THESIS

POLICY TOOLS FOR CARNIVORE REINTRODUCTION: LESSONS LEARNED FROM PAST WOLF REINTRODUCTIONS IN THE WESTERN UNITED STATES

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In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Summer 2021

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ABSTRACT

POLICY TOOLS FOR CARNIVORE REINTRODUCTION: LESSONS LEARNED FROM PAST WOLF REINTRODUCTIONS IN THE WESTERN UNITED STATES

In November 2020, Colorado citizens passed a historic vote to reintroduce gray wolves to the state. Colorado Parks and Wildlife (CPW), the state wildlife agency, was tasked with creating management plans and policy. Wildlife managers and policy makers have the opportunity to consider different paths forward, drawing on the lessons of the past to lead to a successful wolf reintroduction program. Past reintroduction efforts in the western United States could provide valuable perspectives on the management and policy tools available to Colorado.

In order to inform this process and use this opportunity to assess policy tools for addressing multi-jurisdictional conservation challenges like carnivore reintroduction, this thesis research had two primary objectives: analyze perspectives on policy tools utilized in past reintroductions, including the capacities needed for successful tool implementation; and synthesize specific suggestions and considerations for Colorado. In order to meet these objectives, I interviewed 42 individuals from state, federal and Tribal land and wildlife management agencies, and stakeholders from non-profit organizations and livestock associations. Interviewees were from past reintroduction areas of the Northern Rocky Mountains (i.e. Idaho, Montana, Wyoming) and the Southwest (i.e. New Mexico, Arizona), and Colorado.

This thesis consists of four chapters: a brief introductory chapter, a second chapter that is a practitioner report of my findings, a third chapter that is an article intended for submission to a peer-reviewed journal, and a conclusion chapter. The practitioner report is a document aimed for

practitioner and stakeholder audiences and provides a robust overview of findings on interviewee perspectives of a variety of management and policy strategies, along with specific recommendations for Colorado. The intent of this chapter is to provide Colorado wildlife managers and policy makers a detailed overview of our research and findings. My findings emphasize the need for collaborative processes and relationship building with stakeholders, and the flexibility to tailor strategies to local needs. The second stand-alone chapter, which will be submitted to a peer-reviewed journal, offers a policy design perspective on carnivore reintroduction. This chapter provides a narrower range of our findings in the context of policy design literature. Findings contribute to existing literature and emphasize the need for a mixed tool approach to management in order to address the diversity of targets and policy goals, address issues of scale, and leverage capacity.

Overall, insight from this research could help to inform Colorado decision-makers on ways to move forward with planning for future wolf reintroduction. This research also contributes to the growing body of literature on using a policy design perspective to inform and analyze complex wildlife management and conservation issues. Further research is still needed to better evaluate overall effectiveness of policy tool choices and tailor specific reintroductions according to temporal and spatial scales. Future research should also be done to provide a robust stakeholder analysis for Colorado, as it is important to incorporate stakeholder perspectives into policy decisions.

ACKNOWLEDGEMENTS

I extend my sincerest thanks to my advisor, Dr. Courtney Schultz, for giving me the opportunity to join this program. I feel lucky to have had such an amazing mentor who invests so much time and effort into her students. I would also like to thank my committee members, Dr. Tony Cheng and Dr. Tara Teel, for taking the time to provide generous feedback on my project and offering inspiration through the great discussions in their classes. I also extend my thanks to the members of the Public Lands Policy Group for providing a network of support and kindness throughout my time at CSU. Special shoutout to Katie McGrath Novak and Taryn Contento – I could not have done this without their great friendship and guidance throughout this process. Thank you to my past professors at Pace University, especially Dr. Anne Toomey, who gave me the tools and opportunities I needed to succeed at CSU.

I would not be here without the unwavering love and support of my family, especially my mom, dad, and Nana, who are my greatest champions, role models, and cheerleaders always. Thanks to my friends back home who I consider family – I am so grateful to have all of you rooting for me!

Thank you to the Center for Collaborative Conservation at CSU for the opportunity to be part of their Cohort and providing funding to complete this project. Also thank you to the members of the Center for Human Carnivore Coexistence at CSU for providing guidance and support for my research. Lastly, thank you to those who took the time to be interviewed and provide insights for this project.

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CHAPTER 1 – INTRODUCTION

The reintroduction and management of carnivores can be considered one of the most contentious conservation issues in the United States, with wolves *(Canis lupus)* in particular eliciting significant controversy and public debate (Bruskotter, 2013; Niemiec et al., 2020). Wolves are considered an important political symbol, acting as a driver for land use conflict in the American West (Wilson, 1997; Nie, 2001). This conflict originates with the polarization that exists between those who see wolves as a way to return the ecosystem to its natural state and those who see wolves as a threat to rural livelihoods, such as hunting and livestock farming (Kellert et al., 1996; Slagle et al., 2019; Niemiec et al., 2020).

