ESA, endangered animals and their habitat are protected from any 'taking,' as in harassing, capturing, or killing the animal. In an attempt to recover the Mexican gray wolf, the USFWS has undertaken reintroduction of the species into parts of their historic range, and in those areas the Mexican wolf is currently listed under the ESA as a non-essential, experimental population under section 10(j) (AGFD 2012). Experimental populations are deemed as either essential or non-essential to the continued existence of a species, a provision added by Congress in 1982, to allow for greater flexibility during restoration efforts. As the Mexican wolf is listed as non-essential, limited taking of individual animals can be authorized in specific situations, thus allowing the USFWS to respond to certain needs of the reintroduced species and address concerns of the local citizens (AFGD 2012). If a wolf is found to be continuously harassing livestock, the problem wolf can be moved immediately without any further permitting.

2.4 Reintroduction Efforts

In order to facilitate reintroduction, a bi-national captive breeding program was established with several wolves trapped in Mexico between 1977 and 1980, creating three known pure lineages of the Mexican wolf, those of McBride, Ghost Ranch and Aragon.

Geneticists have verified that each of the three lineages consist of purebred Mexican wolves (AGFD 2012). Once raised, a soft release is undertaken, involving several steps to transition the wolves from their captive environment to the wild. Wolves switch from acclimation pens, to caged areas in the wild, to full release into the wild. All adult wolves are fitted with radio collars prior to their transfer to acclimation pens. During an acclimation periods, the wolves are fed road-killed native prey. Once released at the appropriate time, wolves are monitored closely and supplementally fed for one or two months until it is apparent that they are hunting on their own. Reintroduced wolves generally demonstrated ability for wild behavior, including killing wild elk, within three weeks of the release of the first wolf pack in 1998(AGFD 2012).

The first releases took place in 1998 in the Blue Range Wolf Recovery Area (BRWRA, Figure 2). This area is carved out of the Apache portion of the Apache-Sitgreaves National Forests and the Gila National Forest in west-central New Mexico. It has a large, multi-species native prey base, is resilient to drought, and contains over 6,000 square miles of habitat within the historic range for wolves to colonize (AGFD 2012). The primary recovery zone is in the Apache-Sitgreaves National Forests, and from there wolves are allowed to disperse into the secondary recovery zone in both the Apache-Sitgreaves and the Gila National Forests of New Mexico. They are ultimately expected to re-colonize the entire BRWRA. Experimental wolves outside the recovery area are relocated (AGFD 2012).

Currently, about seventy wolves are free-ranging in Arizona and New Mexico (including the pups born in 2012) with approximately eleven distinct packs. Wolves with telemetry collars are located on a once-a-week basis to determine movements. The

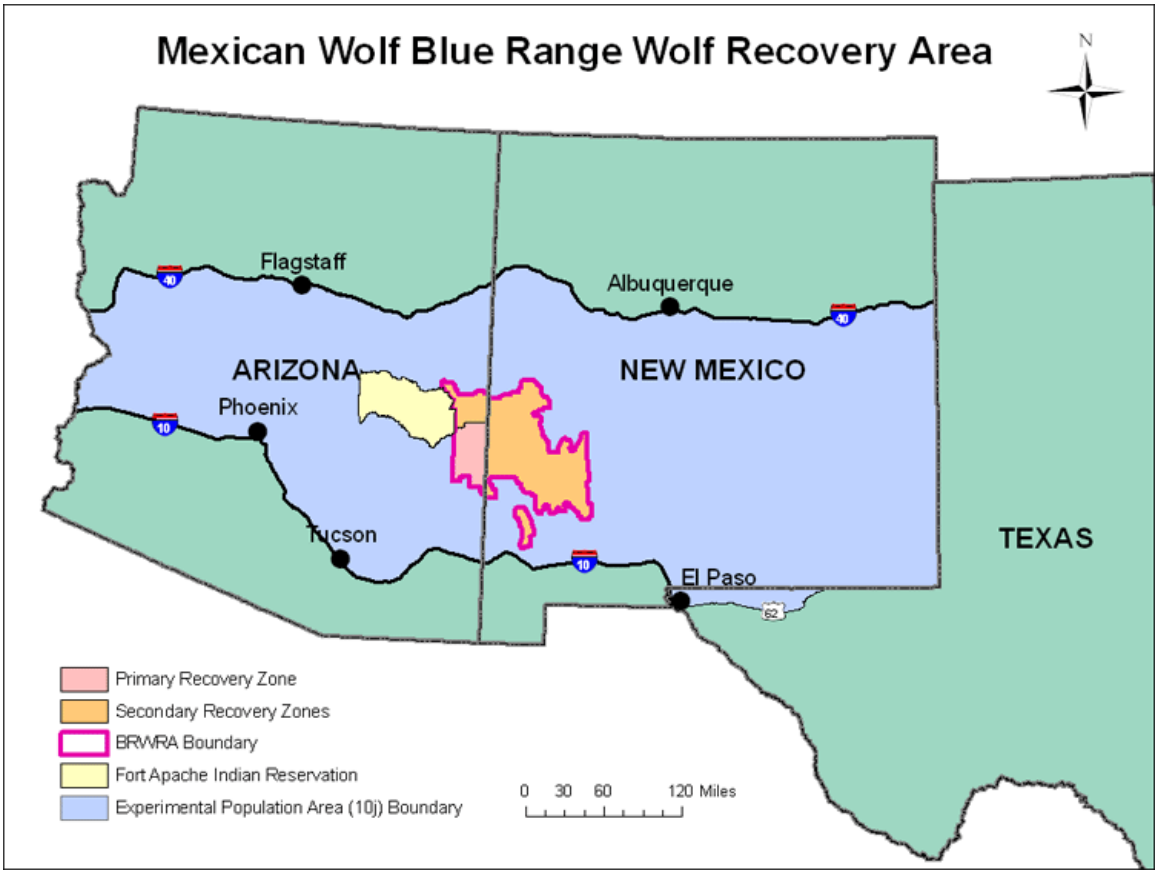

Figure 2: Blue Range Wolf Recovery Area. Source: New Mexico Federal Lands Council, 2010

summer of 2011 found thirty four pups documented in seven of the packs (AFGD 2012). Unfortunately, many of these pups will not make it past the first year, due to the aforementioned high yearling mortality rate.

2.5 Current Issues

Conflict between wolves and humans make up many of the current issues pertaining to wolf reintroduction. Wolf reintroduction is a politically charged issue, with concerns revolving around human interaction, livestock conflict, and removal of trouble wolves (Jule at al. 2008; Carroll et al. 2003). Human issues center on the "'wildness'" of wolves raised in captivity, how wolf reintroduction will affect a person's livelihood, safety concerns, and recreational concerns (Oakleaf at al. 2003; Clark at al. 1996). To assuage worries about '"wildness"' and human safety concerns, the Arizona Game and Fish Department (2012) emphasize that the "primary characteristics used for selecting Mexican wolves for reintroduction is avoidance and fear of humans" and that "wolves that have the potential to be released must not be socialized or habituated to humans, so they are not likely to be attracted to people or human establishments once released". Under the rules of the reintroduction program, a person may kill, injure, or harass a wolf in defense of a human life, as long as the action is reported within twenty-four hours (AGFD 2012).

Livestock predation is perceived to be one of the biggest issues with wolf reintroduction. Approximately ninety-five percent of the reintroduction area for Mexican grey wolves is public land leased by the federal government to private ranchers for grazing land for their livestock. As previously mentioned, livestock depredations by Mexican wolves is minimal. While the private organization Defenders of Wildlife

previously provided remuneration to ranchers in the cases of proven wolf depredation, the program was ended in 2011 to instead focus efforts on promoting cooperation between ranchers and wolves (USFWS 2011). The federal government does not pay direct compensation to the rancher if cattle depredation occurs; instead they have focused their efforts on promoting a sustainable relationship between ranchers and wolves.

That is not to say that "problem wolves" that kill or harass cattle do not exist. Prior to 2010, USFWS Standard Operating Procedure 13 (SOP 13) was in place to deal with these unmanageable wolves. SOP 13 mandated killing or permanently removing any wolf involved in three livestock depredation in one year (USFWS 2012). However in 2010, the Western Environmental Law Center (WELC) brought litigation against the USFWS successfully challenging the three strikes rule as contrary to the broader interests of the US government in violation of the ESA. Challenges to this ruling were, and will continue to be made by livestock producers and others, as the interactions between humans, livestock, and wolves continue.

As evidenced by historical and modern conflicts between wolves and human populations, this body of work is situated within environmental geography. Aldo Leopold (1944) noted the connection between wolves and the environment; that wolves as apex predators had a significant influence on the entire ecosystem. With the expansion of the frontier, humans reshaped the ecosystem to exclude wolves (Lopez 1978), thus greatly shifting the landscape (Cronon 1983). Because this work examines issues revolving around human and environmental views and interactions, along with the spatiality of phenomena, it can be categorized as environmental geography.

Chapter 3

Study Area

This study encompasses Catron and Harding Counties in New Mexico (Figure 3). Catron County contains a large section of the BRWRA, and the people who live there deal with the realities of wolf reintroduction on a day to day basis. Harding County is on the opposite side of the state, has no chance of dealing with wolf reintroduction issues, and acts as a control population for purposes of the study. The two counties share strikingly similar demographic and occupational characteristics.

3.1 Harding County

Harding County is located in north-eastern New Mexico. Its terrain consists of vast plains, mesas, grasslands, rivers, canyons, and pine forests. It contains a significant amount of public land, as it is home to a section of the Kiowa National Grassland (Harding County 2012). With a total land area of 2,125 square miles, it has an extremely low population density of only 0.3 people per square mile (US Census 2012). While the county seat is located at Mosquero, the largest town is Roy, with a population of 234 people (Harding County 2012). Almost eighty-seven percent of the population is white, with 47.2 percent women and 53.8 percent men (US Census 2012). Occupations are dominated by mining, cattle ranching, and farming, as Harding County contains one of the richest sources of liquid carbon dioxide in the world and raises approximately 50,000 beef cattle each year (Harding County 2012). The county was first created by the state legislator and named for Warren G. Harding on March 4, 1921, the same day that Mr. Harding was inaugurated the twenty-ninth president of the United States.

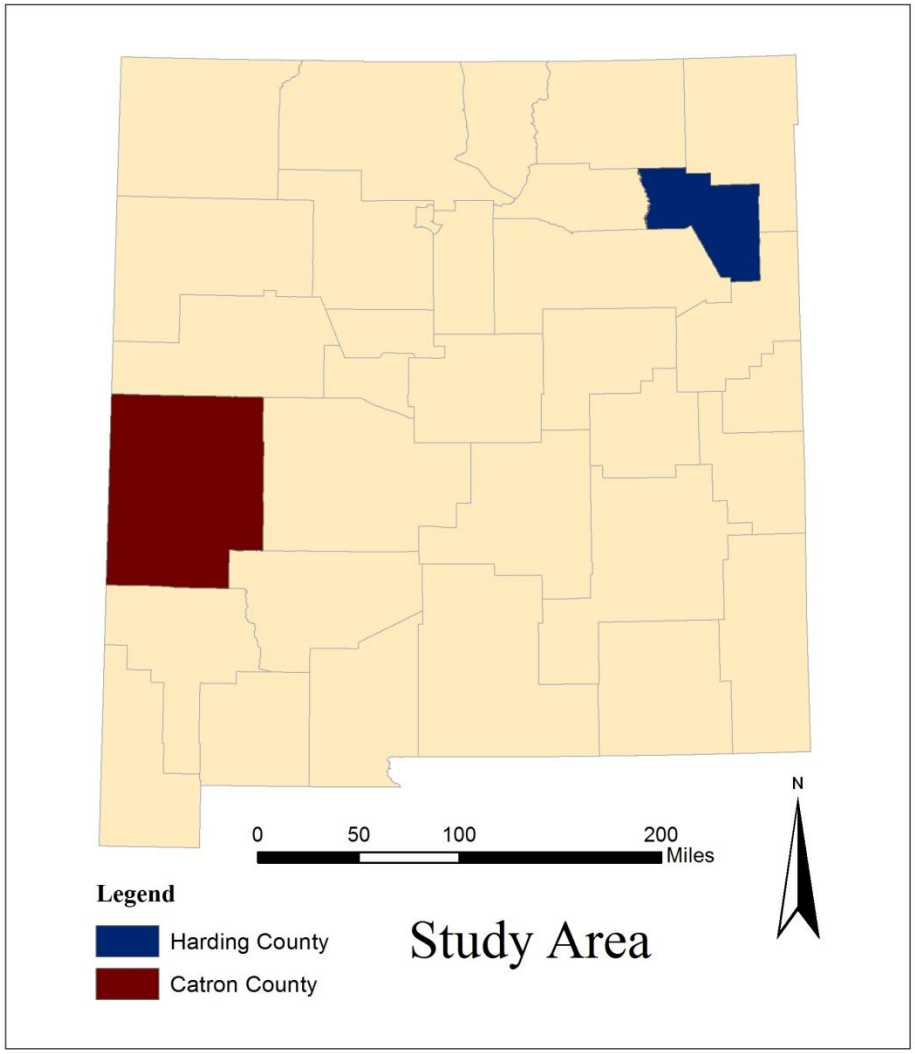

Figure 3: Study areas. Source: U.S. Census 2013.

