

UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

EVALUATING THE LONG-TERM EFFECTIVENESS OF COYOTE
MANAGEMENT IN OKLAHOMA: HUMAN PERCEPTIONS AND TECHNIQUES

A THESIS

SUBMITTED TO THE GRADUATE FACULTY

In partial fulfillment of the requirements for the

Degree of

MASTER OF SCIENCE IN ENVIRONMENTAL SUSTAINABILITY

By

KELSEY WARREN-BRYANT

Norman, Oklahoma

2017

EVALUATING THE LONG-TERM EFFECTIVENESS OF COYOTE
MANAGEMENT IN OKLAHOMA: HUMAN PERCEPTIONS AND TECHNIQUES

A THESIS APPROVED FOR THE
DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL SUSTAINABILITY

BY

Dr. Rebecca Loraamm, Chair

Dr. Travis Gliedt

Dr. Laurel Smith

© Copyright by KELSEY WARREN-BRYANT 2017
All Rights Reserved.

ACKNOWLEDGEMENTS

There are many I would like to thank for without whom, this thesis may never have come to fruition. Always first and foremost, I thank God for all inspiration, ability, and determination. Without Him, I would never have even begun this long and rewarding project. I thank my husband Adam, for providing endless support through all of the tears, sweat, and blood that went into this thesis, and for encouraging me when I felt like I would never complete it. I appreciate the rest of my family and friends (you know who you are), for their constant encouragement and for never giving up on me. Additionally, an enormous thanks to my faculty advisor Dr. Rebecca Loraamm, who helped me turn my ramblings into an actual, readable document. I'd like to thank my thesis committee for their valued advice, and for giving up their time to serve on my committee. Much thanks to Monica Mustain, who showed me how to use ArcMap, and to Bruce Hoagland, for mentoring me through my internship with the Oklahoma Biological Survey during my last few months of writing this document. And finally, I'd like to acknowledge all the faculty and staff of the Department of Geography and Environmental Sustainability, who provided constant contact and support for my many questions.

TABLE OF CONTENTS

| | |
|--------------------------------------------------------------------------|------|
| LIST OF TABLES..... | vi |
| LIST OF FIGURES..... | vii |
| ABSTRACT..... | viii |
| CHAPTER 1: INTRODUCTION..... | 1 |
| CHAPTER 2: LITERATURE REVIEW..... | 5 |
| Coyote Life History..... | 5 |
| <i>Canis Latrans</i> Historical Range..... | 8 |
| The Role of Coyotes within the Ecosystem..... | 11 |
| Human Perceptions of Coyotes..... | 13 |
| Disruptions to Coyotes from Wildlife Policies and Road Interactions..... | 16 |
| Federal Wildlife Organizations and Policies..... | 17 |
| CHAPTER 3: RESEARCH QUESTIONS..... | 20 |
| CHAPTER 4: METHODS..... | 21 |
| Analyzing National Trends in Coyote Management and Techniques..... | 21 |
| Higher Education Institution Perception Measurements..... | 24 |
| <i>Study Area</i> | 26 |
| CHAPTER 5: RESULTS..... | 29 |
| Coyote Policies Across the United States..... | 29 |
| Survey Results..... | 33 |
| <i>Demographics</i> | 41 |
| CHAPTER 6: CONCLUSIONS..... | 50 |
| Survey results in relation to sustainability theory..... | 55 |
| Management Implications..... | 57 |
| Limitations and Future Research..... | 63 |
| REFERENCES..... | 66 |

LIST OF TABLES

| | |
|-------------------------------------------------------------------------------------------------------------------------------|----|
| Table 1. Percentage and total count of states categorized as “open hunting” and “closed hunting,” out of 50 states total..... | 30 |
| Table 2. Percentage and total count of states categorized by policy type, out of 49 states total (excludes Hawaii)..... | 32 |
| Table 3. Total count based on respondent survey questions using a 1-5 answer scale..... | 35 |
| Table 4. Total percentage of respondents to survey questions with a 1-5 answer scale..... | 35 |
| Table 5. Demographics of survey respondents, with total count and percentage of total..... | 42 |
| Table 6. Cross tabulation showing respondents’ views on coyote management methods as it compares to gender..... | 44 |
| Table 7. Cross tabulation showing respondents’ views on coyote management methods by age group..... | 47 |

LIST OF FIGURES

| | |
|-----------------------------------------------------------------------------------------------------|----|
| Figure 1: Range of coyote subspecies as of 2008..... | 9 |
| Figure 2: Support for lethal nuisance wildlife management techniques by survey respondents..... | 38 |
| Figure 3: Support for non-lethal nuisance wildlife management techniques by survey respondents..... | 39 |
| Figure 4: Views on Oklahoma’s current coyote management policy by survey respondents..... | 40 |

ABSTRACT

This study examines coyote management policy in the state of Oklahoma, comparing human perceptions within the state to nationwide coyote management policies. This research affords insight into how Oklahoma's coyote management policies measure against human expectations both within and outside the state, and provides pertinent information assisting the Oklahoma Department of Wildlife Conservation in developing future policies. Other state level coyote management policies throughout the nation are reviewed and compared to Oklahoma. Current students and alumni of the University of Oklahoma are surveyed by questionnaire on their perceptions regarding coyotes and coyote management within Oklahoma. Results suggest that compared to other states, Oklahoma's coyote management policy is not an anomaly with respect to content and enforcement. However, perceptions of those surveyed contradict the policy, with the majority of respondents either opposing it or preferring other alternatives. The policy implications of this public opposition are discussed.

Chapter 1

Introduction

Canis latrans, commonly called coyotes, are an adaptable species inhabiting several states in the United States. Over the past century, coyotes have spread from their native range to the eastern United States, expanding their territory and adapting to new environments (Levy, 2012). This versatile species has been referred to as a “trickster” in some Native American legends, due to their characteristic intelligence and wiliness (“Legendary Native American Figures: Coyote the Trickster [Southwest]”; Oklahoma Department of Wildlife, 2011). These traits have enabled coyote populations to persist despite historic efforts to curb their growth and migration into new areas (Levy, 2012).

The Oklahoma Department of Wildlife webpage states that coyotes are often viewed as a “nuisance” species due to the potential for coyote-human conflicts (“Coyote”, 2011). Coyote-human conflicts may occur where coyotes venture into human habitat; this may result in vehicular collisions and attacks on humans, pets, or livestock (Tigasa et al., 2002; “Avoiding conflicts with coyotes,” 2016; Conner et al., 2008). Incidents involving coyote-human conflict are reported regularly. In fact, some Oklahoma news outlets have reported increased sightings within the past few years, particularly in urban areas such as Oklahoma City and Tulsa (Day, 2012; News 9, 2015; KFOR-TV, 2016). Citizens quoted in news articles appeared to be most concerned with the protection of pets and children from coyote attacks. These concerns fall within the jurisdiction of, and

may be addressed by the Oklahoma Department of Wildlife Conservation (ODWC), which is the primary provider for wildlife management services within Oklahoma state government.

Despite this canine's reputation of being a nuisance, coyotes play a vital ecological role in monitoring prey populations. A few of these include rodents, rabbits, and in some areas, deer (Best et al., 1981; Holle et al., 1977). They are particularly important in the state of Oklahoma due to having little to no competition for food resources; this indicates that changes in coyote populations have the potential to impact several parts of their natural ecosystem (Wallach et al., 2015; Crooks and Soule, 1999). Wildlife managers acknowledge the complexity of natural ecosystems and the importance of each moving part in an ecosystem (Chiras and Reganold, 2010). Viewing coyote management through this complex ecological approach may provide deeper understanding into the role these predators play and the proper methods of managing their populations.

The publicly stated management policy for coyotes for the state of Oklahoma consists of an open, year-round hunting season (Oklahoma Department of Wildlife Conservation, 2011). Though hunting seasons are commonly used to control wildlife populations, nationally, lethal methods of wildlife control can be controversial (Manfredo et al., 2017; "Lethal Wildlife Management"). In some cases, lethal methods are considered ineffective (Warburton and Norton, 2009; Zipkin et al., 2009; Conner et al., 2008). Public opinion has played a significant role in the shaping of United States governmental policy throughout history

(Lijphart, 1984; Manfredo et al., 2017). Due to the causal relationship between public opinion and policymaking in American democracy, understanding current trends in public opinion is vital to properly assessing the stability of current wildlife management policies. For controversial policies such as lethal wildlife management, understanding public opinion is crucial to accurately predict changes in wildlife management policy.

This research aims to determine if Oklahoma's current coyote management approach is likely to be effective in the long-term. This study contributes to the sustainable resource management literature (Chiras and Reganold, 2010), in that this study first acknowledges that proper management of coyotes is required to ensure healthy and balanced ecosystems throughout the state of Oklahoma. For this reason, to operate long-term, the current coyote management plan must have some level of support from important outside influences. To provide a framework for this assessment, this research will consider any outside forces that ultimately affect management method decisions, focusing on public opinion as an important factor influencing policy choices. Second, this research will provide for a measure of current public opinion with respect to coyotes and coyote management in Oklahoma. Finally, this research will discuss how public opinions compare to national wildlife management trends on the state level. Chapter 2 provides a literature review examining coyote life history, the role coyotes play within different ecosystems, historical human perception of the species, potential species disruption, and management strategies.

Chapter 3 lists the research questions to be addressed. Chapter 4 presents the methodology used to gather and evaluate survey data. Chapter 5 summarizes the results, and Chapter 6 discusses these results and their potential management implications.

Chapter 2

Literature Review

The following literature review provides an overview of coyote life history and home range information as background for the study. Coyote roles in different ecosystems are discussed. Historical human perceptions of coyotes are examined, and possible disruptions to the species resulting from human activities are also discussed. Finally, relevant wildlife management policies are reviewed.

2.1. Coyote Life History

Coyotes were first documented by Lewis and Clark in 1804, though Native American legends acknowledged the coyote prior to this (“Legendary Native American Figures: Coyote the Trickster [Southwest]”). Since its documentation by Lewis and Clark, the coyote has spread across the United States. Coyote populations expanded from their native range eastward, nearing the east coast of the United States in the 1900s (Levy, 2012). Studies have been conducted since then in order to understand the coyote’s life cycle (Bekoff, 1977; Hennessy et al., 2012).

Canis latrans are canines that may weigh as little as 8.16 kg and up to 22.67 kg in adulthood. Adult females tend to be smaller and weigh less than adult males, with adult males in Texas averaging 16.75 kg and females 13.62 kg.

Coyotes residing the southern and western parts of the United States tend to have gray or brown fur mixed with red, compared to the gray and black coloration of

their northern and eastern cousins (Bekoff, 1977). Coyotes may travel in packs, in pairs, or alone (United States Forest Service Database). It is theorized that the formation of coyote packs is a survival mechanism, used to more easily take down large prey (United States Forest Service Database). Therefore, for individuals, remaining close together in a pack is crucial to survival. The size of a coyote pack is chiefly dependent on the size of prey in the area, where an abundance of large prey encourages pack behavior (United States Forest Service Database). Where smaller prey is available, lone coyotes are more common (United States Forest Service Database).

Mating generally occurs between the months of January and February (Hennessy et al., 2012). The majority of paired coyotes exist in monogamous bonds that last the entirety of their lives (Hennessy et al., 2012). Packs are led by the mated pair, which then breed and create the litters for the pack. The rest of the pack may consist of one or more individuals that support the breeding pair and the litter (Hennessy et al., 2012). Litters may consist of three or more pups, though size of litter largely depends on availability of food and the ability of females to give birth. More pups may be present in an environment with abundant food resources (Mastro, 2011; United States Forest Service Database).

Gestation takes place over approximately sixty days (Mastro, 2011; Bekoff, 1977). Pups are born in dens and may be moved several times by the adult coyotes. Though it is not certain why pups are moved so often, it is possibly due to the arrival of potential threats near the den, such as parasites, predators, or

humans. At six to eight weeks of age, the juvenile coyotes leave dens for sites on the ground. The pups begin to travel widely at thirteen weeks, and will independently search for food shortly thereafter. At six to nine months of age young coyotes generally leave the vicinity of their dens, either alone or accompanied by a pack. However, some may not leave until they are up to one year of age (Mastro, 2011; United States Forest Service Database).

The sizes of coyote home ranges differ across the United States. For example, in Texas coyotes will commonly cover two square miles from the den, while coyotes in the northeastern United States may cover twenty-one to fifty-five miles on average (United States Forest Service Database). Coyote range has also been shown to vary with food availability and pack size. For example, lone coyotes may cover broader ranges than packs (United States Forest Service Database).

Coyotes are both hunters and foragers, relying primarily on meat but also eating berries and other fruits (Boisjoly et al., 2010; Bekoff, 1977). Hunting and foraging is usually done at night, while the den is used for resting during the day (United States Forest Service Database). As of 1977, the coyote's primary meat sources in some regions of Oklahoma included rodents, livestock, elk, and deer (Holle et al., 1977). However, more recent studies on coyote diet are needed in order know whether these still constitute their primary protein sources.

2.2. Canis Latrans Historical Range

The range of *Canis latrans* has been shown to extend from Alaska south to Costa Rica (Bekoff, 1977). As shown in Figure 1, the range of coyote presence across the continent has changed little in the past forty years. In the 1800s, coyotes primarily inhabited the southwestern and central United States. Populations expanded in the 1900s, moving eastward from the plains, likely due to decreasing gray and red wolf numbers. In fact, coyotes have emerged as top predators in several areas of the United States where wolves once dominated (Fraser, 2016; Prugh, 2009). This rapid expansion has enabled coyotes to move beyond their historic home range, with some eastern states having recorded coyote sightings just within the past sixty years (Gompper and Matthew, 2002).