At the time of this writing, Colorado gets set to enter this political arena as the state prepares for future wolf reintroduction. In 2020, Colorado citizens voted via ballot initiative to reintroduce wolves west of the continental divide in Colorado. The passage of this ballot initiative requires the state wildlife agency, Colorado Parks and Wildlife (CPW) to reintroduce wolves by 2023. Past wolf reintroductions in the western United States can offer valuable lessons on the tools available for future reintroductions.

Although wolves once roamed freely across North America with a population estimated around 2 million, the species was almost completely eradicated by 1970 due to lethal persecution by humans (Wayne et al., 1992; Phillips et al., 2003; Bangs et al., 2005). However, the passing of the Endangered Species Act (ESA) in 1973 prompted the gray wolf and its subspecies, the Mexican gray wolf *(Canis lupus baileyi),* to be listed as endangered (Parsons, 1998; Woolston, 2013). As with all listed species, the United States Fish and Wildlife Service (USFWS)—the Department of Interior agency tasked with overseeing most endangered species—created

recovery plans for the gray and Mexican wolves, citing reintroduction as the preferred strategy to bring back populations (Malcolm & Li, 2018; USFWS, 2019).

The western United States witnessed the historic return of gray wolves through the 1995 reintroduction in the Northern Rocky Mountains (i.e. Idaho, Montana, and Wyoming). Between 1995 and 1997, 76 gray wolves were reintroduced into the area (Bangs & Fritts, 1996). The goal set forth in the original Northern Rocky Mountain recovery plan was to establish 30 breeding pairs of wolves (~300 wolves) for a minimum of three consecutive years (USFWS, 1987). This recovery plan stated that the USFWS would turn management over to the states upon review of an established recovery plan from Idaho, Montana, and Wyoming (USFWS, 1987). By 2002, recovery goals were met, and in 2008 the Northern Rocky Mountain distinct population of gray wolves was delisted from the ESA due to surpassing requirements set in the original recovery plan (DOI, 2016). This decision started an onslaught of litigation with a back and forth of delisting and relisting of the population. Starting after the 2008 delisting, environmental groups successfully reversed the decision through litigation, contesting the review of the state's proposed management, specifically citing issues with Wyoming's plan (NPS, 2020). Then, in 2011, members of Congress from Idaho and Montana were able to delist by using a controversial policy rider on a congressional spending bill that bypassed ESA requirements, leaving Wyoming out of the decision (Bruskotter, 2013; DOI, 2016). Finally, in 2017 an appeal of the previous litigation by the U.S. District Court delisted wolves in Wyoming.

In October 2020, the USFWS federally delisted all gray wolves in the United States from the ESA, turning management authority over to state wildlife agencies (USFWS, 2020). However, this delisting is currently set to be litigated and may change due to a shift in political leadership in the federal government (Arellano, 2021). This continuous listing and delisting of

the Northern Rocky Mountains population and the current litigation over the status of the gray wolf shows the breadth of the social conflict and legal complexities that arise with wolf reintroduction. In order to avoid similar legal conflicts in future wolf reintroductions and management plans, lessons can be learned from the tumultuous 'battle of the wolves' that gray wolf populations have faced.

Although reintroduction of the Mexican gray wolf in the Southwest has gone differently, legal barriers and challenges have occurred. Prior to reintroduction in 1998, the only known Mexican wolves lived in captivity (USFWS, 1996; Holaday, 2003). The USFWS established a reintroduction area spanning southeastern Arizona and southwestern New Mexico, with a goal of establishing a population of 100 wild Mexican wolves (USFWS, 1982; USFWS, 2001). Despite a total of 114 being released between 1998 and 2018, the Mexican wolf has retained the endangered status due to an ongoing struggle to maintain population numbers (USFWS, 2018).

The USFWS established strict boundary lines within the recovery area, relocating or lethally removing wolves once the animals crossed outside of the area (USFWS, 1996). The remoteness of areas occupied by wolves also allows for illegal poaching to occur without ramifications (Mech, 2017). Therefore, many believe social tolerance issues are the primary recovery challenge for the Mexican wolf (AZFGD, 2019; Walsh, 2019). The USFWS has been taken to court numerous times by members of the livestock industry and environmental groups; this is largely due to the continuous changes to management plans, with the most recent plan being released in 2017 (Fitzgerald, 2018). This new plan establishes a population objective of 320 wolves in the United States and 200 in Mexico for eight consecutive years (USFWS, 2017). A total of 59 separate release operations will occur in the established recovery area, which has been expanded (USFWS, 2017). However, critics of the plan state that these recovery goal

numbers are significantly lower than the "best available science" suggests (Fitzgerald, 2018). Others criticize that the expanded boundary still does not adequately account for the range of these animals, limiting population growth (Carroll et al., 2014; Hendricks et al., 2016).