3.2 Catron County

Catron County is located in west-central New Mexico. It consists of mostly rugged, mountainous terrain characterized by narrow canyons, rocky formations, and evergreen forests (Catron County 2012). Catron County is made up of nearly eighty percent federal land, being home to the Gila National Forest, the Apache National Forest, and the Cibola National Forest. The county has a total land area of 6,923.69 square miles, with an extremely low population density of 0.5 people per square mile (US Census 2012). The county seat of Reserve is the largest town, with 380 people (Catron County 2012). Almost ninety percent of the population is white, with 47.7 percent women and 53.3 percent men (US Census 2012). Similar to Harding County, dominate economic activities include ranching, farming, and logging. Ranches contain about 35,000 cows across the 4.4 million acres of public and private land, where they roam largely unattended (Dougherty 2007). Catron County was established as a county by the New Mexico State Legislature on February 25, 1921. The County is named after a famous attorney and Santa Fe political leader, Thomas B. Catron, and is the largest county in land size in the state of New Mexico. However, as represented by its population density, it has the third smallest population of any New Mexico county (Catron County 2012).

These two counties created within just a few months of each other share comparable characteristics. Although Harding County is one of the smallest counties made up generally of grasslands and pinion forests, and Catron is one of the largest with rugged mountains and evergreens, their common demographic and occupational attributes make them comparable. People living in these two counties should share similar life experiences, with the exception of dealing with the wolf reintroduction

program. Because of their commonalities, these two counties provide an opportunity to examine the influence of geographic location and personal experience on attitudes and perceptions regarding wolf reintroduction.

Chapter 4

Literature Review

This research draws from the literature on carnivore reintroductions, stakeholder issues, and attitudinal studies towards Mexican gray wolves in New Mexico and Arizona. The first section deals with carnivore reintroductions, explaining what difficulties and successes exist in other reintroduction projects. Next, stakeholder issues are discussed, elaborating various types of stakeholders and describing how understanding their concerns is essential to a successful outcome. Finally, the literature on past stakeholder research surrounding the Mexican gray wolf in both New Mexico and Arizona and what my project will contribute to this body of literature is considered.

4.1 Carnivore Reintroductions

Animal relocations or reintroductions commonly occur to solve human-animal conflicts, supplement game populations, and support conservation efforts (Fischer and Lindenmayer 2000). Wolf and other carnivore reintroductions are difficult due to the predatory nature of carnivores and their habitat requirements. These characteristics caused initial decline of carnivorous populations with the expansion of humans into their territory, and currently make reintroductions challenging. Today, stakeholders from cattle ranchers to outdoor enthusiasts to environmental managers each have a range of concerns, ranging from economic to ecological, related to why a particular species should or should not be reintroduced to its native habitat.

Carnivore reintroductions are occurring all over the world (Fischer and Lindenmayer 2000). Examples include the reintroduction of the wolf and the grizzly bear

into North American habitats, the African wild dog in South Africa, jaguars, pumas, and coyotes in El Salvador, and others that have been attempted with varying degrees of success (Maguire and Servheen 1992, Bangs and Fritts 1996, Lindsey et al. 2005, Theberge et al. 2006, White et al. 2008, Campbell and Alvarado 2010,Yarkovich et al. 2011). Both ecological and social issues interact to determine the outcome of a carnivore reintroduction.

Reintroductions can entail moving members of an existing wild population to inhabit a new territory or introducing captive animals to the wild. Complications arising from these actions can be numerous. For example, Jule et al. (2008) note that previously captive animals have a reduced ability to survive in the wild due to a lack of hunting or forging skills, social skills, and disease resistance that is normally found in their wild relatives. Additionally, many carnivores such as bears spend a great deal of time in their childhood learning social behavior and survival techniques from their mothers; a process which can be severely interrupted by prolonged captivity (Huber 2010). Also at issue is an unnatural trust of humans developed by captive animals, which can be problematic as the boundaries between wildlife areas and human-use areas become more entwined (Jule et al. 2008). Some of these behaviors can be mitigated by executing a soft-release, which involves both pre-and post-release conditioning, or pairing up a captive bred animal with a wild caught animal to help with training (Kleiman 1989). Life history and behavioral characteristics of carnivores complicate the reintroduction process.

Habitat needs of carnivores pose further issues. Carnivores generally, and wolves in particular, are susceptible to habitat fragmentation and the presence of human-made obstacles (Carroll et al. 2003). A substantial habitat suitability analysis of territory for

reintroduction should not only identify necessary components for survival of the species such as prey and water availability, but also areas that are as continuous and undisturbed as possible. Even in the face of excellent analytic techniques, it should be recognized that simply because an area appears suitable in models does not mean that reintroduction will be successful. In suitability analysis for reintroduction of Florida Panther, for example, some areas deemed to be excellent habitat per GIS analysis were already avoided by existing panther populations (Thatcher et al. 2006). This demonstrates a layer of unforeseeable complexity when attempting reintroductions.

In addition, when dealing with reintroductions of threatened or endangered species, the biological requirements are often difficult to fulfill due to a relatively small amount of genetic material (Hedrick and Fredrickson 2008). In reintroduction cases where populations need to expand their genetic material with wild animals, fragmented habitat can prevent them from diversifying (Maguire and Servheen 1992).

To complicate the situation further, the social phenomena that initially caused the decline of carnivores such as livestock ranching, hunting practices, and cultural values still exist today (Clark et al. 1996). Carnivore reintroductions face an uphill battle against these existing values and practices. Studies suggest that carnivore reintroduction cannot succeed without the cooperation of the social system, which includes gaining the support of local and national governments, non-governmental organizations (NGOs), and the public (Kleiman 1989). To gain the support and trust of the social system is central in creating a positive reintroduction atmosphere. Involving the local community and providing educational material on the reintroduced species is essential, and long-term involvement of stakeholders is needed (Kleiman 1989). Clark et al. (1996) suggest that

interdisciplinary work, from sociology, economics, and ethics need to be considered in management plans and complex factors such as fear of economic loss, loss of property rights, and other social factors need to be tracked and mapped so they can be better understood by all parties.

Carnivore reintroductions are multifaceted, containing a complex suite of biological and social problems that are equally important. This project examines the social side of the equation, by investigating what public perceptions are and how they are influenced. While a transition from overall negative attitudes to overall positive attitudes towards carnivores has occurred over the past several decades, increased attention to public attitudes is necessary (Clark et al. 1996).

4.2 Stakeholder Issues

Collaborative processes involving stakeholders drive the reintroduction process, determining how a project is formed, how it functions, and what outcomes are determined to be successful or in need of adjustment (AMOC 2005). Because carnivores require specific habitat that often conflicts with other land uses, stakeholders advocating for and against reintroduction must be included in the collaborative process (AMOC 2005). Stakeholders in carnivore reintroduction plans can include a variety of federal, state, county, and local governing organizations along with NGOs and other lobbying and advocacy groups. The general public, who are not necessarily part of a formal organization, should also take part in the collaborative process, as their opinions and actions can make or break even the best laid management plan (Clark et al. 1996). Project administrators should be focused on finding the common ground between stakeholder groups to encourage maximum opportunity for the project to succeed (Walsh 2009).

As previously stated, numerous different types of stakeholders exist with vastly different reasons for participating in the collaborative process. Cattle ranchers are often an important component, as their animals may graze on federal lands where carnivore reintroduction programs are taking place, as they do in Catron County. These ranchers worry that their economic livelihood will become prey for the reintroduced carnivore, whether it is a wolf, bear, or other predator. In regards to wolf populations, this worry is ill-founded. Numerous studies have shown that worldwide, wolves contribute less than two percent of livestock kills in a given year, with coyotes and domestic dogs causing far more cattle deaths (Bergstrom et al. 2009). In the BRWRA, seventy-nine percent of all cattle depredations are caused by mountain lions, with bears, coyotes, and wolves accounting for the other twenty-one percent (Breck et al. 2011). Supporting evidence is from analysis of scat taken from the New Mexican Wolf Recovery Area over several years which revealed that calves are secondary prey to elk and deer and consisted of a relatively small portion of wolf diet (Reed et al. 2006). Further studies of wolf-cattle interactions in Idaho showed cattle as a secondary prey item, killed opportunistically with infrequent predatory interactions (Oakleaf et al. 2003).

Even though cattle do not constitute a primary prey item for wolves, predator presence is found to influence how cattle and other ungulate prey animals behave (Muhly et al. 2010; Laporte et al. 2010). While both wild and domestic prey responded variably to wolf presence depending on the terrain or hunting method, cattle still demonstrated signs of stress, including weight loss, reproductive failings, and injury (Laporte et al. 2010). Between deaths and instinctual response to wolf presence, ranchers may feel threatened by the wolf and perceive that it is causing the majority of their problems, as

they have historically (Kellert et al. 1995). This information is relevant because ranchers who initially had negative feelings toward wolf reintroduction due to misconceptions about the amount of cattle lost to wolves may have come to the realization that the amount of cattle depredations that have occurred in the last decade has not significantly increased. Conversely, they may continue to have negative feelings due to changes in cattle health and behavior in predator presence (Laporte et al. 2010). Since reintroduction of Mexican wolves, continued monitoring is necessary to obtain information on ranchers' perceptions and why they take that particular stance.

On the other side of the carnivore debate are environmental advocates, who note the many beneficial effects of carnivore reintroduction. When reintroduced in areas with low aspen or willow recruitment such as the Greater Yellowstone Area (GYA), wolves appear to be partially responsible for causing a trophic cascade through naturally culling large elk herds or significantly changing elk behaviors (Beschta and Ripple 2009). Through reducing the elk browsing on immature trees, aspen and willow recruitment has increased (Kauffman 2011; Beschta and Ripple 2009). Although others posit that wolf reintroduction has only moderately impacted aspen regeneration and that factors such as hunting and elk predation by other carnivores are equally important, wolves will surely have a greater impact in the future on these ecosystems as their populations further recover (Kauffman 2011; Kimble 2011).

Clearly, conflicts exist between what is potentially healthy for the habitat and what is perceived as bad for the economy. Cattle and hunting lobbies in states such as Wyoming and Idaho are often politically powerful and have the ability to promote policy and regulations that could reduce wolf protection and cause significant decrease in wolf

populations (Bergstrom 2011). As lobbying and advocacy agencies can overstate the positions of their constituency, it is important to go to the individual level to note what issues people are concerned about and why they are concerned with them. For successful reintroduction, continued understanding and evaluation of public opinion is necessary.

4.3 Public Opinion Polls Regarding the Mexican Gray Wolf Reintroduction

Social and political scientists agree that public opinion has an influential effect upon public policy (Burstein 2003). In Arizona and New Mexico, various evaluation methods have been used to determine public opinion of the Mexican gray wolf reintroduction, including personal interviews, telephone interviews, and questionnaires (Johnson 1990, Taugher 1995, Shoenecker and Shaw 1997, Biggs 1998, Williams et al. 2002, AMOC 2005, Beeland 2008).

The first of these studies was undertaken by Johnson (1990) during the planning for reintroduction. The survey sampled rural households, urban households, hunters, Defenders of Wildlife, and Game and Fish employees (Ibid.). The study took part in two phases, involving face-to-face and telephone interviews with 726 rural and urban residents and mail-in surveys sent to 3,221 individuals including those of special interest groups and residents. Cattle associations, one of the most important stakeholders, opted out of the survey (Ibid.). This study showed that the vast majority (71 %) of Arizona residents was not aware that wolves had historically inhabited their state and sixty-one percent of respondents were positive about the possibility of reintroduction (Ibid.).

The next statewide survey was a poll commissioned by the League of Women Voters through Responsive Management of Harrisonburg, Virginia. This statewide poll revealed that over half the residents of New Mexico, including those living near the

reintroduction area supported the reintroduction program just a few years before initial reintroduction (Taugher 1995). A similar telephone poll was taken of Arizona residents living in Greenlee County, Arizona, located inside the Arizona wolf reintroduction area (Schoenecker and Shaw 1997). This study was undertaken in 1997 through choosing participants randomly out of the Greenlee County phone book. Results showed that fifty eight percent of respondents disapproved of reintroduction, twenty-two percent approved, and twenty percent had no opinion (Schoenecker and Shaw 1997).

A 2005 poll conducted through Northern Arizona University found that four out of five Arizona residents supported letting Mexican Wolves roam wider areas than currently allowed through policies, while a New Mexico State University thesis surveying public opinion on Mexican wolf reintroduction found overall support throughout the state, although it did vary by region (Biggs 1998, Williams et al. 2002).

Most recently, a 2008 University of Florida thesis looked at attitudes towards wolves exclusively in Catron County, but focused on particular interest groups, such as ranchers, government employees, and wolf conservationists. Also, instead of telephone polling or surveying, the author used in-depth interviews to look specifically at information sources, beliefs, and values of these interest groups in regards to the Mexican gray wolf (Beeland 2008).

Building on this previous work, this research aims to understand what effects geographic location and personal experience have on attitudes and perceptions of the stakeholders towards wolf reintroduction, a component that is not discussed in other studies. While using a study area that Beeland (2008) uses in her work, this research goes

about data collection in a different way and use a comparative framework to ascertain the specific influence that geographic location has on perceptions.