Canis latrans range in North America



Figure 1: Range of coyote subspecies as of 2008. Coyote home range data from IUCN Red List, <http://maps.iucnredlist.org/map.html?id=3745>.

Though coyotes are currently common in the northeastern United States, variation in size and behavior compared to coyotes in the West and Plains regions

is apparent. Eastern coyotes, occasionally referred to as “coywolves,” are thought to have bred with wolves at some point in their history. Eastern coyotes are reported as distinctly larger than coyotes in the west and are genetically unique (Way and Timm, 2011). For example, eastern coyotes are generally over thirty pounds, occasionally reaching up to sixty pounds (Way, 2008). Their western cousins may range from twenty to forty pounds at their heaviest (“Western Coyote (*Canis Latrans*)”). Due to their larger size, eastern coyotes have the ability to hunt larger prey. Instead of relying primarily on hunting small game, eastern coyotes are reported to hunt moose and in some instances, caribou (Benson and Patterson, 2013; Boisjoly, 2010). In fact, one of the only human fatalities in the Northern Hemisphere occurring from a coyote attack was perpetrated by eastern coyotes, when a 19-year-old woman was killed in Canada in 2009 (“Coyotes around the continent,” 2016).

Some coyotes are thought to have bred with red wolves, with red wolf genes contributing to the red coloration of coyotes within the central United States (Dunn and Smith, 2011; Levy, 2012). Hybridization of coyotes and domestic dogs has also been theorized (Adams et al., 2003; Mowry and Edge, 2014). Though the interbreeding of coyotes and dogs has long been assumed, one recent study conducted a genetic analysis of coyotes in the southeastern United States, with individuals sampled from Florida to West Virginia. It was concluded that at some point in their genetic history, southeastern coyotes had most likely interbred with domestic dogs. This could have also contributed to variations in size and coat

color among coyotes in different regions (Adams et al., 2003). Coyote and dog hybridization was proved even more likely by a study completed for melanistic coyotes. Melanistic coyotes are coyotes with completely black fur; a rare occurrence in the wild. In a genetic study estimating the numbers of melanistic eastern coyotes, it was determined that hybridization with domestic dogs was not the only genetic mixing that probably took place. Coyote breeding with gray wolves and red wolves was also suggested. This determination was due to the observed, proportionally larger numbers of melanistic coyotes in the eastern United States, as well as other genetic components. (Mowry and Edge, 2014). Oklahoma coyotes tend to be most similar in appearance to western coyotes (Bekoff, 1977). However, the genetic history of coyotes in Oklahoma specifically is unclear.

2.3. The role of coyotes within the ecosystem

Canis latrans can exist both as apex and mesopredators, depending on the particular ecosystem inhabited. An apex predator is a predator that has little to no competition within its environment, while a mesopredator is a predator that is not dominant and does have competition. Coyotes have been considered mesopredators when wolves or bears were present; however, where larger predators are scarce, coyotes dominate as apex predators (Wallach et al., 2015; Crooks and Soule, 1999).

As a mesopredator, coyotes tend to form smaller packs, have lower population densities, and exhibit an increased reliance on scavenging for food. As a result, their diet is more likely to consist of rodents, birds, or vegetable matter. In comparison, as an apex predator they have less competition, allowing for higher survival rates. This results in larger packs, allowing coyotes to attack larger prey (Crabtree and Sheldon, 1999; United States Forest Service Database). Coyotes are mesopredators in ecosystems where large amounts of wolves or bears are present. However, due to the lack of a wolf population and any other particularly large predators, coyotes reign as apex predators in the state of Oklahoma (Pugh, 1997). In Oklahoma, large packs may enable predation of large prey such as deer and livestock. In the southeastern United States in particular, deer tend to be a primary food source for coyote packs (Chitwood et al., 2014). However, this can vary among different landscapes, and largely depends on food availability, coyote numbers, and the ratio of coyote packs versus lone coyotes (Etheredge et al., 2015; United States Forest Service Database). Further study is required to fully understand the dynamics and diet of coyotes in the state of Oklahoma.

Despite the need for further research, coyotes in Oklahoma play a particularly important role in the ecosystem due to their position as apex predator (Wallach et al., 2015). According to a study (Best et al., 1981) examining the stomach contents of coyotes in the Mixed-grass Plains Biotic District and the Osage Savannah Biotic District of Blair and Hubbell in Oklahoma during 1970, cattle and rodents were the primary food sources discovered, with cattle appearing in

over thirty-three percent of stomachs and rodents appearing in twenty-seven percent of stomachs. Insects and rabbits were also recorded at smaller numbers. The cattle flesh was rotting, suggesting that cattle ingested was carrion. These results suggest that coyotes may play a significant role in modulating rodent populations, and serve as natural cleaners of their habitats due to their tendency to eat carrion.

2.4. Human Perceptions of Coyotes

Human valuation of species varies. Human perceptions may be based on species aesthetics, personal experiences with the species, perceived economic benefit, or media portrayal of the species (Skonhofs et al., 2005; Mincolla et al., 2015). For example, a qualitative study concerning the value of aesthetic perception of wildlife with respect to conservation beliefs in Kenyan communities was completed (Grilo et al., 2014). When the authors examined their participants' responses about their aesthetic appreciation of wild animals compared to their desired method of management of these species, it was found that the majority of species considered "ugly" or "in need of removal" were also considered a pest (Grilo et al., 2014). The primary cause of conflict between humans and wildlife in this case was wildlife interference with livestock and agriculture. In addition, the authors concluded that a lack of experience with these species contributed to the desire to see the species removed.

Coyotes are also sometimes referred to as a “nuisance” or a “pest.”

Coyotes, much like their wolf counterparts, tend to be a controversial species, particularly amongst farming communities due to perceived livestock loss associated with coyotes (Conner et al., 2008). Different studies involving the examination of coyote stomach contents show a varied diet, with ingested cattle presumed to primarily consist of carrion (Best et al., 1981; Holle et al., 1977; Ellis, 2015). Still, there is a lack of recent research on this topic conducted within the state of Oklahoma. The relationship between coyotes and cattle within the state is uncertain and requires further study (Mitchell et al., 2004). However, coyotes do account for the largest percent of predator population in Oklahoma with respect to sheep and goat predation (Pugh, 1997).

A secondary concern is the potential for coyotes to attack humans. Though cases are rare, there have been documented incidents (“Coyote conflicts: a research perspective,” 2016; Gehrt and Quirin). Only two of these occurrences within the United States and Canada have been reported as fatal in recent history. The first was in 1981 when a three-year-old died of injuries sustained during a coyote attack. The second occurred in 2009, when a 19 year-old was killed by a pack of coyotes while hiking in a national park. Less specific accounts of attacks from coyotes have been recorded across fourteen states in the United States and 4 Canadian provinces. 142 attacks occurred between 1985 and 2006, with 159 human victims. The majority of these were considered to be predatory or investigative coyote actions. A predatory act refers to a coyote that appeared to

pursue humans as prey, while the investigative acts are coyotes biting resting humans to find out if they are a viable prey source. Less serious attacks have occurred due to the presence of pets with humans, where coyotes had felt threatened (defending their pups or their den), or where coyotes had been diagnosed with rabies. The majority of these instances occurred in outdoor areas, either in parks or outside of residential homes. A third of them occurred after the humans that were attacked had been feeding the coyotes (“Coyote conflicts: a research perspective,” 2016; Gehrt and Quirin). Feeding coyotes can sometimes cause coyotes to stop fearing humans. This encourages coyotes to test people or their pets as a prey source. Feeding coyotes, whether intentionally or unintentionally, is discouraged by wildlife experts (“Avoiding conflicts with coyotes,” 2016). Additionally, coyotes in some areas have been recorded to have increased interaction with humans due to loss of habitat. They often venture into roads, causing vehicular collisions (Tigasa et al., 2002).

Negative perceptions of wildlife can correlate with lack of interaction or personal experience with wildlife, as observed by Grilo et al., 2014. As demonstrated in Grilo et al., 2014, it is possible that negative perceptions of coyotes stem from humans’ lack of experience with the species. Still, very little research has been completed concerning human perceptions of coyotes. Additional research is required to better understand human perceptions of coyotes and how they correlate with opinions on wildlife management strategies.

2.5. Disruptions to coyotes from wildlife policies and road interactions

Coyotes are known for their ability to adapt to different environments. Unlike gray wolves, coyotes have thrived and expanded alongside human settlements in the United States. In the past century coyotes have spread to the eastern United States along the coast. This ability to expand within harsh environments is possibly due to their natural elusiveness and varied diet (Gompper and Matthew 2002; Bekoff 1977). For example, coyotes can live despite a lack of availability for large protein sources. Stomach contents of coyotes have revealed a number of things, including grass, birds, rodents, rabbits, berries, and vegetables (Best et al., 1981; Holle et al., 1977; Ellis, 2015).

Still, coyote populations can be disrupted. Human expansion has limited their available habitat and increased human-coyote interaction in recent decades. Many states address local coyote populations through an open-hunting season or trapping. However, it is uncertain what affect this policy has on coyote populations. For example, coyote-deer interactions were observed in South Carolina (Banegas, 2015). After enacting trapping methods to reduce the coyote population, it was concluded that the effectiveness of trapping was uncertain. The mixed results of the study made it clear that the costs of trapping would potentially be more than the expected benefit (Banegas, 2015).

Roadside deaths could potentially account for more disruption to coyote populations than hunting or trapping. In an isolated study examining coyote interactions with roads, it was found that vehicular collision was the primary

cause of death within coyote populations (Tigasa et al., 2002). However, packs that are not located near major roads may not experience the same mortality rate as packs that are. Additionally, roadside deaths and injuries would likely vary by location, making it difficult to arrive at any broader conclusions.

2.6. Federal wildlife organizations and policies

In the United States, national wildlife policy is managed by two government organizations, each with very different roles in the management of wildlife. These organizations include the United States Fish and Wildlife Service, and the USDA's Wildlife Services division. Within the Department of the Interior, the United States Fish and Wildlife Service is an organization that manages various fish and wildlife resources across the nation ("About the U.S. Fish and Wildlife Service"). Their mission includes three objectives: to assist in the development of citizen environmental stewardship, to conserve and manage the nation's fish and wildlife resources, and to provide information to the public about how to appreciate and conserve fish and wildlife resources. The United States Fish and Wildlife Service is well known for their role in wildlife law enforcement as part of their effort to meet these objectives. One of the most acknowledged laws enforced by USFWS is the Endangered Species Act. The Endangered Species Act, or ESA, was created in 1973 to protect species considered endangered or threatened. This act is a basis for animal conservation and education efforts, and

underlies the mission of the United States Fish and Wildlife Service (“Endangered Species”).

The other governmental organization involved in the management of wildlife is the less publicly known Wildlife Services, or WS (United States Department of Agriculture). Wildlife Services is a part of the United States Department of Agriculture, or the USDA. WS provides wildlife damage mitigation services to landowners who request assistance with nuisance wildlife. They also invest in developing new wildlife damage management techniques, to better resolve conflicts between humans and animals. As coyote numbers increase, it is likely that WS will be called on to resolve more human-coyote conflicts.

WS claims to be interested in animal welfare, and in reducing harm to animals when resolving conflicts (United States Department of Agriculture). Despite these statements, WS has received criticism from some proponents of animal welfare who requested reduced government funding to the agency. For example, one article accuses the agency of using inhumane lethal practices which are illegal in several states and other countries. The article claims that coyotes in particular were targeted by the agency. In 2014 alone, 61,702 coyotes were reported to have been killed by the agency (Ketcham, 2016). Drawing on this article, author Bale accused WS of being non-transparent, inhumane, and ineffective (Bale, 2016). Bale called on the public to demand dismantling of the WS and for government spending to cease with respect to the agency. Though WS

still operates using federal funding today, it is possible that with increased public opposition the agency will eventually be defunded.

Though federal organizations do have final authority in the management of the country's wildlife, individual states are left significant authority in managing local wildlife (Favre, 2003). Local wildlife is considered a state resource; unless a federal law is being broken or the assistance of Wildlife Services is requested, federal involvement in the management of state wildlife is customarily minimal. Therefore, though federal law supersedes state law, careful consideration of local policies is important when studying coyote management methods. The next chapters explain how state coyote management and public opinion were analyzed in support of the goals of this research.

Chapter 3

Research Questions

In this research, the following questions were addressed:

1. What coyote management techniques are currently being used across the United States?
2. How do people in higher educational institutions perceive coyotes, as well as the current Oklahoma techniques for coyote management?

Chapter 4

Methods

This research was conducted to review and compare coyote management techniques currently being used across the United States, and to determine how people in higher educational institutions perceive coyotes and Oklahoma coyote management techniques in particular. The following sections include a description of the study area, research methods for analyzing national trends, and methods for measuring human perceptions.

4.1. Analyzing national trends in coyote management and techniques

State-level coyote management techniques were identified based on information present on state wildlife management agency websites. Each state website was reviewed and descriptions of their respective coyote management strategies were obtained. Websites were chosen as the primary source of data for the following reasons. First, state webpages reflect public information; the information displayed on a state agency's webpage is generally a reflection of official policy as stated to the public. Websites were also preferred in order to keep the information collected as uniform and accurate as possible. For example, if information was gathered first from the state's webpage and then the department was called via telephone to elaborate on the plan, it is possible two different answers would be received, depending on who was available at the department to

provide the information. Therefore, reviewing state webpages was the simplest way to obtain consistent public-facing information, as opposed to using other media.