In light of the difficulties associated with wolf reintroduction, the USFWS and state managers have relied on specific policy tools to facilitate reintroductions and subsequent management. For example, both reintroduction areas established incentive tools for compensating livestock owners for depredations by wolves (DeCesare et al., 2018). Collaborative tools (e.g. educational and outreach programs, facilitated workshops) have been used to satisfy the needs of the diverse stakeholders and interest groups invested in the reintroductions (Miller, 2019; Walsh, 2019).

For both reintroductions, the USFWS relied heavily on the regulatory tool of section 10 (j) of the ESA. This amendment allows for the reintroduction of nonessential experimental populations of endangered or threatened species, meaning that the reintroduced population is not critical to the overall survival of the species and can be lethally removed if need be (DOI, 2016; Fitzgerald, 2018). The utilization of section 10 (j) for wolf reintroduction has been a crucial policy tool, affording the USFWS more flexibility to tailor management to local concerns (Nie, 2001). According to Nie (2001), several political representatives saw this provision of management flexibility as a way to facilitate less controversial and more politically conducive reintroductions.

Due to the complexities of wolf reintroduction, a single approach to management is inefficient; managers must account for the diversity of goals and actors involved. Therefore, a policy design perspective can be used to better understand the mechanisms needed to efficiently implement wolf reintroduction policy. Policy design is the process of identifying the goals of

policy and determining the mix of tools necessary for achieving these goals (Gunningham & Sinclair, 1999; Schirmer et al., 2012). Utilizing a portfolio of tools addresses the trade-offs associated with different tools and meets the needs of diverse policy goals. Policy tools (e.g. capacity building, collaborative processes, incentives, and regulations) are instruments used by the government to influence behavior of specific policy targets (i.e. actors who respond to the tool) (Schirmer et al., 2012). All tools come with assumptions about existing drivers of behavior, capacities, and how targets behavior will be shaped (Schneider & Ingram, 1990). Assessing the assumptions of a policy tool is necessary for predicting how targets will interact with the tool (Czech & Krausman, 2001). Capacities (e.g. funding, knowledge, staff) must accompany policy tools in order to address challenges for achieving policy goals, such as lack of information, skills, or other resources (Schneider & Ingram, 1990). Not all tools work in the same capacity or under the same behavioral assumptions.

When designing policy, it is important to understand how to target different actors and integrate various policies (Borras & Edquist, 2013: Howlett, 2019). Policy integration refers to a design that has coherent and consistent policy goals and tools, meaning that multiple goals are not contradicting each other and tools support overall goal achievement (Howlett & Rayner, 2007; vonHedemann et al., 2020). Policy integration can help address issues of scale by emphasizing the need for management of cross-cutting issues that transcend jurisdictional boundaries (Meijers & Stead, 2004). Therefore, collaboration and coordination across sectors and organizations is essential for addressing integration challenges (vonHedemann et al., 2020).

As Colorado prepares for wolf reintroduction, it is critical for managers to utilize a mixed tool approach to address diverse targets (e.g. stakeholder groups such as hunters and NGOs, and regulatory bodies at state and federal levels) that support achievement of complex policy goals,

address trade-offs associated with single tools, and leverage capacities. There is also a need to address integration challenges that often occur when working across diverse sectors and levels of governance.

The primary purpose of this study was to identify policy tools utilized in past wolf reintroductions and capture specific suggestions for Colorado reintroduction based on wildlife and land manager perspectives. This included identifying capacities needed for successful reintroduction and other considerations, such as addressing issues of jurisdictional authority and scale. Some stakeholder representatives were also included in this study to better understand divergent perspectives, however the intended goal of the study was to not represent all stakeholder groups or perspectives. This research focused on three specific areas- the Northern Rocky Mountains reintroduction area (i.e. Idaho, Montana, and Wyoming), the Southwest reintroduction area (i.e. New Mexico and Arizona), and Colorado.