Research studying these factors in other locations has suggested that reaction to carnivores vary by age and geographic location, with conflicting human interest determined to be the major source of human prejudice against carnivore reintroduction (Nilsen et al. 2007; Lindsey et al. 2005; Chavez 2005, Williams et al. 2002; Schonecker and Shaw 1997). However, because of the continual debates around the Mexican wolf reintroduction program and its relative lack of success compared to other programs such as gray wolf reintroduction into Yellowstone, determining the attitudes and perceptions of the public and how those attitudes are shaped is vital. Continually updating information about public views and attitudes toward a reintroduction project is necessary for the success of the project and the survival of the species (Clark et al. 1996).

Chapter 5

Research Design

5.1 Methodology

Since 1998, much of the federal, tribal, and private land in the western areas of the state bordering with Arizona has been bookmarked as the BRWRA, whereas the central and eastern sections of the state remain wolf free. To assess the question of geographic proximity and personal experience on attitudes towards wolves, I looked at two counties in New Mexico, one contained by and one outside of the BRWRA. Catron County is well within the BRWRA, while Harding County is situated on the opposite side of the state, far away from wolf reintroduction issues. These two counties have similar demographic qualities including that of occupation and population density, making them a reasonable comparison. I hypothesized that, other factors being even, geographic proximity to the reintroduction area will have a significant effect on public perceptions of wolf reintroduction.

Loosely following methodology set out by Chavez et al. (2005), I created a survey instrument, mailed out survey packets, digitized responses to the survey, and analyzed data. In creating a survey instrument, I relied heavily on questions supplied directly by Chavez et al.'s research that took place in Minnesota on attitudes towards wolves (2005). However, their questionnaire did not get to some of the important issues of why people had a particular attitude, so it was supplemented by short response questions dealing with people's experience with wolves and the reintroduction program and what effect those experiences had on them. These questions were based on Beeland (2008) who dealt with key stakeholder perceptions of Mexican gray wolf reintroduction in New Mexico through

semi-structured interviews. Through identifying applicable questions and issues found in these interviews, I crafted a questionnaire that applied to my study. The questionnaires were divided into sections by subject, with both close and open ended questions. While surveys were returned without identity information to maintain confidentiality, each survey was numbered in the right hand corner in order to identify which study site they came from. The survey also covers basic demographic information along with questions about wolf reintroductions.

Study subjects from residents of Catron County and Harding County were randomly selected by choosing names and addresses from telephone books for each county. For Catron County, a random number generator was used to select 300 numbers corresponding to a particular page found in the Catron County phone directory. Then 300 more numbers were generated to correspond with a particular person on that page. In the event that an entry did not have an address, another set of numbers was generated. This process was customized and repeated for the Harding County phone directory. Several limitations of using this method to choose study participants exist, including that the sample is limited to people who have a land line and are listed in the phone directory. Also, not all people who have their phone numbers listed had a corresponding address listed; many of those who had an address did not have the correct address. This reduced the number of people who could be included in the sample.

After accounting for subjects that did not have a correct address, the sample total came out to be 281 residents from Catron County and 233 residents from Harding County. Surveys were delivered through the mail, along with a corresponding cover letter, consent form, and a self-addressed business reply envelope (Appendix A, B).

Following Chavez et al. (2005), instructions indicated that the adult member of the household that most recently celebrated his or her birthday fill out the questionnaire so as to reduce the potential for gender biased results.

Study subjects were given two months to reply, after which responses were no longer taken due to time constraints. In total, 94 responses were received from Catron County and 47 responses were received from Harding County. A total of 4 surveys were returned with the county identifier removed so they were omitted from the study.

5.2 Analysis

Survey results were digitized and put into Excel spreadsheets. Quantitative data were analyzed using the Excel statistical package and IBM SPSS statistics, which is a statistical package designed for social sciences. The Mann-Whitney U-Test was used to determine if a significant difference in answers existed between the two study areas. This test is used for non-parametric ordinal data. Logistical and linear regression models were run to determine correlation between variables. Linear regression was used when data had numerous variables, such as looking for relationships between age and level of agreement with wolf reintroduction, and logistic regression was performed when the dependent variable was categorical and binomial, used when comparing gender to level of agreement with wolf reintroduction. For linear regression, r^2 values were determined in Excel while SPSS was used to determine r^2 values for logistic regression. R^2 values tell how much variation in the one variable is caused by variation in the other variable. Level of education, location where people were raised, if people raised livestock, gender, and age were all correlated via aforementioned methods with the level of agreement with

wolf reintroduction determined by the first question of the questionnaire. Figures and charts were generated using Excel.

For open ended survey questions, I used online text analysis program DiscoverText to code and organize main ideas and thoughts within the written responses to help understand the attitudes and perceptions of stakeholders toward the wolf project. In my qualitative data analysis, I used the process of Systematic Text Condensatio; a process described by Malterud (2012) to assist, in particular, novice researchers with maintaining methodological rigor in this somewhat subjective process.

Systematic Text Condensation (STC) involves four distinct steps (Malterud, 2012). The first step is to recognize and create themes found throughout the data set. Next, the researcher is to move from themes to codes, or units of text that represent the general idea of a larger block of text. The third step is to condense codes into meaning. This involves creating reports and other tools that state exactly what the research signifies. Finally, these ideas are synthesized into generalizable concepts. While debates have risen on how generalizable, and thus how valuable, qualitative data actually is (Baxter and Eylest 1999), Wainwright (1997) notes that qualitative research findings can extend beyond the initial study to inform on broader social relations and phenomena. These findings on social behavior are important in situations where cultural values could determine the success or failure of a project, such as the Mexican gray wolf reintroduction project or other carnivore reintroduction programs taking place.

To apply STC to my data, I first read through all responses received and recognized themes found throughout the data. From these general themes, I created two codebooks. The first codebook included codes that represented the short response

questions asking about general topics regarding wolf reintroduction and people's experiences with wolf reintroduction and the further comments section (Appendix C). The second codebook represented text found in background information on respondents (Appendix D). Using DiscoverText, I created datasets for each qualitative question for both counties and coded each answer using my codebooks. One example of this process is taken from question 1a, where respondents were asked to give a reason if they disagreed with wolf reintroduction in New Mexico. Responses such as "Wolves have killed or crippled a large number of valuable livestock as well as game animals" and "Because of the price tag and death of livestock" were coded in the Economic Concern category, while responses such as "They are dangerous" and "People are not safe to enjoy the woods anymore" were coded under Safety Concern. I then created reports which essentially quantify the qualitative data, allowing me to figure out if and how people's attitudes, perceptions, and experiences varied between the two study areas. These findings contributed to drawing broader conclusions not only on whether personal experience with the wolf reintroduction project affects attitudes and perceptions about the project but also the reasons behind people's thoughts and behaviors. These findings were inserted into Excel for further graphic analysis and comparisons.

Chapter 6

Results

6.1 Study Population

Returned surveys represented 5.26% of 1,786 households in Catron County and 15.67% of 300 households in Harding County (n= 94, 47). Overall response rate was 33.45% from Catron County and 20.175% from Harding County. Males made up the majority of respondents in both study areas, with 65% male respondents in Catron County and 70% male respondents in Harding County. Average age and education levels of respondents were slightly higher than the actual average for both counties (Table 1). Age differences were relatively small. The average age in Catron County is 55.8 (U.S. Census 2012), while in my study the average age was 62.3. Harding County produced similar demographics, with average age of the county being 55.9 (U.S. Census 2012) and study respondents average age being 61.22.

While age differences were minimal, respondents tended to be more educated in general that the average for the county. For example, in Catron County 96% of respondents completed high school or above and 37% completed a bachelor's degree or above, with the actual average being 86% completion of high school or more and 18.8% completion of bachelor's degree (U.S. Census 2012). In Harding County, the numbers are similar with 89.3% of respondents completing high school or more and 40% completing a bachelor's degree or more. Actual averages for Harding County are slightly lower, with 88.4% completing high school or more and 16.3 % completing a bachelor or more. Significant differences also existed in birth place of subjects; a significantly higher number of people in Catron County were born in a large city than in Harding County.

County	Catron County	Catron County Respondents	Harding County	Harding County Respondents
Percent Male	52.30%	65%	52.80%	70%
Average Age	55.8	62.3	55.9	61.22
Percent Completed High School or Above	86%	96%	89.30%	88.40%
Percent Completed Collage or Above	18.80%	37%	16.30%	40%

Table 1: Comparison of survey respondent demographics to the demographics of their resident county. Source: U.S. Census 2012.

While this is a relatively small sample size and responses are skewed toward an older, more educated population, it is still possible to draw some important conclusions from data gathered, as responses still represent the opinions of people living in these areas.

6.2 Quantitative Analysis

Quantitative data analysis showed no significant difference in attitudes towards wolf reintroduction based on study area ($p=0.659$), thus rejecting my initial hypothesis. Both study areas disagreed with wolf reintroduction and demonstrated negative attitudes towards the project, with 67% and 66% strongly disagreeing with wolf reintroduction in New Mexico from Catron and Harding Counties respectively (Figure 4). Also, no significant difference existed between study areas on whether wolves were causing too much damage to New Mexico livestock industry ($p=0.340$); both study areas generally agreed that wolves were unacceptably damaging. Even when asked whether wolves would be acceptable if they did not cause much damage to livestock or wildlife, participants still felt negatively toward the reintroduction with no significant difference between study areas.

The next set of questions dealing with threats to rural ways of life and threats to the ranching business was one of the only areas in the questionnaire where some answers did significantly differ. In threats to rural ways of life, flooding, crop pests, crop diseases, and drought were found to be much more threatening to rural ways of life in Harding County than in Catron County. Also, coyotes, domestic dogs, bobcats, bears, and mountain lions were found to be considered more of a threat in Harding County than in Catron County (Table 2). These differences may be due to the difference between study areas in percentage of respondents currently raising livestock, with 74.46% in Harding

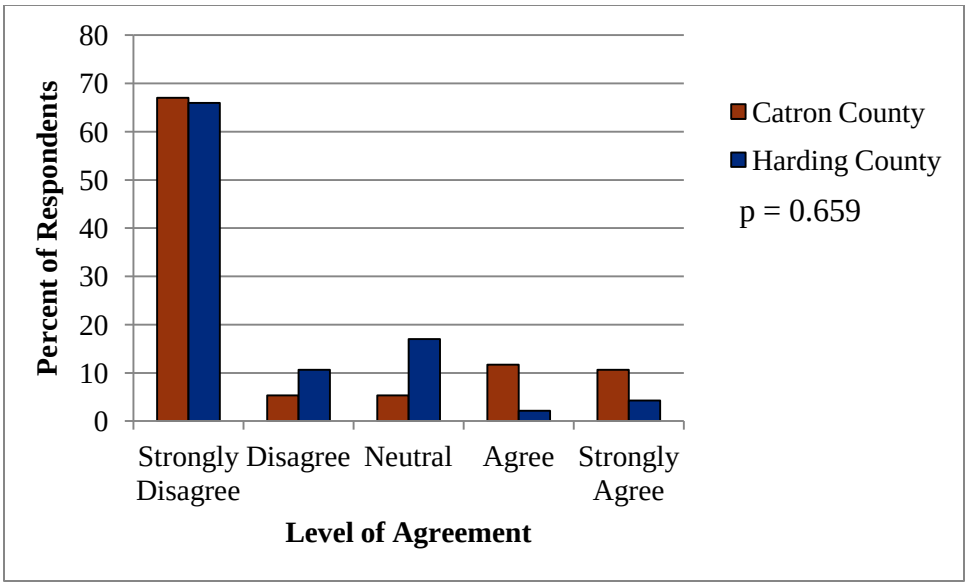

Figure 4: Responses to question: If you disagreed with the previous statement (referring to respondent support of wolf reintroduction) please explain why. No significant difference exists in level of agreement with wolf reintroduction between respondents in Catron County and Harding County.

Question 2		Question 3	
Threat	p-value	Threat	p-value
Flooding	0.002	Coyotes	0.00
Crop Pests	0.002	Deer	0.924
Crop disease	0.022	Moose	0.261
Market fluctuations	0.09	Wolves	0.38
Predators	0.257	Domestic Dogs	0.002
Livestock disease	0.179	Bears	0.011
Drought	0.005	Bobcats	0.052
Laws/Government	0.709	Birds	0.482
		Elk	0.803
		Mountain Lions	0.00

Table 2: Threats to rural ways of live and p-values denoting significant differences between counties in their perceived threat level.

County and only 32.99% in Catron County. This difference may also account for the fact that a significant difference occurred in how many wolf kills should be considered a serious risk to the economic livelihood of the farmer, with significantly more people in Catron County accepting a few occasional wolf depredations than those in Harding County.

Knowledge about wolves and wolf population varied between study sites; people in Catron County were generally more informed about wolves and wolf issues than people in Harding County. For example, 53% of people from Harding County replied "Don't Know" when asked the number of wolves in New Mexico and 6.4% of respondents from Harding County believed there to be greater than 500 wolves in New Mexico. In Catron County, about 88% of people knew the correct number of wolves present and only 3% thought there were between 100 and 500 wolves (Figure 5). Also, 84% of respondents from Catron County thought it was legal to shoot a wolf if they saw one while 65% of Harding County residents thought the same action was illegal. In all questions dealing with knowledge about wolves, between 19% and 40% of residents in Harding County answered that they did not know the answers to the questions, while only between 7% and 19% of Catron County recipients reported no knowledge in the same set of questions.