From review of each state webpage, two general themes were identified: coyote hunting policy and nuisance coyote management practices. These were considered separate policies, and most states treated them as separate policy objectives. In order to quantitatively evaluate this large set of qualitative data, each of the state policies were organized into categories. These categories were developed based on the review of the state webpages. After recording and examining each state policy, recurring policy trends were identified and separated into categories. Following this review, it became apparent that within coyote hunting policy there were two primary policy types. Many states held year-round hunting seasons with no bag limit on coyotes. Because this policy was open and unlimited, these states were categorized as “open hunting.” The remaining state webpages claimed to have closed hunting seasons, meaning that coyotes could only be hunted within a specified season. Due to the closed hunting season, these remaining states were considered to have “closed hunting.” Since no states outlawed coyote hunting completely, these were the only two generalized hunting policies identified.

When reviewing each state webpage to identify individual nuisance coyote policies, the results were more diversified than in coyote hunting. Nuisance coyote policies were often vague or not stated. In contrast, some state policies

were detailed or unique to that state. After reviewing each individual state webpage, four themes were identified for the purpose of categorization. The first of these was called “limited assistance policy.” This category was developed due to a number of state websites noting that assistance would not be provided to landowners except in special cases, such as property damage, or a coyote attack on a human or a pet. Assistance in this case refers to a direct use of the department’s resources, and excludes the provision of educational materials or offering advice to the citizen. In the case of an attack, methods of dealing with the aggressive coyote varied by state. Many state webpages stated that euthanasia would be used in those instances, while some webpages did not list a specific method of removal at all. However, because none of these states would provide direct help to citizens except in cases of severe coyote aggression, these states were considered to have “limited assistance policies.”

Another policy that became apparent after reviewing state webpages was called “educational policy.” “Educational policy” included states that appeared to place high value on educating citizens on the best ways of handling human-coyote conflicts. Educational policies were not easy to identify; many states seemed to value education by providing an abundance of information about coyotes on their government website, but did not necessarily cite education as their chosen policy. For the sake of categorization, “educational policy” was chosen to include states which offered educational programs as their main source of nuisance coyote

control, or which included five or more educational pages concerning coyotes in website materials.

“No policy” was another category identified in this research. “No policy” included states that did not have any affirmative policy on their government website regarding coyotes, or which directly stated that there was no governmental policy. Finally, “other policy” included states with a policy that didn’t fit into any other category. Oklahoma was considered “open hunting” and “no policy.” This was because there was no closed hunting season for coyotes, and there was no nuisance coyote policy offered on the state website, except for a reference to local pest control operations.

4.2. Higher education institution perception measurements

A survey was sent to students and alumni from the University of Oklahoma. It was created via Qualtrics, a survey program with licensing provided by the University of Oklahoma. Qualtrics generated a web link to a custom survey; this link was sent via email to 500 students and 606 alumni, along with a message requesting participation. The survey was sent through student and alumni list serves.

The survey consisted of twenty questions designed to better understand perceptions of coyotes and views regarding Oklahoma’s coyote management strategies. Each question had a selection of options to choose from, which allowed

for summary and analysis of the responses. Three of these questions were presented with a 1-5 answer scale. This 1-5 scale was used to best determine how respondents perceived coyotes and their past experiences with coyotes on an even, incremental scale.

The beginning of the survey asked whether respondents viewed coyotes as beneficial to people and the environment around them. This led into a series of questions about respondents' experience with coyotes. Respondents' experience with coyotes was assessed to provide some insight into the potential relationship between their past experience compared to their perception of coyotes. After a series of questions regarding respondents' past experience with coyotes, they were asked again whether they perceived the species to be beneficial, with the question rephrased. The question was repeated in order to observe if answers would change after respondents recalled their past experiences with coyotes. The following series of questions focused on gauging opinions on Oklahoma coyote management methods. Respondents were asked about their views on various lethal methods compared to non-lethal methods. They were then asked whether they agreed with Oklahoma's coyote management methods, and if they had any recommendations for the Oklahoma Department of Wildlife. The survey ended with demographic questions to better understand the group that was surveyed.

Some questions included the option to provide further explanation for the available selections. Only one question specifically requested that respondents explain their answer; this question asked respondents if they had any

recommendations for the Oklahoma Department of Wildlife. The “yes” and “no” options included large text boxes underneath the selections, allowing respondents to select “yes” or “no,” then explain their choice further by typing in the text box. This was done first to observe if most respondents had any recommendations at all. In the case of the majority of respondents providing typed recommendations, these could have been reviewed to detect trends within the thinking of respondents.

For evaluation of the results, functionality found in Qualtrics was utilized. Qualtrics provided downloadable reporting that displayed the percentage of respondents that chose each selection. To provide further insight into how the answers of respondents differed by demographic group, several cross tabulations were created using a cross tabulation function provided by Qualtrics. Qualtrics also displayed all open-ended, written responses for review. There were not enough written responses to justify full qualitative analysis of the written responses.

4.2.1. Study area

One objective of this research was to compare perceptions and wildlife management methods in Oklahoma to those across the United States. Therefore, the study area used to address the first research question was defined as every state within the United States. Including Oklahoma, 50 states were analyzed. Hawaii was considered as separate, due to not being a part of the natural coyote home range.

While the state policy identification approach developed for the first research question had a nation-wide study area, the survey approach used for the second research question was specific to a particular subset of people within Oklahoma. The survey-based study was completed within the University of Oklahoma located in Norman, Oklahoma, in Cleveland County. This area was chosen to gain insight into human perceptions of coyotes and Oklahoma coyote management, as coyotes are known to exist in the vicinity and the student and alumni population were readily accessible with respect to email surveying. The University of Oklahoma website states that over 30,000 students are currently enrolled (“What do you know about OU?”). The age concentration of students is primarily 18-22, with approximately 62% of students within that age bracket (“University of Oklahoma Campus.”). The student population is comprised of 51.4% females and 48.6% males. There is a 61.7% concentration of Caucasian students, 8.9% Hispanic or Latino, and the remaining 29.4% is comprised of other races. 60% of students attending the University of Oklahoma lived within the state of Oklahoma before enrolling at the university.

The survey was sent primarily to current science majors, within various realms of science. These included biology, geography, etc., with 500 students included in the list serv. 606 alumni were also included, consisting of various majors. This subset of people was chosen as a representative population of people in higher educational institutions. Faculty, staff, and other majors were not accessible due to the university’s regulations and the limited time frame in which

this research was to be conducted. However, with 500 students of various science majors and 606 alumni of differing ages and occupations, the group was considered diverse enough to act as a sample population of people in higher educational institutions. Of the 1,106 total that the survey was sent to, 118 completed the survey. This equates to an 11% response rate.

The University of Oklahoma was built in 1890 on prairie land, with the current campus expanding across 4,190 acres, according to US News. Though the university is now known for its diverse vegetation, it is situated within the city of Norman, which consists of 178.76 square miles of primarily urban area (United States Census Bureau). Little information is available regarding the number of coyotes within Norman or surrounding areas. However, coyotes are mentioned as a primary deer predator in Cleveland County, by the Oklahoma State University: Cleveland County Cooperative Extension (“Cleveland County Cooperative Extension”).

Chapter 5

Results

The following chapter explains the results of the research, beginning with an examination of coyote policies across the United States and ending with a review and summary of the survey results taken from the OU student and alumni population. Coyote policies are recorded on a state-by-state basis, then separated into different categories for comparison. Survey results are documented, with the potential influence of demographics being discussed in the last section.

5.1. Coyote policies across the United States

Information on state policies concerning coyotes was gathered from individual state agency webpages, comprising information drawn from forty-nine states. The state of Hawaii was omitted from consideration due to its lack of an endemic coyote population. From this approach, two types of coyote management were derived: policies concerning hunting, and policies regarding “nuisance” coyotes.

Hunting policies were divided into two categories, which included “open hunting” and “closed hunting.” “Open hunting” included states with a year-round coyote hunting season. “Closed hunting” included states with closed coyote hunting seasons. Oklahoma’s policy fell into “open hunting,” with no bag limit on coyotes. Concerning hunting, Oklahoma’s policy matched most state policies. Eighty-six percent of states had “open hunting” policies (Table 1). Ten percent

had closed hunting seasons. Outside of the eight-six percent in “open hunting” and ten percent in “closed hunting,” two states were considered as “other”. This is due to Alaska’s hunting policy varying by county, and Hawaii not being a part of the coyote home range.

Table 1. Percentage and total count of states categorized as “open hunting” and “closed hunting,” out of 50 states total.

| Policies | <i>Open hunting</i> | <i>Closed hunting</i> | <i>Other</i> |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------|
| States | Oklahoma, Texas, California, Arkansas, Kansas, Arizona, Missouri, New Mexico, Louisiana, Colorado, Utah, Nevada, Oregon, Mississippi, Nebraska, Wyoming, Iowa, Illinois, Idaho, Washington, Montana, South Dakota, North Dakota, Minnesota, Wisconsin, Indiana, Michigan, Kentucky, Tennessee, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, West Virginia, Ohio, Maryland, Pennsylvania, Connecticut, Vermont, New Hampshire, Maine | Delaware, New Jersey, New York, Rhode Island, Massachusetts | Alaska, Hawaii |
| Total Number of States: | 43 | 5 | 2 |
| Percentage of States: | 86% | 10% | 4% |

Regarding nuisance coyote policies, results were more varied. Nuisance coyote policies were divided into four sub-categories: “limited assistance policy,” “educational policy,” “no policy,” and “other policy.” “Limited assistance policy”

included states that limited their involvement in the management of nuisance coyotes to instances of damage to property, pets, or threats to human safety. “Educational policy” included states with either an explicit statement of education being part of their policy, or whose website included five or more educational pages on coyotes. “No policy” covered states that appeared to place the sole responsibility of handling nuisance coyotes on the homeowner, or states that did not state their policy at all. “Other policy” encompassed states that did not fit into any of the other three categories.

Of these, Oklahoma was considered “No policy,” as little information was given to homeowners on how to attend to nuisance coyotes (apart from hunting regulations). Oklahoma’s policy was not an abnormality compared to other “no-policy” states. However, Oklahoma did not fall into the “educational policy” category either, which held the largest proportion of states. States differed among these categories, with the largest portion having an “educational policy,” at forty-three percent (Table 2). The second largest category was “no policy,” which included forty-one percent of states. “Limited assistance policy” comprised around twenty-nine percent of states. “Other policy” had the least amount, with only approximately ten percent of states in this category. Several states were considered to have more than one category. For example, New Jersey was both limited assistance and educational because while it had seven webpages devoted to public awareness of its coyote policy, it also provided assistance to citizens in

the instances of damage to livestock or to human safety. “Educational policy” and “no policy” did not overlap in the results.

Table 2. Percentage and total count of states categorized by policy type, out of 49 states total (excludes Hawaii).

| Policies | <i>Limited assistance policy</i> | <i>Educational policy</i> | <i>No policy</i> | <i>Other policy</i> |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| States | California, Arizona, Missouri, New Mexico, Colorado, Nevada, Oregon, Washington, Montana, Alabama, Delaware, New Jersey, Rhode Island, Massachusetts | Texas, California, Colorado, Nevada, Oregon, Montana, South Dakota, Minnesota, Wisconsin, Michigan, Georgia, Florida, South Carolina, North Carolina, Ohio, New Jersey, New York, Rhode Island, Massachusetts, Vermont, Alaska | Oklahoma, Arkansas, Kansas, Louisiana, Utah, Mississippi, Nebraska, Wyoming, Iowa, Illinois, North Dakota, Indiana, Kentucky, Tennessee, Virginia, West Virginia, Maryland, Pennsylvania, Connecticut, New Hampshire | Idaho, South Dakota, Minnesota, Wisconsin, Maine |
| Total Number of States: | 14 | 21 | 20 | 5 |
| Percentage of States: | 29% | 43% | 41% | 10% |

Based on these results, it appears that most states support a year-round coyote hunting policy. The few states with closed hunting seasons are almost exclusively in the northeastern United States, where incidence of coyote populations is a relatively recent phenomenon. However, nuisance coyote policy

is much more varied, and often not immediately clear given the public-facing information provided on state agency webpages. Though a slight majority of states do offer a plethora of educational materials to web users, most do not provide further assistance or regulate the killing of nuisance coyotes.

Though Oklahoma's policies were similar to many other states, the state is unique in its relationship to coyotes. Oklahoma is in the center of the coyote home range, in between the individual ranges of the traditional western coyote and the more recent eastern coyote (Figure 1; Way and Timm, 2011; "Western Coyote (*Canis Latrans*)"). Additionally, with the eradication of wolves in Oklahoma, coyotes have long been established as a top predator (Freeman, 1976; Wallach et al., 2015; Pugh, 1997). These factors, along with a historic preference for minimal government intervention, made Oklahoma an interesting place to review and survey regarding coyote management (Rausch, 1998).

5.2. Survey Results

The survey was sent to 1,106 people, including 500 students and 606 alumni. Of this, 141 people responded at a 13% response rate. However, out of the 141 respondents, only 118 both agreed to participate and identified as Oklahoma residents. Therefore, the response rate for Oklahoma residents pursuant to this study's objectives was 11%.