I conducted semi-structured interviews consisting of two major groups: past reintroductions and Colorado. Interviewees included federal, state, and Tribal land and wildlife managers (referred to collectively as managers), and livestock association and environmental non-profit organization (NGO) representatives. Each group had its own interview guide designed to address my research questions (Appendix A). In total, I conducted 42 interviews. Of those, 20 were from the Northern Rocky Mountains, 13 from the Southwest, and 9 from Colorado. Interviews were conducted between May and November of 2020, lasting between 45 minutes and one hour. Interviews were confidentially recorded and transcribed by a third party. These interviews took place via phone or video calling platform. Interviewees were identified using existing knowledge of contacts and through online documents such as federal and state agency websites (i.e. “purposive sampling”). I also used “snowball” sampling, asking participants for

names of others who were relevant interviewees (Glesne, 2011).

I analyzed interview data through the systematic process of coding using qualitative data analysis software (Dedoose). This process involved categorizing segments of data into codes, or labels, based on my research questions and any major themes that arose during data collection. Through this process of labeling segments of text with each code, I was able to develop a visual representation of my analysis with a coding tree (Appendix B). The codes produced during this process helped organize my data and allow for key themes to be identified for my final results.

This thesis contains two stand-alone yet interconnected chapters to present my research finding. Chapter 2 consists of a practitioner report for Colorado decision-makers, including CPW, and any state or federal agencies who may find it relevant. This report has been purposefully written with limited literature citations and academic jargon in order to be easily comprehensible for practitioners. This chapter explores the policy and management strategies for wolf reintroduction mentioned by interviewees and overall opinions on the strategies. It includes perspectives on capacities needed for wolf reintroduction and opinions on the differences between state and federal jurisdictional authority. It concludes with key suggestions and insights specifically for Colorado wolf reintroduction. Chapter 3 is an article intended for publication. This chapter utilizes a policy design perspective to identify key policy tools, capacities, and considerations of scale for carnivore reintroduction. Findings were placed in the context of existing literature on policy design to offer insights into the tool choices and considerations necessary for successful reintroduction. The findings in this chapter do not include stakeholder perspectives because our goal was to provide a synthesized version of our data as it relates to the policy design literature. Chapter 4 summarizes key findings, discusses limitations of the research, and proposes future areas of exploration.

CHAPTER 2 – POLICY LESSONS FOR COLORADO WOLF REINTRODUCTION

1. Executive Summary

1.1 Study Overview and Approach

In November 2020, Colorado citizens passed a ballot initiative to reintroduce gray wolves west of the continental divide in Colorado. Colorado Parks and Wildlife (CPW) was tasked with creating a management plan to reintroduce wolves by 2023. Wildlife managers and policy makers now face the challenge of designing a successful wolf reintroduction program. Past reintroduction efforts in the Northern Rocky Mountains (Idaho, Montana, and Wyoming) and the Southwest (Arizona and New Mexico) can provide valuable insights for Colorado.

In 2020, we conducted a study to evaluate the policy and management strategies utilized in these past reintroduction efforts and synthesized suggestions for Colorado. Our goals were to: 1) identify how lessons learned from past wolf reintroduction and subsequent management efforts could inform policy and management strategies for future wolf reintroduction; and 2) capture ideas and suggestions specifically for Colorado. As part of this work, we investigated the capacities needed, perspectives on different jurisdictional authorities, and general challenges associated with wolf reintroduction.

We conducted 42 semi-structured interviews in 2020 with people in the Northern Rocky Mountains, the Southwest, or Colorado. We interviewed a mix of state, federal, and Tribal land and wildlife managers (collectively referred to as “managers”), livestock association representatives, and environmental non-government organization (NGO) representatives. At the time of data collection, all interviewees were either currently or had previously been associated with wolf management or reintroduction.

1.2 Findings

Our findings fall into four categories: perspectives on jurisdictional authority, capacities needed, policy and management strategies, and overall challenges. We present findings according to their importance and priority for implementation based on feasibility and interviewee recommendations.

Jurisdictional authority will depend on the federal endangered status of the wolf under the Endangered Species Act (ESA) at the time of reintroduction in Colorado. If the gray wolf is listed as endangered at the time of reintroduction, the U.S. Fish and Wildlife Service (USFWS) will have ultimate jurisdiction over the species, and CPW will most likely need a permit from the agency to conduct reintroduction. The majority of interviewees advocated for CPW to reintroduce wolves only if they were delisted.

Interviewees overall thought this latter pathway would be best. They said that state agencies have more regulatory flexibility and the ability to tailor management plans to state needs. Interviewees also said management coordination is easier at the state level. Some said that the public trusts state agencies more than federal agencies; therefore, social tolerance may also increase when management is localized. A few interviewees advocated for reintroduction to occur under the jurisdiction of the USFWS because then the wolf would be afforded protection under the ESA. Also, these interviewees believed that the state agency could then have the ability to "shift the blame" away from themselves towards the federal government if members of the public are unhappy with management decisions. Some felt that the USFWS also has more capacity, such as experience and funding, to implement a reintroduction.