All other quantitative questions did not experience significant differences between study areas. This is important for questions such as 2h., which asked how recipients would rate laws and government as a threat to rural life (Figure 6). As Catron County was head of the County Supremacy Movement, it was important to establish whether a traditional distrust of government in this area played a role in the feelings toward the

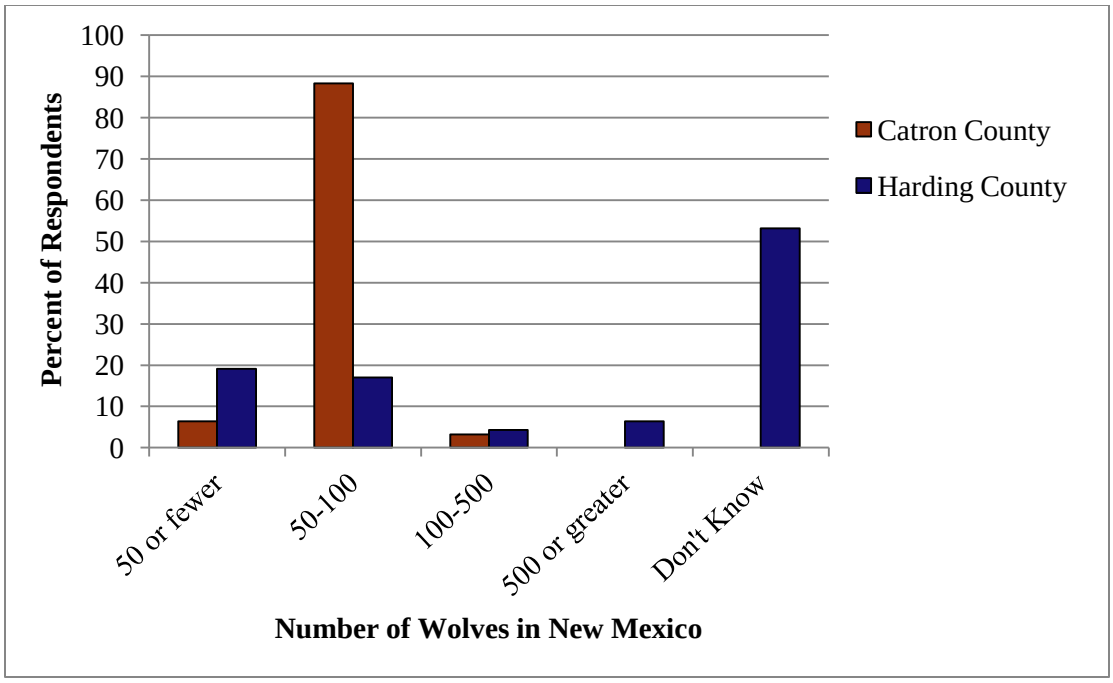

Figure 5: Percent of recipients and number of wolves they thought were present in New Mexico.

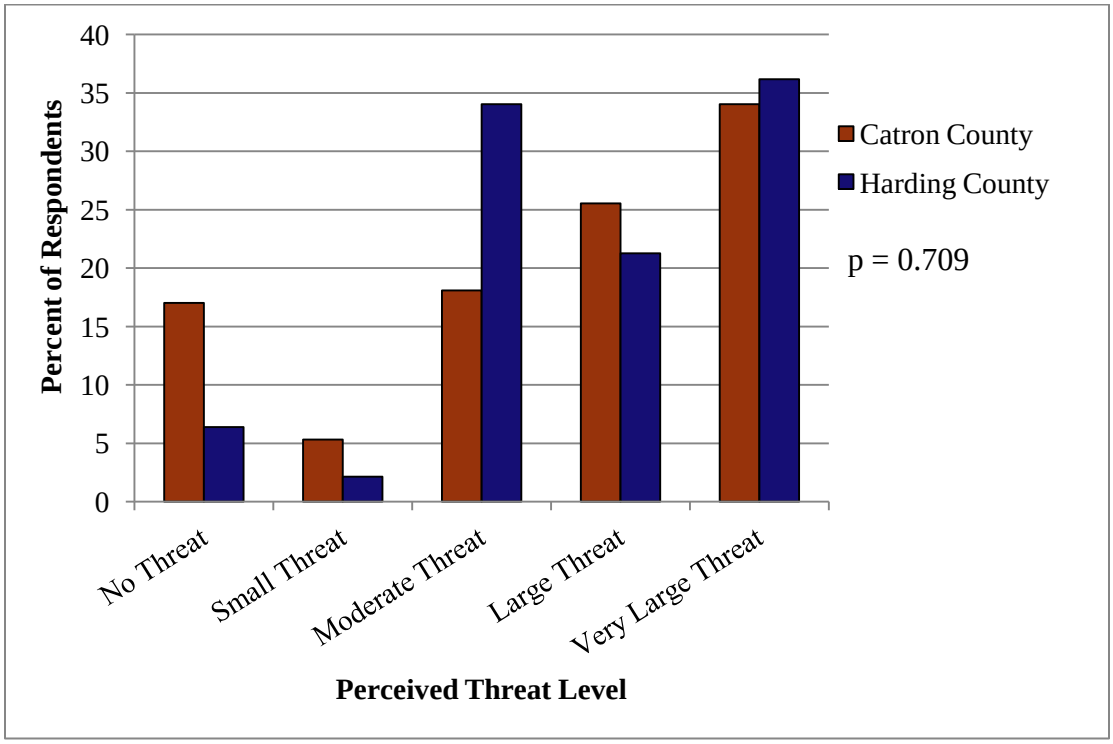

Figure 6: Perceived threat level of government to rural ways of life in New Mexico.

federally mandated wolf reintroduction (Coppelman 1997). As there was no significant difference between the study areas in this question (p=.709), it is safe to say that Catron County's history with the County Supremacy Movement does not influence its feelings toward the wolf reintroduction project.

In both types of regression analysis performed, r^2 values were extremely small, indicating extremely weak correlation between variables in both counties (Table 3). The strongest correlation between variables was found using logistic regression between respondents who raised cattle and the level of agreement with wolf reintroduction. For these variables, r^2= 0.167 in Catron County and r^2 = 0.288 in Harding County. In all other cases, the r^2 value was 0.06 or below.

6.3 Qualitative Analysis

While quantitative data tells us that people think similarly about wolf reintroduction in rural New Mexico, the qualitative results help explain *why* people think the way they do. Some responses are included in several coding groups, as the response represented more than one concern. The first qualitative question was part two of question one, asking people to explain their reasoning if they disagreed with wolf reintroduction in New Mexico. After coding and classifying their data, it became apparent that both people in Catron County and in Harding County disagree with wolf reintroduction mostly because of economic concerns and safety concerns (Figure 7). Closely following were environmental concerns, meaning generally that people worried about the perceived diminishing game populations.

	Gender	Age	Education Level	Location where raised	Raise Livestock
Catron County	0.008	0.008	0.012	0.048	0.167
Harding County	0.017	0.003	0.054	0.058	0.228

Table 3: R^2 values between listed variable and level of agreement with wolf reintroduction in New Mexico, divided by county. R^2 values show how much change in one variable is explained by change in the other variable.

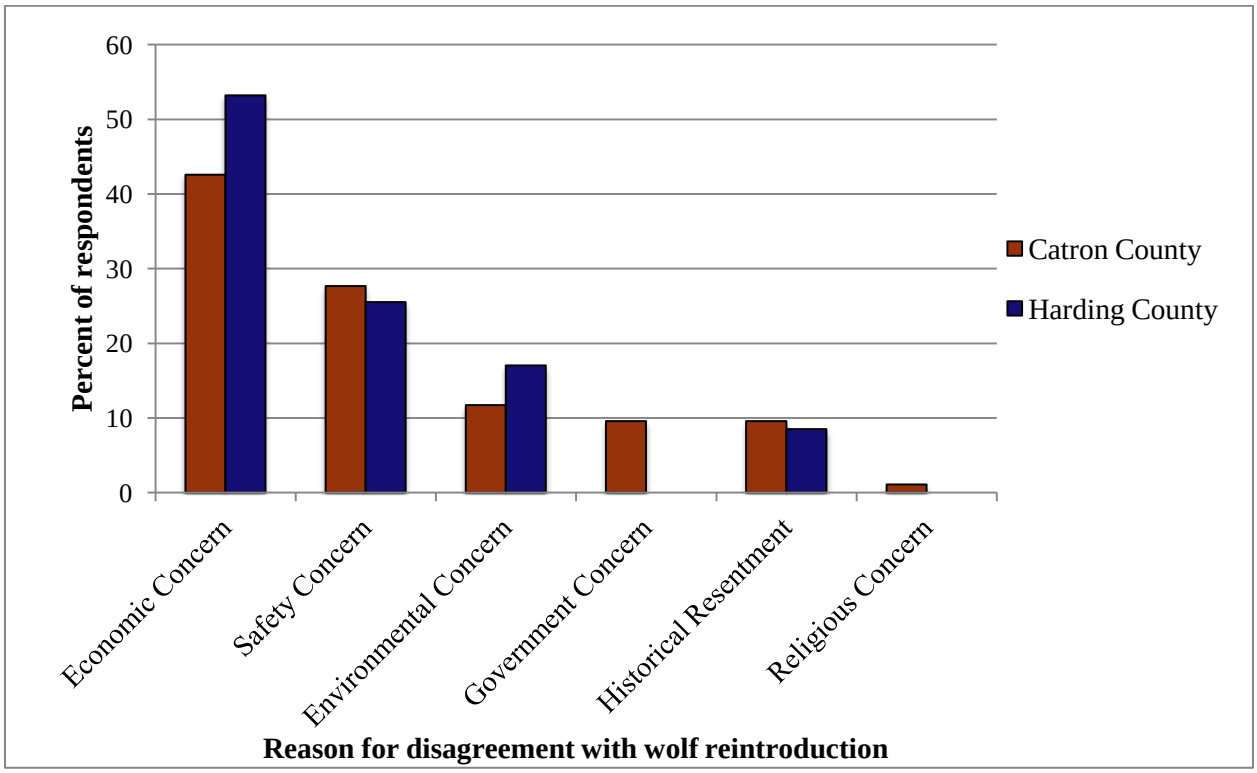

Figure 7: Percent of respondents and their reasons for disagreeing with wolf reintroduction, by county.

Analysis was completed on the first question examining intersections between the two main categories of concerns and gender to determine whether different genders had different concerns in regards to wolf reintroduction (Figure 8, 9). In Catron County, 20% of males and 38.88% of females were concerned about safety, while 51.42% of males and 44.44% of females were concerned about economic issues. About 28% of males and 16.66% of females were concerned about both safety and economics. Responses from Harding County showed that 10.52% of males and 0% of females were concerned about safety, while 51.42% of males and 42.85% of females were concerned about economics. About 26% of males and 57.14% of females were concerned about both issues. This analysis indicates that economics may be represented as one of the largest concerns in this study due to the fact that a large percentage of respondent were male (70%). Clearly, many female respondents were concerned about economic issues as well, but in both study areas they represent the minority of economic concern.

The next series of questions dealt with threats to rural ways of life and ranching. Here, respondents had the ability to list threats to rural ways of life and ranching that they considered important in addition to the threats provided in the question. These responses mainly fell into categories such as environmental concern, government concern, economic concern, and safety concern.

In both counties, the majority of answers listed environmental concerns such as the threat of antelope overgrazing, prairie dogs spreading disease, wild hogs, wild turkeys, and other smaller animals as threats to rural ways of life and ranching practices (n=11 in Catron County; n=12 in Harding County). In Catron County, the next largest perceived environmental threat was fire (n=8). As only 2 respondents listed fire as an

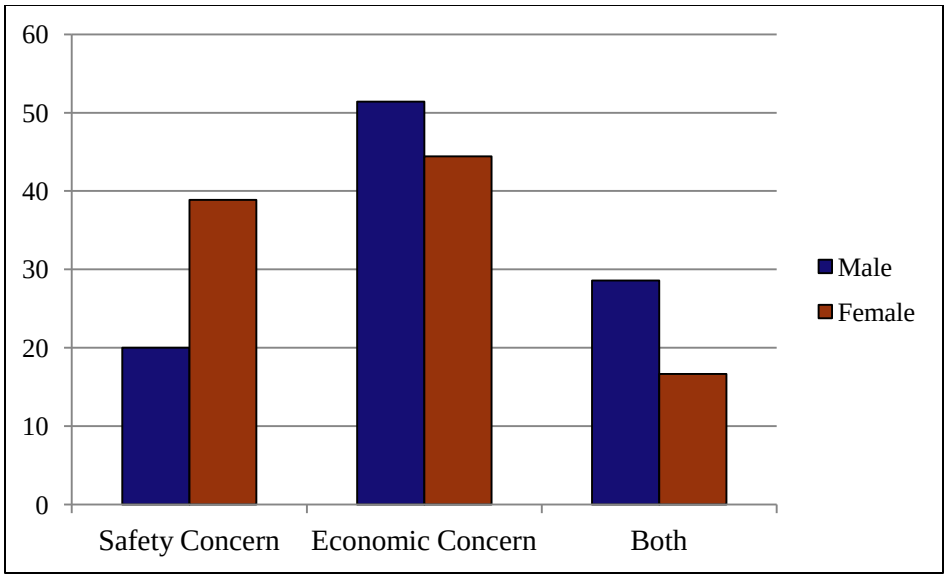

Figure 8: Main reasons for disagreeing with wolf reintroduction, broken down by gender, for Catron County.