The survey consisted of questions dealing with two themes: how the respondents perceived coyotes, and how they perceived Oklahoma's methods of

coyote management. The first section of the survey instrument begins by asking respondents how beneficial coyotes are from their perspective, with possible answers ranging from “not beneficial at all” to “very beneficial” (Table 3; Table 4). Most respondents chose the answer “somewhat beneficial,” at 36%. The least amount of respondents chose “not beneficial at all,” at 4%. “A little beneficial” and “neutral” comprised 20% and 27% of responses, respectively. “Very beneficial” represented 13% of responses. The next questions in the section asked about respondents’ past experiences with coyotes. 83% of respondents claimed to have had an experience with a coyote, either directly or indirectly. When these people were directed to elaborate on this experience, many identified the experience as being neither positive nor negative, at 47% (Table 4). Most negative experiences with coyotes involved the coyote crossing the road in front of the respondent (51%), and most positive experiences were associated with respondents’ wildlife watching activities (74%). Around 30% of respondents stated they had never had a negative experience with a coyote, while only around 10% said they had never had a positive experience. These answers indicate that more respondents had positive experiences with coyotes than negative. Around 36% of people viewed coyotes as somewhat beneficial, and around 47% of the respondents that had a direct or indirect experience with coyotes categorized the experience as neither positive or negative. These percentages imply that a slight majority of people do recognize that coyotes have an important function within their ecosystem; these respondents do not feel they have been meaningfully

impacted by coyotes, either positively or negatively. However, it is interesting that when respondents were asked specifically about whether their experience was positive or negative, a significantly higher percentage of respondents chose positive experiences rather than negative.

Table 3. Total count based on respondent survey questions using a 1-5 answer scale.

| Survey Response Count | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|
| <i>On a scale of 1-5, how much do you perceive coyotes as beneficial, with 1 being the lowest and 5 being the highest?</i> | 5 | 22 | 30 | 40 | 15 |
| <i>On a scale of 1-5, how was that experience, with 1 being very negative and 5 being very positive?</i> | 5 | 11 | 43 | 25 | 8 |
| <i>On a scale of 1-5, please rate your belief on the type of effect that coyotes have on people and the environment around them, with 1 being very negative and 5 being very positive.</i> | 1 | 19 | 31 | 48 | 11 |

Table 4. Total percentage of respondents to survey questions with a 1-5 answer scale.

| Survey Response Percentage (%) | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|
| <i>On a scale of 1-5, how much do you perceive coyotes as beneficial, with 1 being the lowest and 5 being the highest?</i> | 4 | 20 | 27 | 36 | 13 |
| <i>On a scale of 1-5, how was that experience, with 1 being very negative and 5 being very positive?</i> | 5 | 12 | 47 | 27 | 9 |
| <i>On a scale of 1-5, please rate your belief on the type of effect that coyotes have on people and the environment around them, with 1 being very negative and 5 being very positive.</i> | 1 | 17 | 28 | 44 | 10 |

At the end of the first section, the first question was rephrased and presented again to survey respondents. It asked how the respondent thought coyotes affected people and the environment around them, ranging from “very negative” to “very positive” (Table 4). This time, 44% expressed the effect as “somewhat positive,” compared to the 36% that chose “somewhat beneficial” at the beginning. This equated an 8% increase in respondents who stated that coyotes are somewhat beneficial. “Very negative” only received 1%, compared to the original 4% that originally chose “not beneficial at all.” “Somewhat negative” held 17% of respondents, and “neither positive nor negative” held 28%. Interestingly, the percentage who chose “very positive” went down from the original choice of “very beneficial,” from 13% to 10%. The reason for these changes is uncertain, but could be due to the phrasing of the question. It could also have been caused by the recollection of past experiences with coyotes, brought about by respondent review of the previous questions in the survey. This would explain the decreased percentage of negative views, since more respondents claimed to have had positive experiences with coyotes.

Respondents were asked in the next section if they agreed with lethal methods for managing wildlife, which could include hunting, poison, etc. The results were split. 54% said “yes,” and 46% said “no.” The next question asked what types of lethal methods they agreed with. The biggest portion agreed with hunting, at 60% (Figure 2). Strangely, this was a higher percentage than the 54% that agreed with lethal methods in general. This could perhaps be explained by a

small percentage of respondents overlooking the first question, not realizing that hunting was classified as a lethal method. It could also have been affected by the fact that only 108 people responded to the first question, while 110 responded to the second. The second largest percentage agreed with euthanizing a coyote that has attacked a human, including 43%. 35% did not agree with any lethal methods. The remaining options, including euthanizing coyotes that have attacked a pet, euthanizing coyotes that are perceived as a threat or a nuisance, and poison for population control attained a combined total of 33%. These results indicate a large overall support of hunting and euthanasia of human-aggressive coyotes; however, more than a third of respondents did not agree with any of the stated lethal methods.

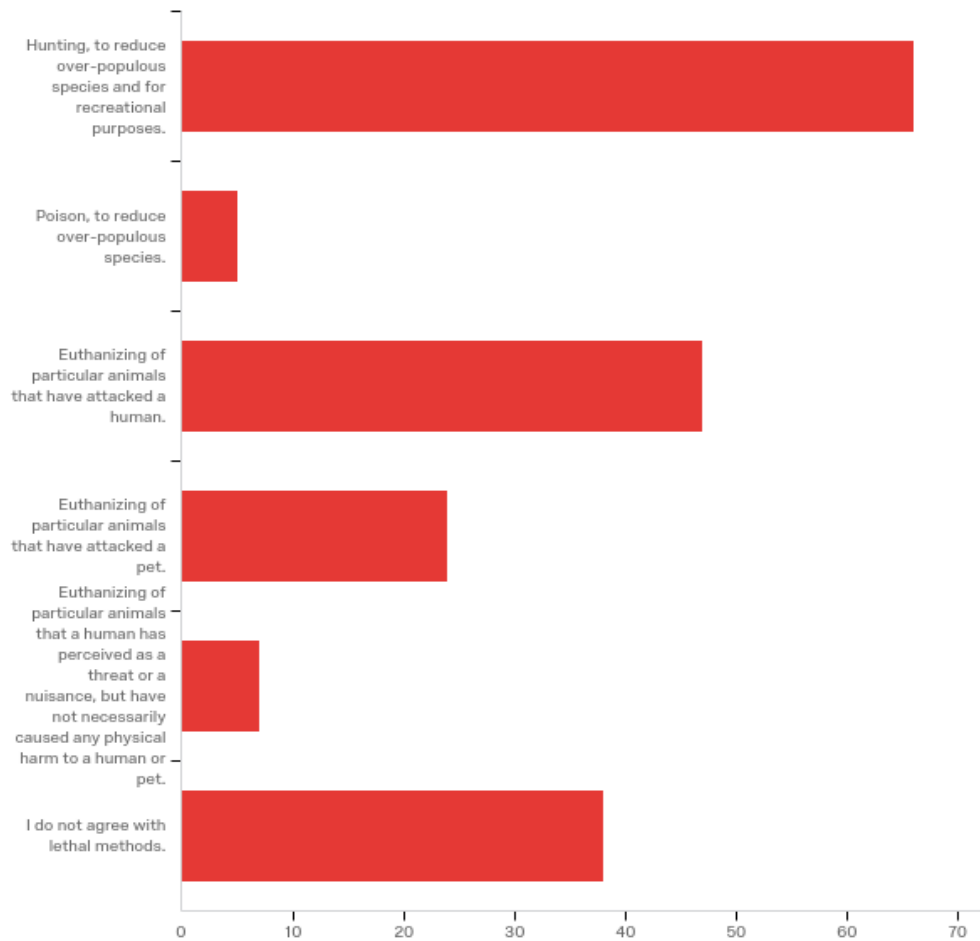


Figure 2: Support for lethal nuisance wildlife management techniques by survey respondents.

Next, respondents were asked what non-lethal methods they agreed with as alternatives to lethal methods. Options included relocation of problem coyotes, educating citizens on how to prevent conflicts with coyotes, the use of sterilization agents to prevent overpopulation, and that none of the options were a suitable alternative to lethal methods. A large majority of 86% of people agreed with educating citizens as a suitable alternative to lethal methods (Figure 3). 62% also agreed with relocation. 40% supported sterilization in the wild, and only 6%

viewed none of these as viable alternatives to lethal methods. This question also had 110 respondents. With the vast majority of respondents choosing what they believe are suitable alternatives to lethal methods, it seems that while most people tolerate certain lethal methods, almost all of the respondents also support non-lethal options in lieu of lethal.

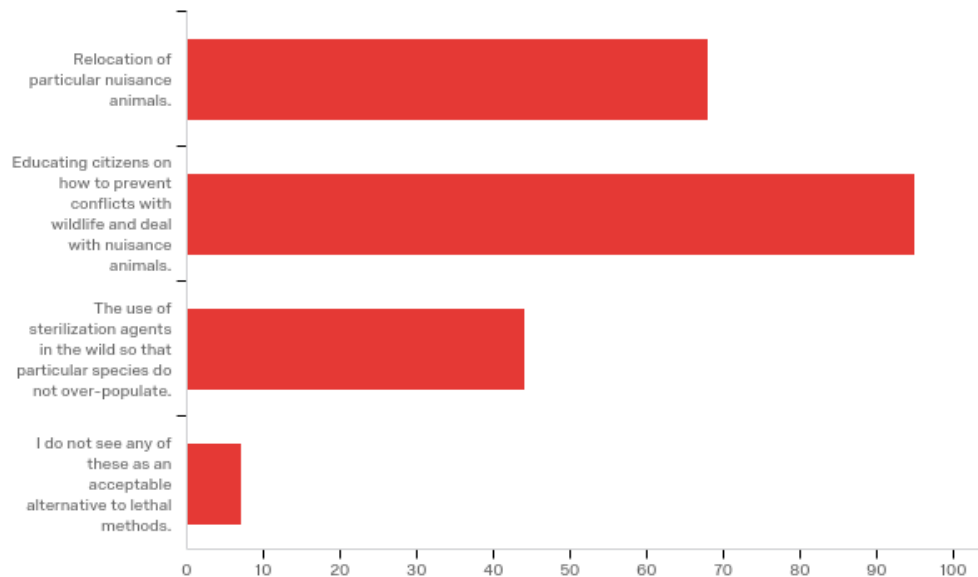


Figure 3: Support for non-lethal nuisance wildlife management techniques by survey respondents.

The following question explained Oklahoma’s management method for coyotes (open, year-round hunting), and asked respondents if they agreed with this. Their options to choose from were “yes,” “no,” and “though I am not opposed to hunting, I believe there might be better management strategies.” 47% chose the latter answer (Figure 4). In comparison, those who chose “yes” or “no” were split, with 25% of people answering yes, and 27% answering “no.”

Combined, this makes 74% of people who were either against or unsure about Oklahoma’s management strategy for coyotes.

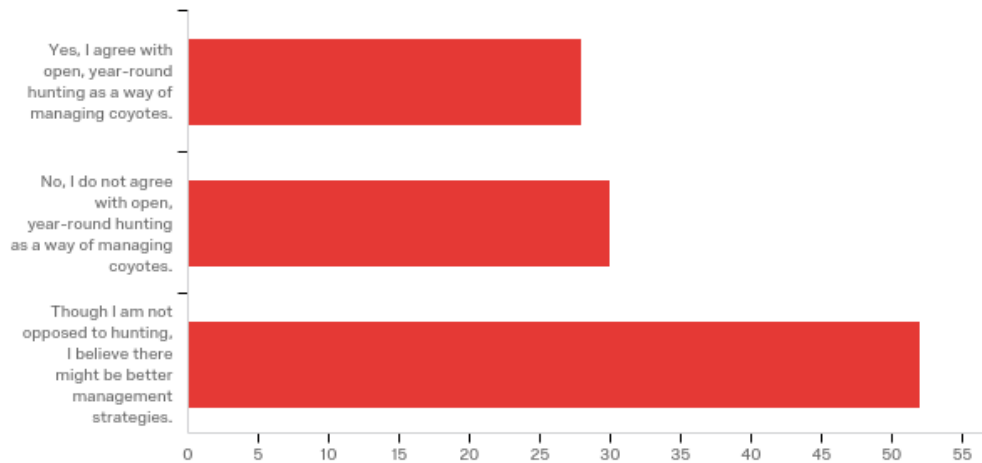


Figure 4: Views on Oklahoma’s current coyote management policy by survey respondents.

The final question of this section asked respondents if they had any recommendations for the Oklahoma Department of Wildlife Conservation (ODWC), allowing for open, typed responses. 79% said no. This high percentage seems to contradict the large percentage of people that do not agree with or are unsure of Oklahoma’s management methods. However, this discrepancy could be explained by the respondents being unsure of the best alternative, or perhaps not having very strong feelings on the issue. Respondents may also have been eager to end the survey, and so did not take the extra time to elaborate on their opinions. In total, 20 respondents offered recommendations for the ODWC. 6 of these respondents suggested providing educational tools to citizens. 5 respondents recommended relocating coyotes to more optimal areas, and 4 suggested either a

closed hunting season or high monitoring of coyote populations year-round to prevent over-hunting. The remaining 5 responses were mixed.

5.2.1. Demographics

From the total of respondents, around 59% were female, compared to 41% male (Table 5). The majority of respondents were also young, with approximately 53% between the ages of 18 to 24 and 24% between 25-34. The remaining 23% fell into older age brackets. Around 83% of respondents had pets, but only 20% had children. 83% had never owned livestock. Most respondents were also educated (around 72% having an associate's degree or higher), and lived in suburban areas (approximately 59%). As all respondents were either students or alumni, high levels of education were to be expected. Around 97% of them had never worked for the Oklahoma Department of Wildlife.