In order to successfully implement management and policy strategies, certain capacities are needed, including funding and a knowledgeable staff. Interviewees said that lead agencies

should consider the capacities and funding that will be needed for a successful reintroduction and plan accordingly. Most interviewees emphasized that Colorado should make sure that the necessary funding mechanisms are in place before reintroduction occurs. Some were concerned that reliance on CPW funds may cause social tolerance issues towards having wolves on the landscape, specifically in the hunting community due to most revenue coming directly from purchases of hunting and fishing licenses. Interviewees suggested that Colorado shift the financial burden away from those who most likely did not vote for reintroduction (e.g., hunting communities) and towards those who did by using general tax revenue. Interviewees also stated that wolf management takes a cadre of dedicated staff members within agencies. Some advocated for finding people with diverse knowledge sets beyond wolf biology. Interviewees said that it was necessary to have staff members that can address social tolerance issues directly.

Once authority and capacities are established, the available policy and management strategies can be determined. Our findings had three major themes of strategies that corresponded with different goals of policy: regulatory strategies, collaborative strategies, and livestock programs.

Regulatory strategies should be implemented early on by the lead agency in order to establish a policy framework. For example, many interviewees felt that if the gray wolf was endangered at the time of reintroduction, section 10 (j) of the ESA should be utilized. Section 10 (j), an amendment to the ESA, allows for the reintroduction of a non-essential experimental population of wolves which provides managers the ability to be more adaptive in management. This flexibility includes the distribution of Incidental Take Permits for lethal removal of wolves on private property. In general, many interviewees felt that lethal removal of wolves was a critical part of management for increasing social tolerance and population control. Most

interviewees advocated for taking an "all tools" approach to management, meaning a mix of non-lethal and lethal measures. Another regulatory strategy available is the use of management zones where wolves are afforded different protections across boundary lines. However, interviewees warned of issues with boundary lines in the Southwest where wolves must be captured and relocated if the cross the boundary. Some felt that this limited the ecological success of the Mexican wolf population and constrained USFWS resources.

Once a regulatory framework is established, interviewees emphasized the importance of establishing collaborative processes with stakeholders (e.g. livestock producers, NGOs, hunters, land owners, etc.). These processes can be convened by the lead agency or the stakeholder groups; regardless, it is important for both managing agencies and stakeholders to be involved. Interviewees felt that allowing for joint-decision making between stakeholders and managers increased social tolerance towards having wolves on the landscape. Many interviewees encouraged a "boots on the ground" or face-to-face approach to establish a relationship and build trust with stakeholders. Many also emphasized the importance of transparency with stakeholders and the general public through data sharing and listening to concerns. In order to share data and communicate more broadly, outreach and education programs were mentioned as helpful tools, such as professionally facilitated meetings, stakeholder advisory workshops, and school education programs.

Decisions about livestock depredation programs should be considered within these collaborative processes. Livestock depredation programs were also mentioned as a strategy to increase social tolerance amongst stakeholders, particularly within the livestock community. The majority of interviewees felt that depredation compensation programs were a necessity for wolf reintroduction. Still, interviewees expressed issues within these programs, such as difficulties to

confirm a depredation, payment not accounting for other losses such as cattle weight loss due to stress, and the amount of time it takes to receive payment. In the Southwest, a "Pay for Presence" system attempts to account for these issues by paying livestock producers a fee for having livestock within wolf territory, regardless of if depredation occurs. However, according to interviewees, lack of stable funding has impacted the effectiveness of this system and other compensation programs. Other strategies mentioned for mitigating depredation included fladry, red flagging that scares predators, and range riders, people who actively monitor livestock. However, some interviewees felt that these strategies can be ineffective on larger public land allotments.

Other general challenges of wolf reintroduction were also brought up. Almost all interviewees mentioned challenges with building social tolerance and acceptance for wolves on the landscape. Some mentioned state agencies catering to more utilitarian values as an aspect of social tolerance that needs to be addressed in Colorado. Another issue mentioned for Colorado was the urban-rural divide and the equitability of urban citizens voting for a reintroduction that will only impact rural livelihoods (e.g. hunters, livestock producers). Interviewees also mentioned challenges associated with reintroducing wolves on public lands, such as equitably managing for the various multiple uses of public lands (i.e. livestock grazing, recreation, wildlife habitat, hunting, etc.). As CPW moves forward with reintroduction, our interviewees strongly encouraged managers to take into account these challenges and look to past efforts for recommendations on how to move forward.