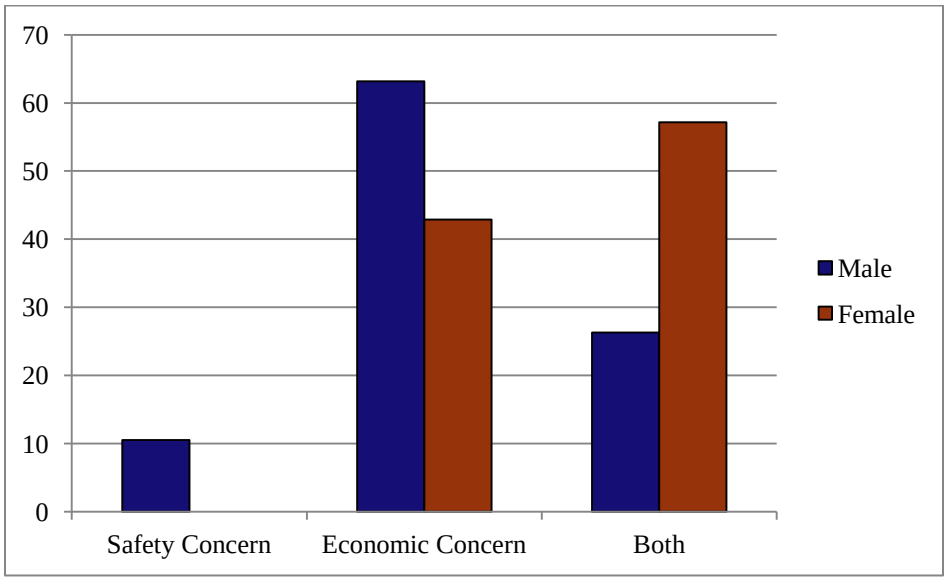

Figure 9: Main reasons for disagreeing with wolf reintroduction, broken down by gender, for Harding County.

additional threat in Harding County, the high response rate could be potentially due to the largest fire in New Mexico history, the Whitewater-Baldy Complex fire, burning in and around Catron County just months before this survey was conducted (Incident Information System 2012). Related to fire, water issues were the next highest rated environmental risk (n=7 in Catron County, n=1 in Harding County). People showed concern about cities using up water that could be used for farming and ranching, along with unease about the continuing drought. Finally, urban sprawl and population growth was perceived to be threatening to rural practices (n=3 in Catron County, n=1 in Harding County) as more ranchland is converted into homes.

Although the majority of people had serious concern about environmental issues that were affecting their way of life, they showed distrust in the agencies charged with and the people interested in fixing environmental problems. Respondents listed environmentalists, the Environmental Protection Agency, the Endangered Species Act, environmental lobbing organizations, the United States Fish and Wildlife Service, the United Stated Forest Service, The New Mexico Game and Fish Department, Barack Obama, and non-agricultural group policies and policy makers all as threats to rural ways of life and ranching (n=11 in Catron County, n=9 in Harding County). In responses, the aforementioned were commonly listed alongside concerns such as uninformed people, liberals, and urban dwellers (n=9 in Catron County, n=4 in Harding County), suggesting a perceived concern that the government and its employees cannot be trusted to make decisions and fix problems in rural areas of New Mexico.

Economic issues are also clearly important to people in Catron and Harding counties. Unemployment, the aging population, mineral exploitation, trappers and

poachers, and predatory animals are all seen as threats (n=7 in Catron County, n=4 in Harding County). Respondents were concerned not only about access to jobs, but also protecting their investments such as their land and cattle herds.

Finally, some safety concerns were listed. A small number of respondents reported threats such as robbery, use of guns, trespassing, and broken fences (n=3 in Catron County, n=3 in Harding County). Although they were a topic already provided on the questionnaire form, wolves were written in as a threat with 5 respondents in Catron County and 2 respondents in Harding County relisting wolves.

The next series of qualitative questions dealt with general topics in wolf reintroduction issues. The first three questions of this section were designed to help understand the potential connection between experience with wolves and wolf reintroduction and feelings toward wolves, while the following three questions were designed to understand issues of trust and education about wolves and the reintroduction program.

The first short response question asked whether a respondent had personally been affected by wolf reintroduction and if so, in what manner. The majority of people in both counties stated that the project had no effect on them personally (55% in Catron County, 82% in Harding County). Of those who had been affected by wolf reintroduction, 29.78% of respondents from Catron County and 10% of respondents from Harding County said that they had been affected in a negative manner economically. Economic concern may include such problems as having cattle or other livestock depredations, losing money in lawyer fees after being accused of harming a wolf, or concern for misspent tax dollars. Only 1.06% of respondents from Catron County perceived the wolf reintroduction project

as an economic benefit, as the respondent was employed to work on the project with a government agency. No respondents from Harding County felt they were benefiting economically from the wolf reintroduction.

Another way in which respondents perceived they were being affected by the wolf reintroduction project was in regards to their safety. Almost 16% of respondents from Catron County and 2% of Harding County residents noted that they no longer felt as safe in their environment as they did prior to wolf reintroduction. Respondents indicating safety concern noted that they were afraid to go outside, afraid to have their kids and pets outside, or generally have a lower quality of life because they no longer feel safe to walk around the woods, their ranchland, or their yard, alone. For example, one respondent noted that the wolves were "too close to my house to have my pets/grandchildren to be outdoors unsupervised. I am afraid to walk whereas before I used to feel safe to go hiking and walking." Another reported a "fear for my life and wellbeing while performing my job." Clearly, respondents are frightened by having large predators present.

Next, recipients were asked if and how friends and families had been affected by wolf reintroduction. In Harding County, 70.21% of respondents did not have friends or family that had been affected by the wolf reintroduction program. By contrast, in Catron County only 29.79% of respondents did not have any friends or family who had been affected by the project. Although many of the people in Catron County had not personally been affected by the reintroduction project, 52.12% of respondents had a friend or family member who had been affected economically and 30.85% knew people who had been affected in other ways (Figure 10).

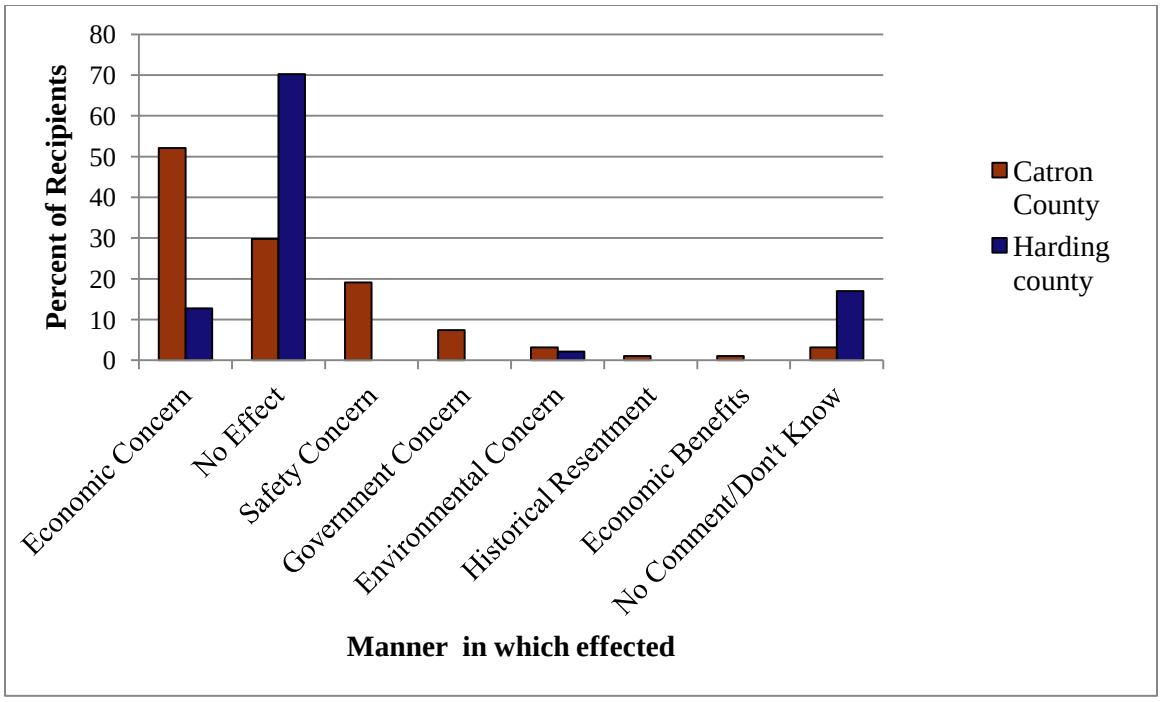

Figure 10: Coded responses to the question: Has any of your family or friends been personally affected by wolf reintroduction?

The final question pertaining to experience with wolves asks if the respondent or one of his or her family members has had any personal encounters with wolves and, if so, what influence this encounter had. In Catron County, 64.89% of people responded that they or their family members had not had an encounter with wolves, or that if they had, it had no effect on them. In Harding County, the percentage increased to 91.48% of respondents who replied that they personally, their family, or their friends had not encountered any wolves. Of respondents who experienced a wolf encounter in Catron County, the largest concern was safety. These were people who saw wolves in their yards, around their property, or while they were walking or riding horses in the forest. Concern ranged from worrying about pets in the yard and children walking to the bus stop to wolves being acclimated to humans and not running off when encountering a human in the woods. One respondent reported that after her children witnessed a wolf in their yard, her children were "now scared of wolves, whereas before they enjoyed them. They used to love to hear them howl and now it frightens them" and that now her children are "afraid to go into the yard to play." Others simply noted that when they encountered a wolf, it "scared" them or that wolves "are scary and we are not allowed to defend our family from them." Fear for personal safety and family safety clearly permeate responses to wolf encounters.

Interestingly, encountering wolves also proved to be a positive experience for some people living in Catron County. Seven and a half percent of respondents reported intrinsic benefits to having wolves present, meaning that they enjoyed having wolves around in the woods and felt privileged to encounter them. These respondents noted that although wolves may have been stalking their dogs or watching them from across a field,

seeing the wolves firsthand was an amazing experience. No respondents in Harding County reported a similar reaction.

However, what respondents from Harding County did report was a certain historical resentment toward wolves. Several responses (4.25%) indicated that while they did not have any direct personal experience with wolves, respondents had family members who in the past encountered wolves. These reports reached back several generations to explain that wolves should not be reintroduced because of damage done to cattle that belonged to ancestors who lived and ranched almost a hundred years ago. One 70 year old respondent replied that her "great uncle had to cut his horses loose and fight wolves off all night till help came. They are vicious animals" while others noted that "wolves are predators that plagued our ancestors until they were killed off." These responses overlapped with present day economic concerns of losing cattle and other valuable animals (horses, goats, etc.) that were present in Catron County as well.

The next series of questions dealt specifically with the wolf reintroduction project, rather than people's personal experience with wolves. The first question aimed at understanding if and from where people are receiving information about the wolf reintroduction project and if they find these sources trustworthy. Many respondents from both study areas reported that they had received no information about the wolf reintroduction project (25.53% in Catron County, 53.19% in Harding County). Out of the people who had received information, 17.02% of people from Catron County and 6.38% of people from Harding County reported that they did not trust any group (governmental, environmental, ranching lobbies, etc.) to provide truthful, unbiased information. Twenty percent of responses from Catron County and 6% of responses from Harding County

indicated distrust in any government publication or information. Responses also indicated some distrust for environmental interest groups and for private cattle ranching lobbies.

However, a much greater percentage of respondents trusted rather than distrusted cattle and ranching lobbies and local ranchers; 14.89% trust compared to 4.25% distrust in Catron County and 14.89% trust compared to 0% distrust in Harding County. Clearly, survey respondents were more trusting of people they perceived had a vested interest in livestock. Only 4.25% of respondents in Catron County and 10.63% of respondents in Harding County trusted publications and information presented by either the state or federal government, while 8.51% in Catron County and 6.38% in Harding County indicated that they would like to receive information from all stakeholders in the issue and make their own, informed decision as they did not truly believe any one group.

The next question asks the recipients if they see any benefit to the wolf reintroduction project. Overwhelmingly, responses from both study areas indicated that people did not believe that any benefits to the wolf reintroduction project existed (75.52% in Catron County, 80.85% in Harding County). Reasons varied from economic concerns, to environmental concerns, to governmental concerns, to safety concerns. Economic concerns included concern about livestock and being able to continue to run a profitable ranch. Environmental concerns included concern about the dwindling amount of game animals available for human hunting, or that the number of ungulates was simply not high enough in this region to support the desired wolf population. Governmental concern included issues that the government was putting the well-being of the wolf above the well being of the people. Finally, safety concerns included concerns that wolves may harm people and are, therefore, not beneficial to have in the area.