Table 5. Demographics of survey respondents, with total count and percentage of total.

| | Count | Percentage | | Count | Percentage |
|------------------------------|-------|------------|-------------------------------------|-------|------------|
| <i>Gender</i> | | | <i>Primary Residence</i> | | |
| Male | 45 | 41% | Primarily rural | 20 | 18% |
| Female | 64 | 59% | Primarily urban | 23 | 21% |
| | | | Primarily suburban | 64 | 59% |
| <i>Age</i> | | | Other | 2 | 2% |
| 18-24 | 58 | 53% | | | |
| 25-34 | 26 | 24% | <i>Highest level of education</i> | | |
| 35-44 | 10 | 9% | High school/GED | 30 | 28% |
| 45-54 | 9 | 8% | Associate's Degree | 12 | 11% |
| 55-64 | 5 | 5% | Bachelor's Degree | 47 | 43% |
| 64+ | 1 | 1% | Master's Degree | 10 | 9% |
| | | | Doctoral Degree | 9 | 8% |
| <i>Pet Ownership</i> | | | Other/Specialized Degree | 1 | 1% |
| Pet Owners | 91 | 83% | | | |
| Non-Pet Owners | 18 | 17% | <i>Employment</i> | | |
| | | | Current or previous ODWC employee | 3 | 3% |
| <i>With/Without Children</i> | | | Has never been employed by the ODWC | 105 | 97% |
| Those with children | 22 | 20% | | | |
| Those without children | 87 | 80% | | | |
| | | | | | |
| <i>Livestock ownership</i> | | | | | |
| Current livestock owners | 8 | 7% | | | |
| Previous livestock owners | 10 | 9% | | | |
| Have never owned livestock | 91 | 83% | | | |

After reviewing cross tabulations comparing the answers of different demographical groups, it became clear that some survey answers varied by group. One of the most striking demographical differences occurred between men and women; specifically, how each group perceived lethal and non-lethal methods of coyote control. When asked if they agreed with lethal methods of controlling nuisance wildlife, 68% of men agreed with lethal methods, compared to only 44% of women (Table 6). The trend continued when respondents were asked what types of lethal methods they agreed with. 80% of men viewed hunting as an acceptable method of controlling nuisance wildlife, while only 47% of women found hunting agreeable. 51% of men and 36% of women supported lethal action in the event of a coyote attacking a human. 33% of men agreed with lethal action in the event of a coyote attacking a pet, while only 13% of women supported this. 13% of men and only 2% of women agreed with lethal action towards nuisance, but not necessarily dangerous, coyotes. Poison lacked support among both genders, with around 4-5% of both selecting poison as acceptable. Finally, 20% of men did not agree with any of these listed lethal methods to control nuisance wildlife, compared to 45% of women.

Table 6. Cross tabulation showing respondents' views on coyote management methods as it compares to gender.

| | | Do you identify as male or female? | | Total |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------|-----------|------------|
| | | Male | Female | |
| | <i>Yes.</i> | 30 | 28 | 58 |
| Do you agree with lethal management methods to control certain nuisance wildlife? Lethal methods... | <i>No.</i> | 14 | 35 | 49 |
| | Total | 44 | 63 | 107 |
| | <i>Hunting.</i> | 36 | 30 | 66 |
| From the below list of options, what kinds of lethal wildlife techniques do you support? Select a... | <i>Poison.</i> | 2 | 3 | 5 |
| | <i>Euthanizing of animals that have attacked a human.</i> | 23 | 23 | 46 |
| | <i>Euthanizing of animals that have attacked a pet.</i> | 15 | 8 | 23 |
| | <i>Euthanizing of animals that a human has perceived as a threat or a nuisance.</i> | 6 | 1 | 7 |
| | <i>I do not agree with lethal methods.</i> | 9 | 29 | 38 |
| | Total | 45 | 64 | 109 |
| | <i>Relocation of nuisance animals.</i> | 25 | 42 | 67 |
| Non-lethal options of wildlife control can include, but are not limited to: relocating particular... | <i>Educating citizens on how to prevent conflicts with wildlife.</i> | 37 | 57 | 94 |
| | <i>The use of sterilization agents in the wild.</i> | 19 | 24 | 43 |
| | <i>I do not see any of these as an acceptable alternative to lethal methods.</i> | 2 | 5 | 7 |
| | Total | 45 | 64 | 109 |

| | | | | |
|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------|-----------|------------|
| | <i>Yes, I agree with open, year-round hunting.</i> | 18 | 10 | 28 |
| The current method of management for coyotes in Oklahoma is to allow an open, year-round hunting... | <i>No, I do not agree with open, year-round hunting.</i> | 5 | 25 | 30 |
| | <i>Though I am not opposed to hunting, I believe there might be better management strategies.</i> | 22 | 29 | 51 |
| | Total | 45 | 64 | 109 |

The next question asked which non-lethal strategies respondents preferred in lieu of lethal. Among both genders, the results were mostly consistent. 56% of men and 66% of women supported relocation of nuisance wildlife. Educational methods received overwhelming support, with 82% of men and 89% of women selecting it as a viable option. 42% of men agreed with sterilization of coyotes, compared to 38% of women. Finally, 4% of men and 8% of women did not see any of the non-lethal options as suitable alternatives to lethal methods.

Next, respondents were questioned about their perceptions of Oklahoma's current coyote management strategy. Men and women differed in their views on lethal and non-lethal methods. 40% of men and only 16% of women agreed with Oklahoma's current management plan. 11% of men and 39% of women did not agree with the plan. However, the latter answer held similar percentages among both genders. 49% of men and 45% of women selected that, though they were not opposed to hunting, there were likely better management strategies.

When comparing respondents' preferences of lethal and non-lethal management strategies, results also differed greatly by age group, with younger age groups showing preference for non-lethal strategies and older age groups preferring lethal strategies. No age brackets over 35 years had more than 10 people in each, so to provide more comparable data, 35+ is treated as one category in the summarization of the results. When asked whether they agreed with lethal management methods of nuisance wildlife, 37% of respondents 18-24 said yes (Table 7). Attitudes toward lethal methods were slightly more positive in the 25-34 age group, with 58% agreeing with lethal methods. Almost all respondents over 35 supported lethal methods, at 92%.

Table 7. Cross tabulation showing respondents' views on coyote management methods by age group.

| | | What is your age? | | | Total |
|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|-----------|-----------|------------|
| | | 18-24 | 25-34 | 35+ | |
| | <i>Yes.</i> | 21 | 15 | 22 | 58 |
| Do you agree with lethal management methods to control certain nuisance wildlife? Lethal methods... | <i>No.</i> | 36 | 11 | 2 | 49 |
| | Total | 57 | 26 | 24 | 107 |
| | <i>Hunting.</i> | 31 | 13 | 22 | 66 |
| From the below list of options, what kinds of lethal wildlife techniques do you support? Select a... | <i>Poison.</i> | 2 | 1 | 2 | 5 |
| | <i>Euthanizing of animals that have attacked a human.</i> | 19 | 10 | 17 | 46 |
| | <i>Euthanizing of animals that have attacked a pet.</i> | 7 | 3 | 13 | 23 |
| | <i>Euthanizing of animals that a human has perceived as a threat or a nuisance.</i> | 2 | 0 | 5 | 7 |
| | <i>I do not agree with lethal methods.</i> | 28 | 9 | 1 | 38 |
| | Total | 58 | 26 | 25 | 109 |
| | <i>Relocation of nuisance animals.</i> | 37 | 18 | 12 | 67 |
| Non-lethal options of wildlife control can include, but are not limited to: relocating particular... | <i>Educating citizens on how to prevent conflicts with wildlife.</i> | 52 | 23 | 19 | 94 |
| | <i>The use of sterilization agents in the wild.</i> | 24 | 9 | 10 | 43 |
| | <i>I do not see any of these as an acceptable alternative to lethal methods.</i> | 4 | 1 | 2 | 7 |

| | | | | | |
|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------|-----------|-----------|------------|
| | Total | 58 | 26 | 25 | 109 |
| | <i>Yes, I agree with open, year-round hunting.</i> | 8 | 7 | 13 | 28 |
| The current method of management for coyotes in Oklahoma is to allow an open, year-round hunting... | <i>No, I do not agree with open, year-round hunting.</i> | 22 | 6 | 2 | 30 |
| | <i>Though I am not opposed to hunting, I believe there might be better management strategies.</i> | 28 | 13 | 10 | 51 |
| | Total | 58 | 26 | 25 | 109 |

Preferred types of lethal methods also varied by age group. The two younger age brackets were comparable in their support for hunting, with 53% support from those 18-24 and 50% support from those 25-34. In comparison, 88% of those over 35 supported hunting. Poison held little support among any age group, with only 3% of those 18-24, 4% of those 25-34, and 8% of those over 35 selecting it. 33% of the 18-24 group and 38% of those 25-34 agreed with lethal measures in the case of a coyote attacking a human, compared to 68% of those over 35. In the event of a coyote attacking a pet, only 12% of each of the younger demographic groups supported euthanasia, compared to 52% of the older group. Euthanasia of nuisance coyotes was almost entirely discouraged by the two younger age groups, receiving 3% support from those 18-24 and 0% from those between the ages of 25 and 34. In contrast, 20% of those over 35 supported euthanasia of nuisance coyotes. Almost half of those 18-24 did not agree with any lethal methods, at 48%. This percentage dropped slightly in the 25-34 age bracket,

at 35%. Only 4% (equivalent to one person) of the 35+ group did not agree with any lethal methods.

Preferred non-lethal alternatives varied somewhat among different age groups. 64% of the 18-24 group and 69% of the 25-34 group supported relocation as a viable non-lethal option. Less people aged over 35 supported this, at 48%. Education held a large support from all age brackets, with 90% support from those 18-24, 88% from those 25-34, and 76% from those 35+. Sterilization agents introduced into the wild also had similar results across all demographics, with 41% of people 18-24, 35% of people 25-34, and 40% of people 35+ supporting it. Percentages of those who did not agree with any of the non-lethal alternatives were also similar, with 7% support from respondents 18-24, 4% of respondents 25-34, and 8% of respondents over 35.

When questioned about Oklahoma's current coyote management, answers varied among each demographic group. 14% of people 18-24 agreed with the plan, compared to 27% of those 25-34 and 52% of those over 35. In contrast, 38% of people 18-24, 23% of people 25-34, and only 8% of people over 35 did not agree with the plan. The belief that there are better management strategies than year-round hunting held significant percentages across all age brackets, holding 48% of those 18-24, 50% of those 25-34, and 40% of those 35+. It is apparent that the age of respondents had a substantial effect on the results, particularly concerning views towards lethal and non-lethal methods. In the next chapter, the meaning and potential implications of these results are discussed in detail.

Chapter 6

Conclusions

The results of this study suggest a disconnect between state government policies and the beliefs of those in higher education institutions. While Oklahoma's coyote management policy was not an anomaly when compared to other states, its policy was only fully supported by 25% of survey respondents. 47% of respondents did not oppose the strategy outright, but would have preferred a different policy. 27% opposed Oklahoma's policy. This suggests that people in higher educational institutions and the Oklahoma state government are not in agreement on how coyote populations in the state should be managed. In addition, in nuisance coyote management, the slight majority of states did favor an educational policy at 43%. However, this is significantly less than the percentage of respondents that favored an educational policy, which equated 86%.

Demographics appear to be connected to the results of the study. Most respondents were female and between the ages of 18-24. Cross tabulations showed that gender and age were directly correlated with the types of responses. Both females and people between the ages of 18 and 24 showed the strongest rejection of lethal methods when compared to the other demographical groups. For example, 39% of women stated they did not agree with Oklahoma's coyote management plan, while only 11% of men disagreed. 38% of people aged 18-24 disagreed with Oklahoma's management plan, compared to just 23% of those 25-

34 and 8% of people over 35. The large proportion of respondents that were female and between the ages of 18 and 24 clearly correlated with the results of this research. Wildlife literature offers some possible explanation for these results. Literature examining how views of wildlife management vary by gender reflect the results of this survey, which demonstrate surveyed women tend to have more compassion for wildlife than men do (Dougherty et al., 2003). According to some studies, women express much less support for lethal measures of controlling wildlife than men, although they also consider wildlife to pose a greater overall threat than men (Zinn and Pierce, 2002). This can possibly be attributed to women's traditional role as caregiver, which results in a high valuation of personal relationships and nurturing, as compared to men's tendency to value independence and a competitive spirit (Kellert and Berry, 1987; Eagly and Steffen, 1984).

In addition, the responses of people aged between 18-24 could have resulted from the influences of their generation. A study measuring human perceptions of wildlife management methods in the Netherlands showed similar results to this study, with older age groups viewing lethal methods of managing wildlife as more acceptable than younger age groups (Vaske et al., 2011). The study centered on comparing traditional wildlife theories regarding domination and mutualism (Vaske et al., 2011; Manfredo et al., 2017). Domination values are considered to be preferred mostly by older generations, and revolve around the idea that wildlife is resource meant for human use. Mutualism ideals developed in

the mid to late twentieth century, and are thought to be of higher value to younger age groups. Mutualism is the belief that humans should have little interference with wildlife, and tends to focus on wildlife existence values (Vaske et al., 2011; Manfredo et al., 2017). Based on this prior survey research, theories of domination and mutualism values, as they relate to age, appear to be consistent with the results of this study.

Despite demographic differences in the survey results, some selections were uniform amongst all subgroups of people. Similar percentages of both men and women were not outright opposed to hunting, but preferred different management strategies, comprising 49% men and 45% women. In parallel, 48% of people aged between 18 and 24, 50% of those 25-34, and 40% of people over 35 also would have preferred different management strategies. Additionally, education was consistently the most supported wildlife management method across all demographical groups. The lowest percentage of support came from the 35 and over age bracket, with 76% supporting educational methods. Aside from how the high amount of young, female respondents affected the results, support for educational policy and uncertainty about the effectiveness of year-round hunting remained consistent throughout all subgroups of respondents.