1.3 Conclusions and Recommendations

We synthesized suggestions for Colorado wolf reintroduction based on the perspectives and recommendations of interviewees in this study. These suggestions include:

- Regardless of which agency has jurisdictional oversight, a bottom-up approach to management will be helpful for increasing social tolerance of wolves on the landscape. Our findings suggest that keeping management decisions as local as possible increases trust between the public and managers.
- Capacity issues, such as funding, should be addressed prior to reintroduction and will be dependent on jurisdictional authority. Diversifying funding sources to better leverage the resources of those who voted for wolf reintroduction may be helpful to address issues of equity.
- A regulatory framework that utilizes a mix of policy tools (e.g. incentives or financial assistance), along with regulatory flexibility, can help to effectively manage wolves over different temporal and spatial scales. This mix of tools will include both lethal removal and non-lethal measures.
- Managing wolves differently across geographic zones may be helpful to address the challenges associated with mixed public land uses but can also bring specific challenges such as issues of capacity and restrict growth of wolf populations. Zonal management is difficult to establish prior to reintroduction due to unpredictability of wolf movements; therefore an adaptive approach to setting management zones should be used.
- Collaborative processes that allow for joint-decision making between stakeholders and wildlife managers may help to reduce social tolerance issues. These processes should include all relevant managing agencies and stakeholder groups. For example, livestock producers must be a part of the decision making process for livestock depredation programs. Face-to-face interactions are the most effective for building relationships and trust with stakeholders.

2. Study Overview

On November 3rd, 2020, Colorado citizens voted to approve a ballot initiative to reintroduce gray wolves (*Canis lupus*). This ballot initiative, known as Proposition 114, requires the state wildlife agency, Colorado Parks and Wildlife (CPW), to reintroduce gray wolves west of the continental divide in Colorado by the year 2023. The passage of Proposition 114 makes Colorado the first state where citizens are directing the reintroduction of gray wolves, rather than the federal government. Despite prior data predicting that the measure would pass overwhelmingly, Proposition 114 passed by less than two percentage points (Niemiec et al., 2020; Colorado Election Results, 2020). The narrow passage of this measure is an indication of the contention and polarization that will be and is often associated with wolf reintroduction.

Wolves are often considered a policy surrogate, meaning they are a driver for other complex issues such as land use conflict, state versus federal government control, and deeply seated issues of value (Nie, 2001). This includes polarization in the values of those who see wolves as a way to return to the ecosystem to its natural state and those who see wolves as a threat to rural livelihood, such as livestock farming and hunting (Niemiec et al., 2020). This polarization has resulted in social tolerance issues amongst certain groups, resulting in increased illegal poaching and harassment of wolves (Naughton-Treves et al., 2003). The task of creating a management plan that is not only inclusive and equitable for all stakeholders, but also ensures a level of social tolerance towards having wolves on the landscape falls to CPW.

In anticipation of this ballot initiative, we conducted a study to evaluate the policy and management strategies utilized in past reintroduction efforts. We also captured specific policy and management suggestions for Colorado. This included the differing jurisdictional authority, capacities needed, and general challenges associated with wolf reintroduction. To achieve our

objectives, we conducted interviews with federal, state, and Tribal land and wildlife managers who either worked previously on wolf reintroduction or who currently manage wolves in two reintroduction areas: the Northern Rocky Mountains (i.e. Idaho, Montana, and Wyoming) and the Mexican wolf recovery area (i.e. Arizona and New Mexico). We also conducted interviews with environmental non-profit organizations (NGOs) and livestock board members who have helped to shape policy and management strategies. We then conducted interviews with Colorado state and federal land and wildlife managers in order to capture internal state suggestions, and the foreseen challenges that lay ahead. While we could not capture all perspectives about wolf reintroduction, these interviews offer insight into potential strategies and challenges that will be relevant in Colorado.

The following research objectives guided this study:

1. Identify how lessons learned from past wolf reintroduction efforts can inform policy and management strategies for wolf reintroduction in Colorado.
2. Capture ideas and suggestions from land and wildlife managers for successful reintroduction in Colorado.

3. Background on Wolf Reintroduction in the Western United States

Colorado is fortunate to sit in a unique place, geographically positioned between two of the most high-profile wolf reintroductions in the United States. The Northern Rocky Mountains reintroduction of gray wolves occurred just north of Colorado in Wyoming, Montana, and Central Idaho in 1995. The Mexican gray wolf (*Canis lupus baileyi),* a subspecies of the gray wolf, was reintroduced to the Southwest in New Mexico and Arizona in 1998. These past reintroduction efforts in neighboring states offer important lessons regarding the management and policy strategies available to Colorado.