However, about 17% of respondents from Catron County and about 8% of respondents from Harding County found that there were some environmental, intrinsic, or religious benefits to having wolves in the area. Environmental benefits included people who believed that there were too many wild ungulate species on the grazing land and wolves were a vital part in helping to contain ungulate populations. Also, people noted that as a top species wolves not only influenced the ungulates, but also all the other animals and plants in the ecosystem. People who identified intrinsic benefits of wolf reintroduction noted that wolves have a right to exist as part of nature and humans should not be taking away or influencing that right. Respondents also noted that wolves were in the Gila Forest before humans, so humans have the responsibility to be accommodating towards wolves. The last benefit that people noted had a religious theme; namely that God put animals on the earth and that humans have a stewardship duty to watch over and protect the wolves. For these respondents, reintroducing wolves had the benefit or fulfilling a duty to God.

The last long response question asked if the government should be allowed to reintroduce wolves on public land (Figure 11). In Catron County, 69.14% of respondents thought that the government should not be able to reintroduce wolves on public land. Numerous respondents who answered in this manner thought that holding a grazing permit for federal land was essentially the same as paying rent on that land for its use, and, as such, the government should not be using the land for any other purpose. Also, the same concerns about safety, environmental problems, and historical resentment towards the wolves came up again in these responses. Harding County respondents felt

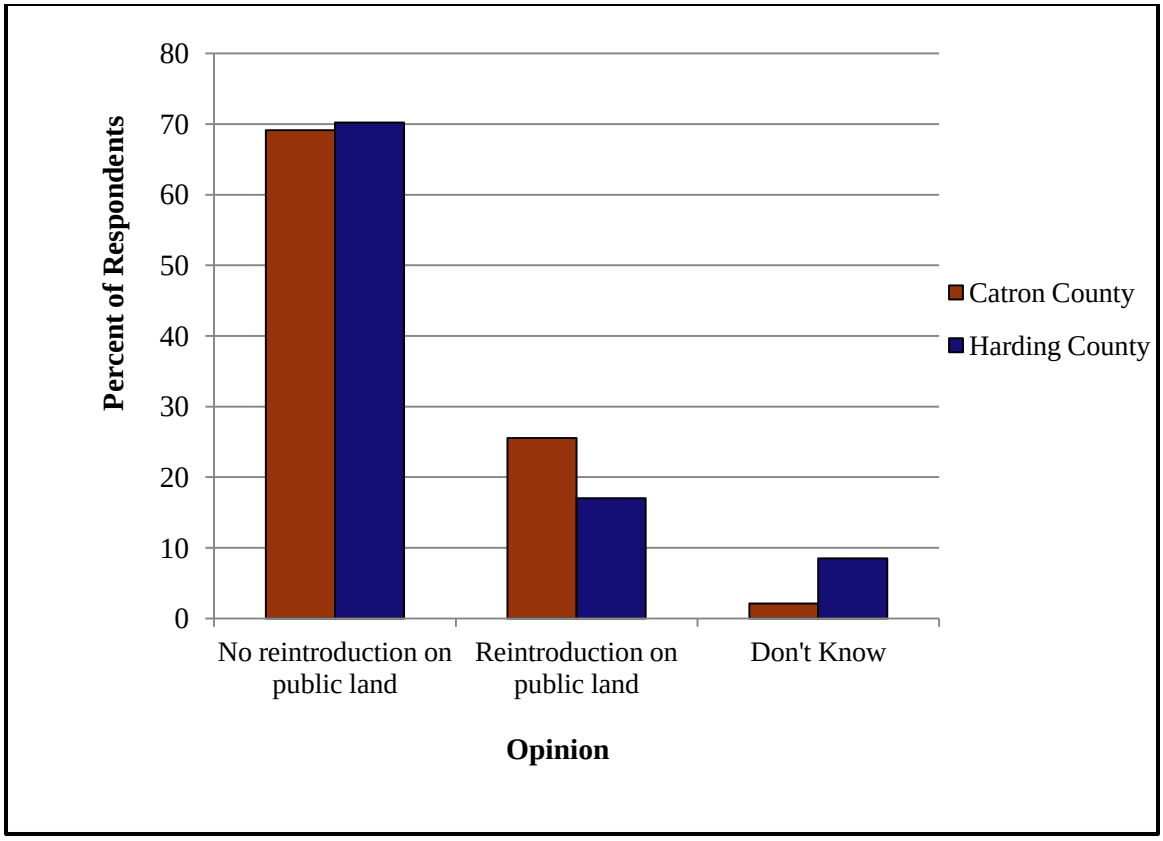

Figure 11: Coded responses to the question: Should the government be allowed to reintroduce wolves on public land?

similarly with 70.21% saying that the government should not be able to reintroduce wolves on federal land.

About 25% of people in Catron County and 17% of people in Harding County thought that the government should be allowed to reintroduce wolves on public land. However, many of the people agreed with this somewhat begrudgingly, with comments such as "The government should not even be able to feed themselves; however they have to authority to reintroduce wolves if they want to" or "I wish they would not, but it is government land."

The next opportunity that respondents had to leave narrative responses was in adding items to a list detailing important sources of information and their importance to the respondent. In addition to the items provided in the question, respondents from both counties added items such as balanced sources (n=5 in Catron County; n=1 in Harding County), internet or online research (n=2 in Catron County; n=1 in Harding County), scientific journals or other peer-reviewed sources (n=5 in Catron County; n=1 in Harding County), cattle association publication or other business associated sources (n=4 in Harding County), and attending local meetings (n=2 in Catron County). These additional sources show a desire to find out either exactly what is going on in the wolf reintroduction program and its upsides and downsides, or a desire to determine if and how the wolf reintroduction program is effecting a person's business.

Finally, respondents had the opportunity to leave any additional comments they wished to share on the last page of the survey. Not every respondent left a comment (n=27 in Catron County; n=12 in Harding County), but this additional information can

still be useful for gaining a broader understanding of attitudes and perceptions towards wolves and the wolf reintroduction program.

In general, of people who left responses, 29% of respondents from Catron County and 50% of respondents from Harding County mentioned that they had some sort of safety concern. Comments which reflected this concern included respondents who noted that, while informational signs and literature existed on what to do if a person was hiking in the wilderness and encountered a bear or a mountain lion, no such informational signs were posted on what to do if one was to encounter a wolf. Other respondents noted that while the wolves may have been reintroduced on federal land, a wolf cannot tell the difference between federal and private property and were likely to wander onto private land. This concern about wolves on private land extended to recipients fearing for their children or grandchildren, noting that some children were afraid to go outside knowing that wolves were present in the area while other children had nightmares after encountering a wolf eating prey.

Economic issues were also prominent in the comments sections with 44.44% of respondents in Catron County and 8.33% of respondents in Harding County demonstrating concern on this topic. Respondents noted that they lived and worked in extremely rugged country. These people wrote that there would be a prohibitive cost to trying to either pay people to watch their cows over such a vast area or own enough land to rotate their cows away from the wolves. For these people, bringing their cows into pasture away from wolves would require massive amounts of money spent on feed; money which they do not have. Respondents also noted that it was hard enough to make a living in rural New Mexico without the government being involved; numerous

suggestions remarked that the government should take the money that they were spending on wolves and put it toward reducing the national deficit instead. Concern about the economic condition of the country rather than just the individual county was discussed in several responses.

Environmental concern (25.92% in Catron County and 33.33% in Harding County) ranged from hikers noting that not enough game existed in the wilderness area to support wolves, to the fact that humans are continuously encroaching on wilderness areas, so there are fewer and fewer "acceptable" places for the wolf to live. Still others enjoyed seeing ungulate wildlife in its natural habitat and did not want to see it being harassed by wolf populations. A few respondents intertwined this concern for their environment with cultural concerns. Respondents wrote that they lived daily with nature; they experienced all the elements first hand making their living from working on the land. They suggested that people who lived in "the city" were not connected with nature and, therefore, did not understand why wolf reintroduction was a bad idea. These people noted that if city people had to deal with the rural living and working conditions on a daily basis, then they would understand the environmental and economic issues with reintroducing the wolf. Numerous suggestions indicated that since large portions of New Mexico were in the original range of the Mexican wolf; why not reintroduce wolves into Albuquerque or Santa Fe? Then people residing in cities could get a sense of what living with a predator was like.

An extension of this rural cultural feeling was manifested in some religious statements, indicating that humans were charged with subduing the earth, and that no animal's wellbeing should come above the wellbeing of a human. In fact, the concern that

the government, environmental groups, and any other proponent of the wolf reintroduction were putting the life of a wolf above the life of a human was so strong that 14.81% of respondents in Catron County and 33.33% of respondents in Harding County specifically commented on it. Examples of this religious mindset include responses such as "Animals should be for the good of man. They should not be allowed to be a problem" and "A new ideology has spread that humans are to be compassionate, caring, and self-sacrificing for all animals. It seems that we are forbidden to consider that animals don't have souls. People come before animals."

Many of the comments reflected concern that the government was untrustworthy and should not be charged with reintroducing wolves. Respondents commenting on this noted that they resented the government for imposing on people who were just trying to make a living in a tough area. Others said that the government would lie about anything to get its way, or that if the government is involved, failure is a guarantee. Still more felt that the government introducing wolves which may eventually roam onto private property is an erosion of their property rights.

Although many respondents wrote about perceived issues revolving around the wolf reintroduction project, some respondents noted some positive benefits to wolf reintroduction. About 16% of comments from Harding County mentioned some sort of environmental benefit, namely keeping the ecosystem intact and providing a balance in nature. Also, one respondent noted a religious reason for allowing wolf reintroduction. They wrote "God asks us for a 10% tithe. Surely we can afford a 1% kill of weak and diseased cattle to god's creatures. Overgrazing a lack of knowledge of the water cycle and greed (total disregard of natures and the economics law of diminishing returns) is a

far greater threat to agriculture than any species of wildlife." The various reasons elaborated in the further comments section for agreeing or disagreeing with wolf reintroduction provided some rich additional information which helps gain an understanding of the numerous and varied perceptions that people hold about the wolf and the wolf reintroduction project.

Chapter 7

Discussion

Few respondents from Catron County and Harding County were personally affected by, or knew people who had been affected by, the wolf reintroduction. Yet the majority of respondents strongly disagreed with reintroducing wolves in New Mexico. This suggests that proximate location to the wolf reintroduction project has no bearing on attitudes and perceptions about wolves; other factors are at play. This discussion will focus on cultural biases of rural areas toward wolves, how these biases are manifested, why they are important, and the management implications of dealing with rural cultural biases.

7.1 Cultural Biases

The findings of this study are in line with those of other attitudinal studies about wolf populations. A nationwide study showed attitudes towards wolves to be especially negative in livestock producers, elderly persons, rural dwellers, and the least educated people, while positive attitudes are found in young adults, urban residents, college educated adults, and environmental groups (Kellert 1985). So while a rural-urban geographic bias may exist, based on this study, a rural-rural bias based on proximity to wolf population does not exist.

Other factors, including knowledge about the wolf reintroduction program, occupation, level of education, location where raised, what kind of outdoor activities recipients enjoyed, age, and gender did not make any significant difference in attitudes and perceptions of the wolf reintroduction program. As Kellert et al. (1996) found no relationship between attitudes towards and knowledge of wolves, it is not surprising that

other factors discussed in the survey and attitudes about wolves had little to no correlation. This suggests that rather than any specific factor contributing to feelings about the wolf reintroduction program, cultural biases are at work.

This conclusion aligns with Bright and Manfredo's (1996) study of attitudes and wolf reintroduction which found that attitudes toward wolf reintroduction were based less on knowledge and beliefs about wolves, and more on values and emotions. Also, Kellert et al. (1996, 980) assert that results of their study and others "consistently reveal deeply ingrained biases among agriculturists, particularly livestock producers, against wolves and other large predators, often independent of personal experience." My study shows this statement to still be true and relevant in New Mexico today.

The origins of rural biases are difficult to derive, and may reach back to any number of ideologies or events. However, many rural groups share the same roots, and therefore, may be culturally influenced by the same factors. Chavez et al. (2005, 524) note that in rural communities, "attitudes that preserve remnant traits of an area's founding and settling pattern generally are highly regarded in the community." For example, cultural heritage played an important role in revealing historical resentment towards the wolf populations in many responses to survey questions. Responses such as "our ancestors hunted wolves to near extinction because they were so destructive to livestock and wildlife" demonstrated a long standing cultural bias against wolves, stereotyping them as destructive killers even though this respondent had never actually seen or been affected by a wolf personally. Rural communities and cultures may take an extremely long time to change thought patterns, explaining why several responses

reached back generations to describe their experience with wolves and why they disagree with present day wolf reintroduction.

This desire to preserve cultural identity and heritage is also found in Beeland (2008) who studied attitudes towards the wolf reintroduction in Catron County through long response interviews. She found that livestock producers in Catron County "expressed a unified alliance against not only the wolf as a physical animal, but the symbolism of what it represented: encroachment of property rights and land control, federal government regulation and urban environmentalists exerting control or judgment over their lifestyles and livestock operations" (Beeland 2008, 107). My findings confirm that this phenomenon is not spatially confined to those who must deal with the reality of wolf reintroduction, but rather it is a more general attitude found in many rural communities.