Though demographics appeared to correlate with the results of this study, the preference for policies other than hunting persisted regardless of associated demographics. Additionally, females and people between the ages of 18 and 24 only made up slight majorities of their demographic categories, with females

comprising 59% of respondents and people 18-24 comprising 53%. Therefore, demographics were certainly not the only factor influencing survey results. It is apparent that within higher educational institutions, year-round hunting of coyotes is a controversial policy that does not have widespread support. However, as 79% of respondents did not have recommendations for Oklahoma's government, this indicates most respondents likely did not have strong opinions on the topic of coyote management. For those that did have recommendations, answers varied. Most recommendations consisted of educating citizens, relocating coyotes, and restricted hunting. However, some respondents displayed uncertainty in their recommendations; two respondents phrased their recommendation as questions, and one respondent openly stated that they "did not know". Additionally, most survey takers that provided recommendations did not provide any reasoning to justify their suggestions.

The lack of recommendations, as well as the relative uncertainty in the recommendations that were offered, may indicate a lack of knowledge about wildlife management among respondents. Moreover, respondents' past experiences with coyotes may have played a role. According to a learning and adaptation theory proposed by Wilson, et al. (2013a), a person's decision to seek knowledge depends partially on prior experience. If prior experience does not inspire the person to seek certain knowledge, then that person may perceive that knowledge to have a higher opportunity cost than benefit. This is a short summary of the theory presented by Wilson, et al.; however, it points to a potential

relationship between the stated experience of survey respondents and the lack of suggested action. As reiterated by Wilson, et al. (2013b), a person's existing knowledge acts as a guide for future action. Since most respondents who claimed to have had an experience with coyotes described that experience as "neither positive nor negative," this could have correlated with the lack of suggested action for the ODWC, despite their stated preference for non-lethal management methods. However, as a person's experience with the subject of wildlife management methods is not necessarily limited to his or her direct experience with coyotes, it was likely not the only aspect influencing these results.

This suggested incongruence between Oklahoma coyote management policy and surveyed public opinion leads to uncertainty in future developments for Oklahoma predator management. Though respondents did not seem to favor Oklahoma's current coyote policy, most also did not display interest in making other recommendations. State policy is often influenced by public engagement. However, if citizens do not actively advocate for their preferred management policies, it is unlikely that the policy will change based on public interest. It should be noted that nationally, non-lethal methods are largely preferred over lethal, and concern for animal rights has increased in recent years (Reiter et al., 1999; Manfredo et al., 2017). Should interest in animal rights continue to grow, it could eventually inspire citizens to advocate for their preferred non-lethal methods. However, this requires further study within the state of Oklahoma.

6.1. Survey results in relation to sustainability theory

The basis for this study, as it relates to sustainability theory, was the ecological approach to natural resource management. This approach to management acknowledges that ecosystems are complex systems that may be completely altered by the change in a single species (Chiras and Reganold, 2010). Within their role as apex predator throughout most of Oklahoma, coyotes have a particularly important role in the function of their particular ecosystems (Wallach et al., 2015; Crooks and Soule, 1999). An example of how the alteration of an apex predator population may affect an ecosystem can be seen in the reintroduction of gray wolves in Yellowstone National Park in 1995. After approximately 70 years of there being no wolves in the park, the gray wolf reintroduction resulted in what was believed by many to be a trophic cascade (Creel and Christianson, 2009; Smith et al., 2003). Elk and deer populations began avoiding certain areas of the park where they were likely to be hunted, which resulted in an increase in vegetation within those areas. The increased vegetation attracted songbirds and beavers, and provided an increased supply of food for bears, due to the berries on the new, growing shrubs. The dams built by the rising beaver population also provided habitat for fish and otters. These are only a few changes that occurred in the Yellowstone ecosystem after the reintroduction of wolves; however, they serve as an example of the potential changes that can result from large changes in an apex predator population. Based on this example, coyotes within Oklahoma may require special attention from the

Oklahoma Department of Wildlife Conservation to ensure stable population numbers and healthy surrounding ecosystems.

Based on the ecological approach of natural resource management, all aspects of an existing ecosystem should be managed properly to ensure that resources are continually available for both human and wildlife use (Chiras and Reganold, 2010). This approach is rooted in conservation principles as opposed to preservation. Conservation principles focus on sustainably managing natural resources for future use, while preservation principles seek to remove humans almost entirely from natural environments (Chiras and Reganold, 2010; “Conservation vs Preservation and the National Park Service”). Both approaches seek to protect wildlife in different ways, and each have support from various subgroups of people (Chiras and Reganold, 2010). The opposition to year-round hunting by survey respondents may potentially fall within preservation ideology, as it favors the removal of humans from a type of coyote population control. However, this opposition may not stem from an aim to preserve coyotes. Other reasons for respondents’ opposition to year-round hunting could include a desire for high tracking of coyote populations within a closed hunting season, or a preference for non-lethal methods of wildlife management in lieu of lethal. Therefore, it is unclear whether most survey respondents prefer the ecological or the preservation approach to wildlife management.

6.2. Management Implications

Though public perceptions are important for lasting support of wildlife management, the plan that is implemented must also be effective. A large percentage of respondents did not prefer hunting as a wildlife management strategy; however, there is much evidence that supports the effectiveness of hunting in managing overpopulating species, if it is done sustainably and based on current science (Paulson, 2014; Cromsigt et al., 2013; United States, 2012).

Wildlife which is invasive or overpopulating can cause environmental problems. An example of this would be the elk and deer populations in Yellowstone, which grew so large that vegetation was declining at rapid rates throughout certain areas of the park (Creel and Christianson, 2009; Smith et al., 2003). Though hunting was not effective in decreasing the elk and deer in Yellowstone, many argue its effectiveness in other areas where predators are not abundant enough to control overpopulating prey populations (Paulson, 2014; Cromsigt et al., 2013).

In comparison, hunting has also been considered by some to be ineffective and unethical (Warburton and Norton, 2009; Zipkin et al., 2009). Hunting policies in some areas were considered a threat to the species being hunted, and as a result, received high public opposition. Examples of this include gray wolf hunting in the northwestern United States and black bear hunting in Florida, where those species had been recently delisted as endangered or threatened (Way and Bruskotter, 2012; Albert, 2017). Some wildlife literature criticizes hunting as a policy altogether (Warburton and Norton, 2009; Zipkin et al., 2009). One reason for this

is that hunting can sometimes result in unintended consequences (Zipkin et al., 2009). Overcompensation can occur, in which the hunted species multiplies rapidly in response to its declining population numbers. There are also moral and scientific objections. Authors Warburton and Norton (2009) argue that concerns by the public should be reasonable justification for minimizing lethal measures such as hunting. They also insist that, if lethal measures are used, they should be tested before implementation to ensure efficacy.

Based on hunting literature, it appears that the effectiveness of hunting depends largely on many factors, including the population of the species being hunted and its relation to the surrounding ecosystem (Paulson, 2014; Cromsigt et al., 2013; United States, 2012; Zipkin et al., 2009). Coyote populations would likely have to be evaluated by the Oklahoma Department of Wildlife Conservation (ODWC) within different ecosystems in the state to determine the current effectiveness of hunting and trapping. Because coyote populations in general tend to be increasing rather than decreasing, lethal measures could potentially be useful in monitoring populations should coyotes pose a risk of causing environmental damage (Paulson, 2014; Cromsigt et al., 2013; United States, 2012). Based on the review of hunting literature, it may be advantageous for the ODWC to conduct studies on how hunting effects coyote populations and their surrounding ecosystems. Because public perceptions often influence public policy, the views of citizens within the state should also be considered.

It could be beneficial for the state to invest in further study revealing public views on coyote management to assess whether changes in coyote management methods are actually necessary to maintain public support. An additional survey could be conducted to include a more diverse group of individuals across the entire state of Oklahoma, perhaps focusing on respondents comprising an even age distribution. This survey could be administered at a regular interval to observe changes in public opinion over time; perhaps performing the survey every five years, for example. If further study confirms that people across the state still prefer non-lethal methods, and especially if support for non-lethal methods grows over time, it could be advantageous for the state to begin considering additional methods in conjunction with hunting.

Should future studies reveal high support for non-lethal wildlife management methods, the adoption of educational methods should be considered, as this was a popular method used by other states and the most supported non-lethal alternative by survey respondents in this study. Regarding the effectiveness of education in rallying public support and changing human behavior, studies have shown mixed results. One study aimed to evaluate the effectiveness of education in changing human behavior (Baruch-Mordo et al., 2011). Educational methods were used to determine if citizens would respond, and leave out less attractants for black bears. These educational methods included hanging educational signs on dumpsters and distributing brochures about black bear protection to selected houses. The study concluded that the educational methods

used were ineffective, due to there being no reduction in the volume of trash left out for bear consumption. The authors asserted that these particular educational methods, which are used by many wildlife managers currently, are ineffective; they suggest that wildlife managers should therefore adopt educational methods that are supported by social science literature, and couple them with proactive enforcement. Proactive enforcement may include wildlife legislation, law enforcement, and the use of warning signs. Other studies have reached similar conclusions, with currently used educational methods proving ineffective at changing behavior (Gore et al., 2008; George and Crooks, 2006).

Despite these examples of ineffective campaigns, there are some who argue that the adoption of educational methods is not only effective, but is necessary to rally public support. Rejection of lethal methods of managing wildlife has grown throughout the past several decades (Reiter et al., 1999). In response to this shift, one author argues that wildlife agencies must acknowledge this group of people if they are to retain continual funding and support (Todd, 1980). The author suggests that agencies build their public image by enacting educational programs for non-game wildlife as well as game wildlife. He asserts that this method would ease the concerns of anti-hunting groups, while still catering to hunters. One example of educational methods that were said to be effective at changing human behavior is the Kenya Wildlife Service (Mbugua, 2012). Their educational tools included the building of wildlife education centers and the use of public radio to broadcast educational messages. Wildlife education

in public schools was considered particularly effective by the Kenyan Wildlife Service. The usefulness of education in public schools was also supported by a group of authors that studied the effects of wildlife exhibits in high schools (Mbugua, 2012; Adams et al., 1989).

Based on these studies, the efficacy of using educational methods to change human behavior is contested, but could at least be useful in rallying support among groups opposed to lethal wildlife management methods. The effects of these educational tools could be monitored regularly by the ODWC to prevent unnecessary spending. If based in science and monitored regularly, the adoption of educational policy has the potential to reduce human-coyote conflicts, without interfering with funds received from holding a year-round hunting season (Baruch-Mordo et al., 2011; Mbugua, 2012; Adams et al., 1989). It is possible that properly enacted educational methods would inspire citizens to feel more connected with their local wildlife and wildlife service. They could promote more educated decision-making on the part of Oklahoma citizens, and create the potential for increased interest in Oklahoma wildlife and conservation efforts.

There are a few ways an educational policy could be enacted. Based on the studies discussed here regarding wildlife education measures, educational programs in public schools could be effective in gaining support from the upcoming generation (Mbugua, 2012; Adams et al., 1989). Media outlets, such as public radio or television, could also be utilized (Mbugua, 2012). The ODWC website could be expanded to provide more information on coyotes, including

information on the coyote's role in the ecosystem, coyote behavior, and advice on how to handle human-coyote conflicts. External links could be included to promote further learning for interested citizens. Additionally, public meetings could be held to provide citizens the opportunity to personally connect with ODWC representatives on the subject of coyote management. Public meetings would provide Oklahoma citizens the opportunity to learn about coyotes in an interactive environment, allowing them to ask questions and learn more about local wildlife; representing a reinforcement of concepts presented on the ODWC website. A combination of these educational methods has the potential to be a useful addition to the current coyote management policy that, based on the results of this study, would likely receive public support.

If further survey research indicates a greater level of dissatisfaction with lethal methods than what is already documented, other non-lethal alternatives could be considered. Hunting is a long-standing method of nuisance wildlife control that is rooted in history and tradition, and is likely to continue playing a large role in wildlife management in the future. However, non-lethal methods could be used in conjunction with hunting to rally public support. Since the best non-lethal control methods are still a matter of debate, research may be conducted to suggest alternative methods which are most conducive to ODWC's future goals. (Warburton and Norton, 2009; Zipkin et al., 2009; Conner et al., 2008).

6.3. Limitations and Future Research

Though this research did provide insight into state coyote policy compared to higher educational institution perceptions, there were a number of limitations that may have affected the results. The reviewing of state webpages to discover various coyote management policies was done by manually searching each website, which allowed for a margin of human error in gathering complete information. Additionally, it is possible that not all state government websites held updated, accurate information regarding these policies. For future research, further measures could be taken to verify the accuracy of web information through direct contact with each state wildlife department. This type of verification was not possible in this research due to time constraints.

One of the major limitations to this study is the time and budgetary restrictions; the audience for surveying was limited to current and former University of Oklahoma students. Respondents were mostly educated, young, female, and either current or former Norman residents. These demographics appeared to be related to the results of this research. Additional research is needed to better understand public views on coyote management and its relationship to state policy in Oklahoma, as well as the nation at-large. A wider or more representative survey population would be beneficial to increase knowledge regarding public views of coyotes. This could be done by surveying a larger sample of people in higher educational institutions, such as including faculty and staff, and sampling other universities. It could also be expanded to include people

beyond higher educational institutions to better assess the Oklahoma citizenry as a whole. For example, various demographic groups could be delivered the same survey to determine how these results differ among each subset of people. Some interesting groups to compare could be hunters, animal rights activists, ranchers, and people employed at the Oklahoma Department of Wildlife. Additionally, it could also be sent to a random, diverse group of people to better assess the entire populace, rather than focusing on specific demographics.