Although wolves once had a population estimated around 2 million, by 1970 the species was almost entirely eradicated in the United States due to persecution by humans (Bangs et al., 2005). After the Endangered Species Act (ESA) was passed in 1973, the gray wolf and Mexican wolf were among the first species and subspecies to be listed as "endangered." In accordance with ESA requirements, the U.S. Fish and Wildlife Service (USFWS) was mandated to write separate recovery plans for gray and Mexican wolves. Both recovery plans cited reintroduction as the primary strategy to restore populations (USFWS, 1982, 1987).

The 1995 reintroduction in the Northern Rocky Mountains marked the return of wolves into the western United States. Despite reintroduction achieving success in restoring the species population, these wolves have been the driver of political controversy for several decades (Nie, 2003; Boyce, 2018). Population goals established in the original recovery plan put forward by the USFWS were met in 2002, and in 2008 the Northern Rocky Mountain distinct population of gray wolves was delisted under the ESA. In accordance with this original recovery plan, the USFWS turned management authority over to the states upon review of each state's management plan (Idaho, Montana, and Wyoming).

However, according to a court decision, the state plans lacked adequate protections for wolves, particularly in Wyoming, and the delisting decision did not withstand legal challenge (NPS, 2020). Meanwhile, debate surged throughout the country over whether populations of wolves in the area had recovered to the point of ensuring long-term population viability. Both of these issues were raised in court, causing the subject of wolf delisting to become an ongoing legal battle (Bruskotter et al., 2010). In 2011, Congressional members from Idaho and Montana were able to delist the wolf in these two states via a policy rider on a congressional spending bill that bypassed the ESA requirements (Fitzgerald, 2011). Wyoming was left to continue their legal

battles for the next decade, until in 2017, a court decision allowed for delisting within the state (Sims et al., 2020). In October 2020, the USFWS ruled to federally delist all gray wolf populations from the ESA, with individual state wildlife agencies now managing current populations across the country (USFWS, 2020). However, this decision is currently set to be litigated against by environmental NGOs and could be reversed due to a change in presidential administration as of January 2021 (Arellano, 2021).

In the Southwest, the Mexican wolf program has also faced an array of challenges. Prior to the 1998 reintroduction, the only known Mexican wolves lived in captivity (USFWS, 1996). In accordance with the original recovery plan, the USFWS established a recovery area spanning from southeastern Arizona into southwestern New Mexico. This subspecies of the gray wolf has been significantly slower to recover compared to the Northern Rocky Mountains gray wolf population (USFWS, 2018). The Mexican wolf retains the endangered status, with full management authority falling to the USFWS. Many cite social tolerance factors as being a cause for slow recovery, including conflict with livestock depredation and lethal removal of wolves (Walsh, 2019). This has also led to legal challenges, with the USFWS being taken to court numerous times by members of both the livestock industry and environmental groups. This is most often due to the USFWS' continuous changes to recovery and management plans (Fitzgerald, 2018).

As Colorado prepares to follow in the footsteps of past reintroduction efforts, and wildlife managers and policy makers prepare policy and management plans, there is an opportunity to draw on the lessons learned from previous efforts and uncover the challenges that will face Colorado specifically. This includes understanding who can and will need to be involved in the decision making processes and the capacities needed to foster policy implementation; the policy

strategies available will be contingent on these factors. While the ecological and social aspects have often been studied and discussed, the policies and management implications associated with carnivore reintroduction are equally complex and important to understand in order to better inform future management practices.

4. Research Approach and Methods

For this project, we utilized semi-structured interviews. Our interviewees were from past reintroduction areas—the Northern Rocky Mountains (Idaho, Montana, and Wyoming), and the Southwest (Arizona and New Mexico)—and Colorado (Table 1.1). Our initial list of participants included land and wildlife managers (referred to collectively herein as managers) from the USFWS, National Park Service, U.S. Forest Service, Wildlife Services—U.S. Department of Agriculture, Tribal Nations, and state wildlife agencies. We later decided to include representatives from environmental NGOs and livestock associations in order to understand divergent stakeholder perspectives. This study was not intended to represent all stakeholder groups, as the primary goal was to gain insights from managers of wolves, not to do a comprehensive overview of stakeholder perspectives. Interview participants were identified by reviewing state and federal management plans for names of potential interviewees, and by asking initial interviewees for additional potential interviewees.

Table 2.1. Geographic location of interviewees and the number from each region.