7.2 Cultural Bias and the Environment

Rural populations tend to view the environment in a utilitarian manner (Kellert 1986). My findings directly reflect this, as the most frequent reason for disagreeing with wolf reintroduction was economic concern. Respondents noted that "the cost of the program to the tax payers and the loss of livestock to people, loss of revenue, all effects hunting, ranching, etc." or that wolf reintroduction is "detrimental to livestock and livelihood of rural/frontier areas" Ranchers make their living directly from the land. They depend on safe, predator free, grazing allotments to feed, calve, and raise cattle. If wolves are stalking or depredating their cattle, then the ranchers see the direct impact through unhealthy cattle herds and loss of cattle, which translates directly into loss of income.

Hunting guides and hunters demonstrated similar feelings. Large ungulate populations are necessary for hunting guides and hunters to successfully make money or provide food for their families. Hunters noted that "pack wolves will cause deer, elk, and antelope to relocate- also affect birth rates of deer and elk." As wolves are a protected species and not allowed to be hunted for trophy game in New Mexico, they do not serve any economic purpose in themselves and slowly cull the ungulate herds. One respondent noted that "High wolf populations won't completely wipe out a species, but they will reduce ungulates to a low level, thereby reducing or eliminating altogether any possible surplus for human harvest." In both study areas, many sources of income were dependent on the land or providing for those the industries that are dependent on the land. If the cattle rancher is hurt economically and has fewer cattle to send to market, than the cattle hauler that does business with that rancher also loses money. My findings reflect that rural residents view the land as something to be used, rather than an intrinsic or aesthetic quantity. These traditional rural values more likely had a greater effect on the attitudes and perceptions towards wolves than the geographic proximity of rural residents to wolf populations.

7.3 Cultural Bias and Trust

Cultural ideologies and values clearly play an important role for respondents in which sources of information they chose to trust. Many respondents noted that the sources that they trusted were those "directly affected by [the wolf reintroduction] and their information," "the livestock industry or producers," or "local ranchers and other neighbors because they know firsthand the damage that wolves can cause." Many did not trust the government or any private environmental group, listing reasons behind this

distrust such as “government agencies only tell people what they want them to see” or that “city people don’t get these issues nor does our federal government.” As Beeland (2008) remarks, ranchers view the wolf reintroduction program as the government “taking” their property through reintroducing wolves onto their grazing allotments, and these actions make it appear to the ranchers that the government is trying to kick them off their land or remove their property rights. If this is the manner in which the government’s actions are being perceived, then it is understandable why ranchers do not trust government information or publications.

Although Kellert (1999) documented an increase in positive attitudes towards wolves in farmers from Minnesota from 1985 through 1998, the results of this study indicate these advances do not appear to be occurring in rural New Mexico. Trusting people solely from the same socioeconomic background may be an obstacle to increasing positive attitudes towards wolves in rural communities, as it negates the ability of the government or other groups to distribute educational material as a way to increase awareness about wolves and break down their destructive killer stereotype.

7.4 Cultural Bias and Safety

This longstanding stereotype of the wolf as a killer manifested itself in the responses as an overwhelming concern for personal safety and safety of family members. Respondents were afraid to go into the woods alone, were afraid for the children to stand or walk home from the bus stop, and were afraid to walk around their property. This fear is interesting as wolf attacks on humans are extremely rare. A 2002 study by the Norwegian Institute for Nature Research reported that during the twentieth century, there were between twenty and thirty attacks of wolves on humans in North America, including

Canada and Alaska, only three of which were fatal due to rabies. In comparison about 16-18 people each year in the United States die from domestic dog attacks (Yellowstone Insider 2012). The question then becomes, where does this fear of wolf attacks originate? Is it exclusively a remnant of colonial attitudes towards wolves exhibited in cultural biases?

One study respondent mailed back not only a completed survey, but also some informational literature published by the group Americans for Preservation of Western Environment (APWE). APWE is a "grassroots effort that includes everyone in the West and anyone concerned about preserving the culture, customs and heritage of the West" (APWE 2013). Their focus is on the Mexican Wolf Project and fighting environmental interest groups which force "people who live in the west to bear outrageously high burden for private agendas of these special interest groups" and was created in response to "unfair special interest litigation and aggressive public education practices" (APWE 2013). This brochure (Figure 12, 13), titled "The Truth about the Mexican Wolf Program," contained graphic picture of wolves feeding on animals and stated on the cover: "Fact: If you live in wolf country your life, the lives of your family and the lives of your pets and domestic animals may be at risk!" This group's desire to hang onto 'traditional' western values and culture perfectly embodies the conclusion that rural cultural biases play a much larger role in perceptions towards wolves than any actual experiences, interactions, or knowledge with or about the wolves. Clearly, in line with Bright and Manfredo's findings, values and emotions play a large role in attitudes and perceptions about wolf reintroduction in Catron and Harding Counties.

Figure 12: Americans for Preservation of Western Environment, Side1.

Figure 13: Americans for the Preservation of Western Environment, Side 2.

7.5 Perceived Benefits of Wolf Reintroduction by Rural Residents

A minority of respondents from both study areas was in favor of wolf reintroduction and perceived it as providing some ecological, economical, intrinsic, or religious benefit. As wolves are top predators, they affect every ecological process that occurs from number of ungulate species to the number of aspen trees. Proponents of wolf reintroduction noted that top predators were an important part of natural cycles and they should be kept in place in the environment. In an economic sense, jobs with the wolf reintroduction program, whether directly monitoring wolf populations or working with one of FWS's other programs helping ranchers deal with the wolf reintroduction, provide much needed work to rural areas where jobs are scarce.

Intrinsic benefits were noted by people who enjoyed having wolves around. For example, one respondent noted that they "Saw two wolves trailing my dog several years ago. They took off when they saw me. I felt privileged to have seen them!" while another noted that they "went hunting and had one 10 paces from me, just looking at me and walked off in a natural walk. What a great experience!" These people realize that wolves are predators, but clearly enjoy and respect the animals rather than fearing them. People who noted a religious reason to reintroduce wolves noted that "overgrazing, a lack of knowledge of the water cycle, and greed, while totally disregarding nature's law of/economic law of diminishing returns is a far greater threat to agriculture than any species of wildlife. I say keep all of god's creature around." Respondents who approved of wolf reintroduction, whatever their reason, have been less affected by cultural bias than the majority of respondents.

7.6 Links to Management

This study has numerous implications for management not only of the Mexican gray wolf reintroduction program, but also for other carnivore reintroduction programs that encroach on ranching and farming land. It suggests that rural residents have predetermined ideas and feelings about carnivores based on concerns and fears ranging from economic, to safety, to environmental, and more. This and other studies show that these fears and concerns are independent of personal experience with the reintroduced species and instead are based in a shared rural culture. Managing agencies need to recognize this fact from the beginning of the process. Without acknowledging the culture and cultural values, the reintroduction can encounter extreme resistance.

Based on the above research, one of the largest obstacles encountered is the lack of trust between managing agencies and the rural residents. This relationship between governmental agencies and rural residents needs to be strengthened, with mutual respect for each party and their respective jobs and lifestyles developed. In this manner, a trust between parties can be formed. Only now will passing out educational materials or holding educational meetings be useful. Otherwise, as demonstrated by responses received, the rural residents will not trust the government or their educational material, which prevents them from learning the correct information. This relationship building process could be lengthy, but without a mutual trust and respect the project will not easily succeed.

Once trust is gained, it is necessary to educate rural residents about the effects of the carnivore on their lifestyles. For example, safety was clearly a serious concern for rural residents who thought of the wolf as a dangerous, killing machine. If a trusting relationship is developed, it may be possible to slowly break down these outdated

stereotypes through education. Also, educational programs informing ranchers on methods of keeping their cattle safe from carnivores and protecting their investments would be helpful in appeasing economic concerns. In Catron County, the USFWS has numerous programs available to assist ranchers in dealing with wolves, such as helping in hanging turbo-fladry around pastures, assisting in purchase of hay during calving season, purchase of water to assist in moving cattle away from denning wolves, helping to haze wolves seen near cattle, and many more (USFWS 2012). However, if the ranchers are never educated about the programs, then they never are able to reap the benefits.

Many of the concerns discovered and discussed in this study could be appeased by developing a trusting relationship between parties and then using this trust to break down traditional barriers. In no way does this mean that rural populations need to change all of their beliefs and values; however, they do need to acknowledge the reality of carnivores and their true danger to economic activity and human life. In return, the managing agencies and other groups involved need to recognize the importance of culture and not completely dismiss rural belief systems. When these factors are in place, a productive, collaborative program can succeed.

7.7 Limitations

While this study provides useful and necessary information, it also is restricted by numerous limitations. First, the study has a relatively small scope, as only two counties are included in the study. Also, both of these counties are rural, which does not allow for an up-to-date comparison with urban residents. Problems exist within the methodology as well. These problems were found in the survey instrument and method of choosing recipients. The questionnaire was designed to be accessible to a wide range of education

levels, but recipients who were illiterate or had an extremely low reading level were most likely unable to understand and reply. Also, the questionnaire was only provided in English. Therefore, only recipients who spoke English had the ability to respond. The method of choosing recipients was also limiting. As discussed in the Methods section, residents of Catron County or Harding County that were not listed in the phone directory, did not have an address listed, or did not have the correct address listed could not be chosen as a survey recipient. This not only reduced the number of people who could be chosen for the study, but also systematically excluded certain populations of people, such as those with no land line. These limitations are reflected in the responses received. The average age and education level of respondents was higher than the average for the counties, meaning that there are most likely a variety of opinions that were not captured and are not represented in these results. Also, recipients who felt strongly about the issues addressed may have been more likely to reply than those who were neutral on the issue, potentially leaving out a wide variety of opinions.

The next issue to be addressed is that of gender representation. Because I had a high number of male respondents from both study areas, their concerns may have been overrepresented. Analysis showed that male respondents tended to be more concerned with economic issues than females, and differences such as this may be present throughout the study. However, while it needs to be acknowledged that concerns gathered by qualitative data may be skewed to a particular viewpoint, quantitative regression analysis showed no correlation between gender and attitudes toward wolf reintroduction.

Finally, there is the issue of low sampling size. Although the response rate was excellent among mail-out surveys (33% response rate for Catron County, 20% response

rate for Harding County), the sample for the entire population was low. While this does not negate the value of this study, it does need to be acknowledged that more responses, or an extended period of time to return questionnaires, would make this work more robust.

7.8 Further Research

This research shows that attempting carnivore reintroductions in any rural area will be difficult, as rural areas appear to demonstrate cultural biases which can affect attitudes and perceptions about carnivores, and wolves in particular, independent of personal experience with the animals. However, a minority population existed in both of the study areas which was in favor of the wolf reintroduction and saw the animals as beneficial for a variety of aforementioned reasons. Future research should focus on what causes this group of people to think differently than other rural residents. According to research gathered in the questionnaires, the difference in attitude cannot be explained by education levels, place of upbringing, age, or gender. Research should focus on whether this group of wolf proponents shares any other similar characteristics that was not tested for in my study. Phenomenon effecting individual's thoughts may include such variables as parental ideologies or religious or spiritual beliefs. Finding out how the proponents developed their attitudes and perceptions about wolves would be helpful in formulating programs to work in conjunction with or around, cultural rural biases in carnivore reintroductions.

Other research could focus on how rural attitude and perceptions about wolves change over time. Many previous attitudinal studies (either in New Mexico or in other states) were conducted in the early to mid 1990s at a time when personal home computers

and the internet were not considered a common household item. Today, more people have access to better and more diverse information from their homes. People can fairly easily conduct their own research about issues that are important to them and draw informed conclusions. This powerful tool may expose rural peoples to other viewpoints and may slowly cause a change in rural cultures and lifestyles. Although there is clearly a strong desire to hang onto 'western culture and values,' change may nonetheless occur.

Clearly, this change has not yet occurred. The ESA does not require the public to agree with its methods, and a disregard for the importance of public opinion has caused the Mexican gray wolf reintroduction to suffer, leading to public attitudes of "shoot, shovel, and shut-up" (AMOC 2005). However, follow up studies every several years to track rural attitudes may show slow changes in opinions towards wolves with continued dissemination of information. Tracking how attitudes and perceptions are influenced is, and will continue to be, important information for conservation planners.

Appendices

Appendix A: Consent form for mail out surveys.

Dear New Mexico Resident,

I am a graduate student conducting research to better understand the perceptions and attitudes of New Mexico residents regarding the Blue Range wolf recovery project currently underway in the western part of the state. This research is being conducted through the University of New Mexico. As you may be aware, the wolf recovery project is not fully succeeding, and I am trying to understand what role public opinion plays in the wolf reintroduction process. This questionnaire survey relates to this problem and should only take approximately 15 minutes of your time.

Many farmers raise or have raised livestock in your region. I am particularly interested in your opinions about issues regarding the amount of risk wolves present to the overall viability of New Mexico agricultural operations as well as the economic livelihood of livestock producers. This information will be used in completion of my master's thesis and will potentially be provided to the reintroduction committee for use in the reintroduction project.