Future work could also explore the relationship between experience and opinions regarding coyote management. The survey responses collected for this research seemed to indicate most people have had either positive or neutral interactions with coyotes. This could have had a direct effect on respondents' favoring of non-lethal management, as well as their lack of recommendations for the ODWC. More sophisticated surveys could be conducted to better assess any correlation between prior experience, policy views, and suggested action. Further research examining the relationship of other demographics with views on coyote policy could also be useful. Despite these limitations, however, the results of this research do provide some implications for current leaders in coyote management, as well as possible grounds for future research.

Overall, this study provided valuable insight into national coyote wildlife policy and the perceptions of people in higher educational institutions. It showed an apparent disconnect in policy and public opinion, proving that there is strong support for non-lethal management methods within Oklahoma; however, it also

suggested that the adoption of non-lethal methods may not be supported strongly enough to result in present action. This is significant, because it provides information pertinent to policy makers and the ODWC regarding future coyote management decisions. While adopting non-lethal methods may not currently be a priority, it could be advantageous for the ODWC to begin investing in further research on this topic. This study may provide a basis for this future research, as well as future research efforts regarding state policy, public opinion, and coyotes within Oklahoma.

REFERENCES

- 2016 Cook County Urban Coyote Research Project. "Avoiding conflicts with coyotes." Accessed May 15, 2017.
<http://urbancoyotereseach.com/avoiding-conflicts-coyotes>
- 2016 Cook County Urban Coyote Research Project. "Coyotes around the continent." Accessed April 14, 2016.
<http://urbancoyotereseach.com/coyotes-around-continent>
- 2016 Cook County Urban Coyote Research Project. "Coyote Conflicts: a research perspective." Accessed April 14, 2016.
<http://urbancoyotereseach.com/coyote-conflicts-research-perspective>
- Adams, et al. "Promoting wildlife education through exhibits." *Journal of Research in Science Teaching* 26, no. 2 (1989): 133-140.
- Adams, Leonard, and Waits. "Widespread occurrence of a domestic dog Mitochondrial DNA haplotype in southeastern US coyotes." *Molecular Ecology* 12, no. 2 (2003): 541-546.
- Albert, J. "Evaluating Stakeholder Involvement and Influence in the Decisionmaking Process of Reinstating the Florida Black Bear Hunt." PhD diss., Proquest Dissertations Publishing, 2017.
- Bale, R. "This Government Program's Job Is to Kill Wildlife." *National Geographic*, February 12, 2016.
<http://news.nationalgeographic.com/2016/02/160212-Wildlife-Services-predator-control-livestock-trapping-hunting/>
- Banegas, "Study Concludes Coyotes Help Manage Deer Population in Southeast U.S." United States Forest Service Blog.
<http://www.fs.fed.us/blogs/study-concludes-coyotes-help-manage-deer-population-southeast-us>
- Baruch-Mordo, et al. "The Carrot or the Stick? Evaluation of Education and Enforcement as Management Tools for Human-Wildlife Conflicts." *Plos One* 1 (2011): e15681.
- Bekoff, M. "Canis latrans." *Mammalian Species* 79 (1977):1-9.
- Benson and Patterson. "Moose (*Alces alces*) predation by eastern coyotes (*Canis latrans*) and eastern coyote × eastern wolf (*Canis latrans* × *Canis lycaon*) hybrids." *Canadian Journal of Zoology* 91, no. 11 (2013): 837-841.
- Best, Hoditschek, and Thomas. "Foods of Coyotes (*Canis latrans*) in Oklahoma." *The Southwestern Naturalist* 26, no. 1 (1981): 67-69.
- Boisjoly, Ouellet, and Courtois. "Coyote Habitat Selection and Management Implications for the Gaspésie Caribou." *The Journal of Wildlife Management* 74 (2010): 3-11.
- Chiras and Reganold. *Natural Resource Conservation: Tenth Edition*. Upper

- Saddle River, NJ: Pearson Education, Inc., 2010.
- Chitwood, et al. "Confirmation of Coyote Predation on Adult Female White-Tailed Deer in the Southeastern United States." *Southeastern Naturalist* 13, no. 3 (2014): N30-N32.
- College Factual. "University of Oklahoma Campus." Accessed June 13, 2017. <http://www.collegefactual.com/colleges/university-of-oklahoma-norman-campus/student-life/diversity/#>
- Conner, Ebinger, and Knowlton. "Evaluating Coyote Management Strategies using a Spatially Explicit, Individual-Based, Socially Structured Population Model." *Ecological Modelling* 219 (2008): 234-237.
- Crabtree and Sheldon. "The ecological role of coyotes on Yellowstone's northern range." *Yellowstone Science* 7, no. 2 (1999): 15-24.
- Creel and Christianson. "Wolf presence and increased willow consumption by Yellowstone elk: implications for trophic cascades." *Ecology* 90, no. 9 (2009): 2454-2466.
- Cromsigt, et al. "Hunting for fear: innovating management of human-wildlife conflicts." *Journal of Applied Ecology* 50, no. 3 (2013): 544-549.
- Crooks and Soule. "Mesopredator release and avifaunal extinctions in a fragmented system." *Nature* 400, no. 6744 (1999): 563-566.
- Day, C. "Oklahoma Residents Say Coyotes Prey On Pets, Even In Urban Areas." *News on 6*, August 20, 2012. <http://www.newson6.com/story/19324202/residents-say-coyotes-prey-on-pets-even-in-urban-areas>
- Dougherty, Fulton, and Anderson. "The influence of gender on the relationship between wildlife value orientations, beliefs, and the acceptability of lethal deer control in Cuyahoga Valley National Park." *Society and Natural Resources* 16, no. 7 (2003): 603-623
- Dunn and Smith. Alabama Cooperative Extension System ANR-1413. "The Coyote: Facts and Myths About Living with This Wild Canid." Accessed April 15, 2017. <http://www.aces.edu/pubs/docs/A/ANR-1413/ANR-1413.pdf>
- Eagly and Steffen. "Gender stereotypes stem from the distribution of women and men into social roles." *Journal of Personality and Social Psychology* 46, no. 4 (1984): 735-754.
- "Edmond officials warning residents after reports of coyotes attacking small dogs." *KFOR-TV*, October 4, 2016. <http://kfor.com/2016/10/04/edmond-officials-warning-residents-after-reports-of-coyotes-attacking-small-dogs/>
- Ellis, R. "Some foods used by coyotes and bobcats in Cimarron County, Oklahoma." *Proceedings of the Oklahoma Academy of Science*, Vol. 38. 2015.

- Etheredge, et al. "Local-Scale Difference of Coyote Food Habits on Two South Carolina Islands." *Southeastern Naturalist* 14, no. 2 (2015): 281-292.
- Favre, D. Michigan State University. "American Wildlife Law." Animal Law Web Center. Accessed June 16, 2017.
- Fraser, S. "'Coyotes (Canis Latrans) Response to Anthropogenic Pressures on a Heterogeneous Landscape." PhD diss., Proquest Dissertations Publishing, 2016.
- Freeman, R. "Coyote X Dog Hybridization and Red Wolf Influence in the Wild Canis of Oklahoma." M.S. thesis, Northeastern Oklahoma State University, 1976.
- Gehrt and Quirin. The Ohio State University Extension. "Urban Coyotes: Conflict & Management." Fact Sheet: Agriculture and Natural Resources. Accessed June 16, 2017.
<http://urbancoyotereseach.com/sites/default/files/coyote%20fact%20sheet%20sources%20of%20conflict%20final.pdf>
- George and Crooks. "Education and Conservation on the Urban-Wildland Interface: Testing the Efficacy of Informational Brochures." *The Southwestern Naturalist* 51, no. 2 (2006): 240-250.
- Gompper and Matthew. "Top Carnivores in the Suburbs? Ecological and Conservation Issues Raised by Colonization of North-eastern North America by Coyotes." *BioScience* 52 (2002): 185-190.
- Gore, et al. "Evaluating a conservation investment designed to reduce human-wildlife conflicts." *Conversation Letters* 1, no. 3 (2008): 136-145.
- Grilo, et al. "Influence of aesthetic appreciation of wildlife species on attitudes towards their conservation in Kenyan agropastoralist communities." *Plos One* 9, no. 2 (2014): e88842.
- Hennessy, Dubach, and Gehrt. "Long-term pair bonding and genetic evidence for monogamy among urban coyotes (Canis latrans)." *Journal of Mammalogy* 93, no. 3 (2012): 732-742.
- Holle, et al. "Diet and general availability of prey of the coyote (Canis latrans) at the Wichita Mountains National Wildlife Refuge, Oklahoma." M.S. thesis, Oklahoma State University, 1977.
- Kellert and Berry. "Attitudes, knowledge, and behaviors toward wildlife as affected by gender." *Wildlife Society Bulletin* 15, no. 3 (1987): 363-371
- Ketcham, C. "The Rogue Agency: A USDA program that tortures dogs and kills endangered species." *Harpers Magazine*, March, 2016.
<https://harpers.org/archive/2016/03/the-rogue-agency/>
- "Legendary Native American Figures: Coyote the Trickster (Southwest)." Accessed February 3, 2016.
<http://www.native-languages.org/southwest-coyote.htm>
- Levy, S. "The New Top Dog." *Nature* 485, no. 7398 (2012): 296-297.

- Lijphart, A. *Democracies: Patterns of Majoritarian and Consensus Government in Twenty-One Countries*. New Haven: Yale University Press, 1984.
- Manfredo, et al. "Values, trust, and cultural backlash in conservation governance: The case of wildlife management in the United States." *Biological Conservation* 214 (2017): 303-311.
- Mastro, L. "Life History and Ecology of Coyotes in the Mid-Atlantic States: A Summary of the Scientific Literature." *Southeastern Naturalist* 10, no. 4 (2011):721–730.
- Mbugua, P. "Wildlife Conservation Education." *The George Wright Forum; Hancock* 29, no. 1 (2012): 59-66.
- "Metro Residents Concerned About Neighborhood Coyote Sightings." *News 9*, November 19, 2015.
<http://www.news9.com/story/30563626/edmond-residents-concerned-about-neighborhood-coyote-sightings>
- Mincolla, et al. "Socio-Economic Impact of the Coyote in Oklahoma." M.S. thesis, ShareOK, 2015.
- Mitchell, Jaeger, and Barrett. "Coyote Depredation Management: Current Methods and Research Needs." *Wildlife Society Bulletin* 32 (2004): 1209-1218.
- Mowry and Edge. "Melanistic Coyotes in Northwest Georgia." *Southeastern Naturalist* 13 (2014): 280-287.
- National Park Service. "Conservation vs Preservation and the National Park Service." Accessed November 28, 2017.
<https://www.nps.gov/klgo/learn/education/classrooms/conservation-vs-preservation.htm>
- Oklahoma Department of Wildlife Conservation. "Coyote." Accessed January 1, 2016.
<http://www.wildlifedepartment.com/wildlifemgmt/species/coyote.htm>
- Oklahoma State University. "Cleveland County Cooperative Extension." Accessed February 2, 2017.
<http://oces.okstate.edu/cleveland/agriculture-wildlife/wildlife-management-1>
- Paulson, N. "Representing Wildlife Management: Sustainable Hunting Narratives at the International Wildlife Museum." *Nature + Culture* 9, no. 1 (2014): 87-112
- Prugh, et al. "The Rise of the Mesopredator." *Bioscience* 59, no. 9 (2009): 779-791.
- Pugh, B. "Predator Control."
<http://agecon.okstate.edu/meatgoat/files/Chapter%2013.pdf>
- Rausch, D. "Direct Democracy in Oklahoma." *The Almanac of Oklahoma Politics* 6 (1998): 33-36.