Your household was randomly selected to be part of a statistical sample of New Mexico residents. If the results of this study are to accurately reflect the views and opinions of people in the study area, your cooperation and participation in completing the questionnaire is very important. The adult member of the household that most recently celebrated his/her birthday should be the person to fill out the form, so as to gather perspectives from a variety of ages and genders.

All responses will be kept completely confidential. Therefore, please do not sign your name or put a return address anywhere on the questionnaire envelope. All responses will be aggregated for a statistical analysis and write-up. All survey responses will be kept for one year in a locked filing cabinet and/or on a password-protected computer in my University of New Mexico office, and then destroyed.

When you have completed the questionnaire, please place it in the postage paid envelope provided and return it to me. If you have any questions, concerns, or wish to request information regarding the outcome of this project, please call Erin Marchand (505-277-5041) or contact me at eemccull@unm.edu. If you have questions regarding your legal rights as a research subject, you may call the UNM Human Research Protections Office at (505) 272-1129. By completing this survey, you will be agreeing to participate in the above described research study.

I greatly appreciate your cooperation and thank you in advance for your time and consideration in responding to our questionnaire.

Sincerely,

Erin Marchand
Graduate Student
University of New Mexico
Department of Geography
Bandelier West Room 111, MSC01 1110
1 University of New Mexico
Albuquerque, NM 87131

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Appendix B: Survey questionnaire form.

ALL INFORMATION YOU PROVIDE IS COMPLETELY CONFIDENTIAL

Please answer the questions in the order that they appear, without reading ahead or going back to change answers. If you need more space to explain your answers, use the blank space provided at the end of the questionnaire. If you are unable to answer a question, just write DK (don't know) in the margin and go on to the next question. The term livestock in this survey is meant to represent only four-legged farm animals (i.e. cattle, sheep, goats, pigs, etc…). Pets, poultry, and other farm animals will be distinguished as such. Because we are seeking opinions and perspectives from a variety of people, please do not discuss your answers with anyone, including your spouse or other members of your household or community.

1. In this question, I would like to get your opinion on wolf reintroduction in New Mexico. Please circle the number that best matches your level of agreement with these statements

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
a. I support wolf reintroduction in New Mexico	1	2	3	4	5
If you disagreed with the previous statement please explain why: _____					
b. Wolves are causing unacceptable levels of damage to New Mexico's livestock industry.	1	2	3	4	5
c. I think Mexican wolves should be allowed to inhabit New Mexico's agricultural lands, as well as surrounding forested land without being disturbed or threatened by people if they:					
• Do not disturb livestock often	1	2	3	4	5
• Do not kill many game animals	1	2	3	4	5

Page Break

2. In this next question, I would like you to evaluate some threats to rural life in New Mexico. Please circle the number indicating your opinion about the level of threat posed by each of the following factors.

	No Threat	Small Threat	Moderate Threat	Large Threat	Very Large Threat
a. Flooding	1	2	3	4	5
b. Crop pests	1	2	3	4	5
c. Crop diseases	1	2	3	4	5
d. Market fluctuations	1	2	3	4	5
e. Predators	1	2	3	4	5
f. Livestock diseases	1	2	3	4	5
g. Drought	1	2	3	4	5
h. Laws/Government	1	2	3	4	5
i. Other threats (Please specify and number these threats)	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

3. Please circle the number indicating the level of threat you think each species of wildlife presents to farmers in New Mexico.

	No Threat	Small Threat	Moderate Threat	Large Threat	Very Large Threat
a. Coyotes	1	2	3	4	5
b. Deer	1	2	3	4	5
c. Moose	1	2	3	4	5
d. Wolves	1	2	3	4	5
e. Domestic Dogs	1	2	3	4	5
f. Bears	1	2	3	4	5
g. Bobcats	1	2	3	4	5
h. Birds	1	2	3	4	5
i. Elk	1	2	3	4	5
j. Mountain lions	1	2	3	4	5
k. Other threats (Please specify and number these threats)	1	2	3	4	5
_____	1	2	3	4	5
_____	1	2	3	4	5

Page Break

4. How often must a wolf visit within one mile of a livestock pasture to be considered a serious risk to the lives of the livestock? (circle only one number)

1	Wolves are always a serious risk	5	Once a month
2	Once a year	6	Every day
3	Once every 6 months	7	Never a serious risk
4	Once every 2-3 months	8	Don't know

5. How close must a wolf's den or rendezvous site be to a livestock pasture to be considered a serious risk to the lives of the livestock? (circle only one number)

   Note: A den site is where the litter from a wolf pack is born, generally in April. Wolves spend about a month at their den site before moving to a rendezvous site once the pups become more mobile. A rendezvous site is a meeting place for individual wolves from a single pack to gather before and after hunting; this is also the area where the adult members of a pack will bring food to their pups. Wolf packs usually use one or more rendezvous sites for the entire summer and early fall.

1	Any distance may be a risk	5	Within 1 mile
2	Within 25 miles	6	Within the pasture
3	Within 10 miles	7	Never a serious risk
4	Within 5 miles	8	Don't know

6. How many wolf depredations on livestock must occur to be considers a serious risk to the economic livelihood of an individual farmer (Please circle only one number).

1	Any kill is a serious economic loss	5	2-5 kills every year
2	One kill every five years	6	Greater than 5 kills a year
3	One kill every other year	7	Never a serious risk
4	One kill every year	8	Don't know

7. The next series of questions deal with how much you know about the issues involving wolves. (Please circle only one number for each question)

a. The number of Mexican Wolves in New Mexico is: (please circle one number).

1	Less than 50	4	Greater than 500
2	Between 50 and 100	5	Don't know
3	Between 100 and 500		

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		Yes	No	Don’t Know
b.	Is it legal for anyone to shoot a Mexican wolf if they see one?	1	2	3
c.	Is there a wildlife agency that handles problems regarding livestock damage caused by Mexican wolves?	1	2	3
d.	Can livestock producers receive monetary compensation for damage caused by Mexican wolves?	1	2	3

e. Under the Endangered Species Act are Mexican wolves in New Mexico classified as:

1	Endangered	3	Don’t know
2	Threatened		

The next questions ask about some general topics dealing with Mexican wolf reintroduction issues. Use the space provided to answer the question. If you need more room, complete your answer on blank pages at the end of the survey. If you do not know the answer to a question, put DK (for don’t know).

8. Have you been personally affected by wolf reintroduction? In what way?

9. Has any of your family or friends been personally affected by wolf reintroduction? In what way?

10. Have you or your family had an encounter with Mexican wolves? If so, what effect did this encounter have?

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11. Have you received information about the wolf reintroduction project? What sources do you trust to give you the correct information and why?

12. Do you see any benefits to the current wolf reintroduction project?

13. Should the government be allowed to reintroduce wolves on public land?

BACKGROUND INFORMATION

I would like to learn more about your background and your current household characteristics. Your answers will remain completely confidential. The information will only be used to report comparisons among groups of people.

14. How old are you? _____Years

15. What is your gender? (Circle one)

1 Male 2 Female

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16. What is the highest level of formal education that you have completed? (circle one number).

1	Less than a high school education	4	Some college
2	Completed high school	5	Completed a bachelors degree
3	Completed a post-high school trade school program	6	Completed a graduate degree (Masters or Doctorate)

17. What best describes your current place of residence (Circle just one)?

1	Rural area	3	City or town of 2,501 to 10,000
2	1 W Small city or town of 2,500 people or less	4	City of 10,000 or more

18. Which of the following best describes the place of residence where you grew up?

1	Rural Area	4	City of 10,000-100,000
2	Small city or town of 2,500 or less	5	City of 100,000+
3	City or town of 2,501 to 10,000		

19. Are you currently involved in an agricultural production business?

1	Yes	2	No (Please skip to question 23)

20. Have you been involved in an agricultural production business within the last 20 years?

1	Yes (please explain below)	2	No

Page Break

21. Do you raise livestock?

1 Yes 2 No (Please skip to question 23)

22. Do you perform any means of preventing wolf damage to your livestock?

1 Yes (please explain below) 2 No

23. If you answered NO to questions 18, 19, or 21, then please indicate the extent to which of the following reasons best explains why you choose not to raise livestock.

		Not at all important	Somewhat Important	Moderately important	Extremely important
a	Because my immediate family has never been involved in this type of agriculture	1	2	3	4
b	Because the livestock market is not strong enough to be a profitable business	1	2	3	4
c	Because I spend more of my resources in crop farming of other types of farming	1	2	3	4
d	Because I would experience too many problems with wolves	1	2	3	4
e	Because I would experience too many problems with other types of predators	1	2	3	4
f	Because I would experience too many problems with disease or harsh environmental conditions, such as severe weather	1	2	3	4
g	Other reason (please indicate below and circle a number for this reason)	1	2	3	4

_____

_____

24. If you were to have or have had livestock or other domestic animals killed by a wolf, would or did you always report it to a government resource agency (i.e. USFWS or NMGF)?

1 Yes 2 No

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25. The next series of questions deal with how important various sources for obtaining information pertaining to Mexican wolves are to you. (Please circle only one number for each question).

		Not at all important	Somewhat important	Moderately important	Extremely important
a	Newspaper articles	1	2	3	4
b	Television programs	1	2	3	4
c	Radio programs	1	2	3	4
d	Talking with people from a natural resource agency	1	2	3	4
e	Talking with people who are not from a natural resource agency	1	2	3	4
f	Other source (books, phamphlets, scientific articles, etc. please describe)	1	2	3	4

26. We would like information regarding your involvement in out-door related activities. Please check the items that appropriately describe your participation in the different activities.

_____I have participated in hunting and/or trapping of wild game in the past 10 years
_____ I have participated in skiing, snowboarding, or snowmobile activities in the past 10 years
_____I have participated in fishing activities in the past 10 years
_____I have participated in hiking, canoeing, and/or camping in the past 10 years
_____I have participated in wildlife viewing activities in the past ten years

Page Break

Thank you for your cooperation! Feel free to use the blank space on the back of this page to provide any additional information you would like to share with us. Please insert this questionnaire into the prepaid envelope and mail it back to us. Your help with our project is greatly appreciated!

Appendix C: Code Book 1

Economic Benefits: Respondent reported that they somehow benefited from the wolf reintroduction monetarily or viewed the wolf reintroduction program as generally monetarily beneficial.

Economic Concern: Respondents reported a concern about either monetary loss or loss of assets, either personally or generally.

Environmental Benefits: Respondents reported benefits to having a apex predator present in the area.

Environmental Concern: Respondents reported that the wolves were causing environmental damage.

Governmental Benefits: Respondents reported some sort of benefit to having the government involved in the area, such as providing jobs or programs to help ranchers.

Governmental Concern: Respondents reported concern about the government involvement, authority, or that they were not undertaking the reintroduction in a proper manner.

Historical Resentment: Respondents referred to their ancestors or the past in general as a reason for disliking the wolf and disagreeing with reintroduction.

Intrinsic Benefits: Respondents reported that the wolf had an aesthetic appeal, or that it had the right to exist in its natural environment.

Religious Benefits: Respondents reported a religious reason for reintroducing the wolf.

Religious Concerns: Respondents reported a religious reason for not reintroducing the wolf.

Safety Concern: Respondents reported concern that their personal safety or safety in general would be compromised by wolf reintroduction.

No Comment/Don't Know: Respondents had no response to a question.

No Effect: Respondents reported the wolf reintroduction program had no effect, either on them personally or generally, depending on the question asked.

Do Not Trust Any Group to Give Accurate Information: Respondents reported that they did not trust any group to give unbiased information

Do Not Trust Government Publications/Information: Respondents reported specifically that they did not trust government information.

Do Not Trust Private Cattle/Ranching Interest Groups: Respondents reported specifically that they did not trust information distributed by ranching/cattle interest groups.

Do Not Trust Private Environment Interest Groups: Respondent reported specifically that they did not trust information distributed by environmental groups.

Trust Government Publications/Information: Respondents reported specifically that they trusted government information.

Trust Private Cattle/Ranching Interest Groups: Respondents reported specifically that trusted information distributed by ranching/cattle interest groups.

Trust Private Environment Interest Groups: Respondent reported specifically that trusted information distributed by environmental groups.

Have Not Received Any Information: Respondents indicated that they had never received any information about wolf reintroduction from any source.

Appendix D: Code Book 2

Always Report Loss: Respondents reported that they always reported a cattle depredation.

Never Report Loss: Respondents reported that they saw no point in reporting a loss or considered it a waste of time.

Involved in Ranching Currently: Respondents reported that they are currently involved in ranching, either working as a ranch hand, a ranch owner, or in another livestock dependent job.

Involved in Ranching Previously: Respondents noted that they were previously involved in ranching; generally, a decade or more ago.

Cannot Protect Cattle: Respondents reported that it was impossible to protect cows from the wolf.

Protect Cattle: Respondents noted that they actively protected their cattle in some manner

Wish to Receive Information From All Sides: Respondents noted that they wished to receive information from multiple sources and make their own decisions.

Balanced Sources: Respondents noted that they wished to receive information from what they considered balanced sources.

Internet/Online Research: Respondents indicated that they will look for their own research using electronic resources.

Scientific Journals/Other Peer Reviewed Sources: Respondents indicated that they view peer reviewed sources as an important information source.

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