- Reiter, Brunson, and Schmidt. "Public Attitudes toward Wildlife Damage Management and Policy." *Wildlife Society Bulletin* 27, no. 3 (1999): 746-758.
- Skonhoft, Anders, and Jon Olaf Olausen. "Managing a Migratory Species That Is Both a Value and a Pest." *Land Economics* 81, no. 1 (2005): 34-50.
- Smith, Peterson, and Houston. "Yellowstone after Wolves." *Bioscience* 53, no. 4 (2003): 330-340.
- The Humane Society of the United States. "Lethal Wildlife Management." Accessed September 19, 2017.
http://www.humanesociety.org/issues/lethal_wildlife_management/
- The University of Oklahoma. "What do you know about OU?" Public Affairs. Accessed June 13, 2016.
<http://www.ou.edu/publicaffairs/oufacts.html>
- Tigasa, Van Vurena, and Sauvajotb. "Behavioral Responses of Bobcats and Coyotes to Habitat Fragmentation and Corridors in an Urban Environment." *Biological Conservation* 108 (2002): 299-306.
- Todd, A. "Public Relations, Public Education, and Wildlife Management." *Wildlife Society Bulletin* 8, no. 1 (1980): 55-60.
- Trent University. "Western Coyote (*Canis Latrans*)." Wolf & Coyote DNA Bank. Accessed December 29, 2016.
<http://wolf.nrdpfc.ca/westerncoyote.htm>
- United States. Congress. House. Committee on Science, Space, Technology. Subcommittee on Investigations Oversight. *The Science of How Hunting Assists Species Conservation and Management: Hearing before the Subcommittee on Investigations and Oversight, Committee on Science, Space, and Technology*. House of Representatives, One Hundred Twelfth Congress, Second Session. Tuesday, June 19, 2012.
- United States Census Bureau. "Quick Facts: Norman city, Oklahoma. 2010-2015." Accessed June 13, 2017.
<https://www.census.gov/quickfacts/table/PST045215/4052500>
- United States Department of Agriculture. "WS Vision, Mission, and Goals." Accessed June 13, 2017.
https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/sa_program_overview/ct_about_mission
- United States Fish and Wildlife Service. "About the U.S. Fish and Wildlife Service." Accessed June 11, 2017.
https://www.fws.gov/help/about_us.html
- United States Fish and Wildlife Service. "Endangered Species." Accessed June 11, 2017.
<https://www.fws.gov/endangered/laws-policies/>
- United States Forest Service Database. "Index of Species Information. Wildlife

- Species: *Canis latrans*.” Accessed May 5, 2017.
<http://www.fs.fed.us/database/feis/animals/mammal/cala/all.html>.
- U.S. News. “University of Oklahoma.” Accessed June 13, 2017.
<https://www.usnews.com/best-colleges/university-of-oklahoma-3184>
- Vaske, Jacobs, and Sijtsma. “Wildlife value orientations and demographics in The Netherlands.” *European Journal of Wildlife Research* 57, no. 6 (2011): 1179-1187.
- Wallach, et al. “What is an apex predator?” *Oikos: Synthesising Ecology* 124, no. 11 (2015): 1453–1461.
- Warburton and Norton. “Towards a Knowledge-Based Ethic for Lethal Control of Nuisance Wildlife.” *Journal of Wildlife Management* 73 (2009): 158-164.
- Way, J. Project Coyote. “Eastern Coyote: Coyote, Wolf, or Hybrid?” Accessed December 29, 2016.
http://www.projectcoyote.org/newsreleases/news_eastern.html
- Way and Bruskotter. “Additional Considerations for Gray Wolf Management After Their Removal From Endangered Species Act Protections.” *The Journal of Wildlife Management* 76, no. 3 (2012): 457-461.
- Way and Timm. “Record Pack-density of Eastern Coyotes/Coywolves (*Canis latrans* × *lycaon*.” *The American Midland Naturalist* 165, no. 1 (2011): 201-203.
- Wilson, et al. “Costly information and the evolution of self-organization in a small, complex economy.” *Journal of Economic Behavior & Organization* 90 (2013a): S76-S93.
- Wilson, Acheson, and Johnson. “The cost of useful knowledge and collective action in three fisheries.” *Ecological Economics* 96 (2013b): 165-172.
- Zinn and Pierce. “Values, gender, and concern about potentially dangerous wildlife.” *Environment and Behavior* 34, no. 2 (2002): 239-256
- Zipkin, et al. “When Can Efforts to Control Nuisance and Invasive Species Backfire?” *Ecological Applications* 19, no. 6 (2009): 1585-1595.

APPENDIX

Appendix A- Web sources for policy categorization by state.

| States | Source |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alabama | http://www.outdooralabama.com/alabama-nuisance-animal-control |
| Alaska | http://www.adfg.alaska.gov/index.cfm?adfg=coyote.uses |
| Arizona | https://www.azgfd.com/wildlife/livingwith/coyotes/ |
| Arkansas | https://www.agfc.com/en/resources/wildlife-conservation/nuisance-wildlife/ |
| California | http://www.fgc.ca.gov/regulations/current/mammalregs.aspx#368 |
| Colorado | http://cpw.state.co.us/learn/Pages/LivingwithWildlifeCoyote.aspx |
| Connecticut | http://www.ct.gov/deep/cwp/view.asp?a=2723&q=325936 |
| Delaware | http://www.eregulations.com/delaware/hunting/furbearer-trapping-hunting/ |
| Florida | http://myfwc.com/wildlifehabitats/profiles/mammals/land/coyote/ |
| Georgia | http://georgiawildlife.com/nuisancewildlife |
| Idaho | https://idfg.idaho.gov/wildlife/predator-management |
| Illinois | https://www.dnr.illinois.gov/conservation/wildlife/Pages/Coyote.aspx |
| Indiana | http://www.in.gov/dnr/fishwild/5688.htm |
| Iowa | http://www.iowadnr.gov/Hunting/Hunting-Season-Dates |
| Kansas | http://ksoutdoors.com/Hunting/Furharvesting/Furbearers/Coyote |
| Kentucky | https://fw.ky.gov/Wildlife/Documents/KASpring17coyotes.pdf |
| Louisiana | http://www.wlf.louisiana.gov/sites/default/files/pdf/publication/34726-living-coyotes-low-res/living_with_coyotes_low-res.pdf |
| Maine | https://www1.maine.gov/ifw/wildlife/human/lww_information/coyotes.html |
| Maryland | http://www.eregulations.com/maryland/hunting/furbearers/ |
| Massachusetts | http://www.mass.gov/eea/agencies/dfg/dfw/hunting-fishing-wildlife-watching/hunting/coyote-hunting.html |
| Michigan | http://www.michigan.gov/dnr/0,4570,7-153-10370_12145_25065---,00.html |
| Minnesota | http://www.dnr.state.mn.us/mammals/coyote.html |
| Mississippi | https://www.mdwfp.com/wildlife-hunting/nuisance-wildlife/ |
| Missouri | https://mdc.mo.gov/wildlife/nuisance-problem-species/nuisance-native-species/coyote-control |
| Montana | http://fwp.mt.gov/fishAndWildlife/livingWithWildlife/uwvwg.html |
| Nebraska | http://outdoornebraska.gov/furbearerspecies/ |
| Nevada | http://www.ndow.org/uploadedFiles/ndoworg/Content/public_documents/Hunt/2010_Coyote.pdf |
| New Hampshire | http://www.wildlife.state.nh.us/wildlife/profiles/coyote.html |
| New Jersey | http://www.state.nj.us/dep/fgw/coyote_info.htm |
| New Mexico | http://www.wildlife.state.nm.us/download/education/conservation/wildlife-notes/mammals/Coyotes.pdf |
| New York | http://www.dec.ny.gov/animals/9359.html |
| North Carolina | http://www.ncwildlife.org/Portals/0/Learning/documents/Species/CoexistingWithCoyotes.pdf |
| North Dakota | https://gf.nd.gov/wildlife/id/carnivores/coyote |
| Ohio | http://wildlife.ohiodnr.gov/Portals/wildlife/pdfs/species%20and%20habitats/Coyote%20cardR112_F.pdf |
| Oregon | http://www.dfw.state.or.us/wildlife/living_with/docs/living_with_coyotes.pdf |
| Pennsylvania | http://www.pgc.pa.gov/Wildlife/Pages/NuisanceWildlife.aspx |
| Rhode Island | http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/coyotes.pdf |
| South Carolina | http://www.dnr.sc.gov/wildlife/publications/pdf/coyotecontrol.pdf |
| South Dakota | https://gfp.sd.gov/wildlife/wildlifedamage/default.aspx |
| Tennessee | http://tennessee.gov/twra/article/urban-coyotes |
| Texas | https://tpwd.texas.gov/huntwild/wild/nuisance/coyote/ |
| Utah | https://wildlife.utah.gov/predator-control-program.html |
| Vermont | http://www.vtfishandwildlife.com/cms/One.aspx?portalId=73163&pageId=148991 |
| Virginia | https://www.dgif.virginia.gov/wildlife/nuisance/coyotes/ |
| Washington | http://wdfw.wa.gov/living/coyotes.html#problems |
| West Virginia | http://www.wvdnr.gov/HUNTING/CoyoteResearch.shtm |
| Wisconsin | http://dnr.wi.gov/topic/wildlifehabitat/damage.html |
| Wyoming | https://wgfd.wyo.gov/FAQ/Small-Game-FAQ |

Appendix B- List of survey questions.

| |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>1 - Are you a resident of Oklahoma?</i> |
| · Yes |
| · No |
| |
| <i>2 - On a scale of 1-5, how much do you perceive coyotes as beneficial, with 1 being the lowest and 5 being the highest?</i> |
| · 1-not beneficial at all |
| · 2-a little beneficial |
| · 3-neutral |
| · 4-somewhat beneficial |
| · 5-very beneficial |
| |
| <i>3 - Have you ever had an experience with a coyote(s)? These experiences can include directly interacting with a coyote in a positive or negative way, seeing it from a distance, hearing it howl, or witnessing the effects of its presence (paw prints, trash being foraged, etc).</i> |
| · Yes |
| · No |
| |
| <i>4 - On a scale of 1-5, how was that experience, with 1 being very negative and 5 being very positive?</i> |
| · 1-very negative |
| · 2-somewhat negative |
| · 3-neither positive nor negative |
| · 4-somewhat positive |
| · 5-very positive |
| |
| <i>5 - Have you experienced or witnessed any of the following potentially negative effects from the presence of coyotes? Select all that apply.</i> |
| · Crossing the road in front of you. |
| · Foraging through trash. |
| · Attack on livestock. |
| · Attack on children or pets. |
| · Attack on an adult human. |
| · Other negative experience (if so, please describe). |
| · I have never experienced or witnessed a potentially negative effect from the presence of coyotes. |
| |

| |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6 - <i>Have you ever experienced or witnessed any of the following potentially positive effects from the presence of coyotes? Select all that apply.</i> |
| · Wildlife watching (this can also include enjoying hearing their howls). |
| · Ecosystem service benefits. These can include reduced rodents in the area, cleaner forests due to less animal carcasses, diversity of wildlife, etc. |
| · Other positive effect (if so, please describe). |
| · I have never experienced or witnessed a potentially positive effect from the presence of coyotes. |
| |
| 7 - <i>On a scale of 1-5, please rate your belief on the type of effect that coyotes have on people and the environment around them, with 1 being very negative and 5 being very positive.</i> |
| · 1-very negative |
| · 2-somewhat negative |
| · 3-Neither positive nor negative |
| · 4-somewhat positive |
| · 5-very positive |
| |
| 8 - <i>Do you agree with lethal management methods to control certain nuisance wildlife? Lethal methods can include hunting, poison, euthanizing, etc.</i> |
| · Yes. |
| · No. |
| |
| 9 - <i>From the below list of options, what kinds of lethal wildlife techniques do you support? Select all that apply.</i> |
| · Hunting, to reduce over-populous species and for recreational purposes. |
| · Poison, to reduce over-populous species. |
| · Euthanizing of particular animals that have attacked a human. |
| · Euthanizing of particular animals that have attacked a pet. |
| · Euthanizing of particular animals that a human has perceived as a threat or a nuisance, but have not necessarily caused any physical harm to a human or pet. |
| · I do not agree with lethal methods. |
| |

| |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><i>10 - Non-lethal options of wildlife control can include, but are not limited to: relocating particular nuisance animals, developing educational programs so that citizens have the necessary knowledge/skill to handle nuisance wildlife, or putting sterilization agents in the wild so that a particular species doesn't over-populate. Which of these non-lethal options would you say is an acceptable alternative to lethal methods? Select all that apply.</i></p> |
| <ul style="list-style-type: none"> · Relocation of particular nuisance animals. |
| <ul style="list-style-type: none"> · Educating citizens on how to prevent conflicts with wildlife and deal with nuisance animals. |
| <ul style="list-style-type: none"> · The use of sterilization agents in the wild so that particular species do not over-populate. |
| <ul style="list-style-type: none"> · I do not see any of these as an acceptable alternative to lethal methods. |
| <p><i>11 - The current method of management for coyotes in Oklahoma is to allow an open, year-round hunting season. Do you agree with this method of managing coyote populations? Choose from the following list of options.</i></p> |
| <ul style="list-style-type: none"> · Yes, I agree with open, year-round hunting as a way of managing coyotes. |
| <ul style="list-style-type: none"> · No, I do not agree with open, year-round hunting as a way of managing coyotes. |
| <ul style="list-style-type: none"> · Though I am not opposed to hunting, I believe there might be better management strategies. |
| <p><i>12 - Do you have any recommendations for the Oklahoma Department of Wildlife to develop their coyote management techniques further? Please explain.</i></p> |
| <ul style="list-style-type: none"> · Yes |
| <ul style="list-style-type: none"> · No |
| <p><i>Demographics</i></p> |
| <p><i>13 - Do you identify as male or female?</i></p> |
| <ul style="list-style-type: none"> · Male |
| <ul style="list-style-type: none"> · Female |
| <p><i>14 - What is your age?</i></p> |
| <ul style="list-style-type: none"> · 18-24 |
| <ul style="list-style-type: none"> · 25-34 |
| <ul style="list-style-type: none"> · 35-44 |
| <ul style="list-style-type: none"> · 45-54 |

| |
|-------------------------------------------------------------------------------------------------------------------------------------|
| · 55-64 |
| · 64+ |
| |
| <i>15 - Do you have pets?</i> |
| · Yes |
| · No |
| |
| <i>16 - Do you have children?</i> |
| · Yes |
| · No |
| |
| <i>17 - Do you own, or have you previously owned, livestock?</i> |
| · Yes, I currently own livestock. |
| · Yes, I have previously owned livestock. |
| · No, I have never owned livestock. |
| |
| <i>18 - For as long as you have lived in Oklahoma, have you lived primarily in a rural area, an urban area, or a suburban area?</i> |
| · Rural |
| · Urban |
| · Suburban |
| · Other |
| |
| <i>19 - What best describes your highest level of education?</i> |
| · High school/GED |
| · Associate's Degree |
| · Bachelor's Degree |
| · Master's Degree |
| · Doctoral Degree |
| · Other/Specialized Degree |
| |
| <i>20 - Do you work for, or have you previously worked for, the Oklahoma Department of Wildlife?</i> |
| · Yes |
| · No |