	Northern Rocky Mountains	**Southwest**	**Colorado**
States Represented	Idaho, Montana, and Wyoming	New Mexico and Arizona	Colorado
Number of Participants	20	13	9

We used separate interview guides for participants from past reintroduction areas and participants from Colorado (Appendix A). A total of 42 interviews took place between May and

November of 2020. Of those interviewees, 18 were from federal agencies, 13 from state agencies, 3 from Tribal Nations, 5 from NGOs, and 3 from livestock associations. Each confidential interview lasted approximately 40-60 minutes and took place via phone call or video chat. Interviews were recorded with permission from the participant and transcribed. Analysis included the qualitative coding process in which segments of data were sorted into categories based on our research objectives and other major themes that emerged during the interview process. The findings detailed in this report were derived from the perceptions of our interview participants.

5. Findings

The findings of this study are organized into four major sections based on our research objectives and themes that emerged during interviews: 1) federal or state jurisdictional authority; 2) capacities needed to facilitate strategy implementation; 3) strategies identified for wolf reintroduction and management; and 4) challenges associated with wolf reintroduction. As a part of our findings, we tiered each section in a sequence of priority for decision makers. It will be important for certain hurdles, such as understanding who has ultimate management authority over wolves and the capacities available from that authority, to be understood prior to policy implementation. Certain policy strategies will also need to be implemented prior to others in order to establish a policy framework.

5.1 Jurisdictional Authority over Wolves

Prior to implementing any policy strategies, there is a need to solidify who will have oversight over wolf reintroduction and management: the state government or the federal government. Ultimate jurisdictional authority over reintroduction of the gray wolf in Colorado is uncertain because of the possibility for the USFWS decision to federally delist the species to be

overturned in court or dismissed by the new presidential administration. If the wolf is endangered at the time of reintroduction, the USFWS will have ultimate authority. CPW will most likely have to seek a permit from the USFWS in order to conduct reintroduction and the federal agency will have ultimate decision making power. However, if the wolf is federally delisted from the ESA at the time of reintroduction, CPW will have full management authority. This section will highlight interviewees' perspectives on reintroduction under state or federal jurisdiction.

5.1.1 Support for State Management

The majority of interviewees felt that having local management control was ideal and, therefore, advocated that the state have authority over reintroduction and management. Many felt that social tolerance and public acceptance is much greater when state agencies manage wolves. According to interviewees, the public has more trust for state governments than the federal government. Also, local state agency managers often already have established relationships with key stakeholders. Others felt that the local agencies have more regulatory flexibility and the ability to tailor management plans to state needs. Along those lines, coordination is also easier at the state level because there are fewer political barriers to overcome. For example, people said:

> *It'd be a lot better for Colorado to wait until delisting and then do it on their own. Then Colorado could tailor how reintroduction in their State should look, by people from Colorado. – Southwest, Manager*

> *It's hard to bring people together, to find workable solutions with the uncertainty that derives from the federal level, not only from the administration, but from actions of Congress that are largely driven by people who are far away from where the issue lies. – Northern Rockies, Livestock Producer*

> *The state should do it because… you're going to see decisions made that are more compatible with the communities… your chances of success are greater if you build tolerance and support at the local level… success lies in the communities and their tolerance for species. – Northern Rockies, Manager*

5.1.2 Support for Federal Management

Some interviewees felt that federal authority over reintroduction and management was preferable because this would mean the gray wolf would be afforded protections under the ESA. Under federal protection, it is perceived that the gray wolf receives less lethal persecution than when the states have authority. Some mentioned that wolf habitat would also be protected if the wolf was listed as endangered. The ESA requires protection of habitat for all listed species.

Interviewees also felt that the federal government is less likely to be "captured" by local interests than the state agency. In part, this is due to the diversity of funding the federal government can utilize as compared to state agencies who often rely on hunting license profits. One person also expressed concern that state agencies represent a limited demographic, whereas federal agencies represent the broader public. A couple interviewees from a Tribal Nation in the Northern Rocky Mountains felt that the federal government had more of a responsibility to uphold Tribal treaties than state governments. They cautioned of issues that arose between states and Tribes during past reintroduction efforts. Interviewees explained:

> *My understanding of the Tribe's position is that the federal government is the entity with the trust responsibility to the Tribe and is protected by [a treaty]. So the federal government is the one that has the responsibility to fulfill that …. Part of that is ensuring ecological integrity within its homeland, including the presence of wolves…. There's a long history of deep skepticism…and open hostility between [the state] and the [Tribe]. – Northern Rockies, Tribal Nation Manager*

> *If you look at the demographic makeup of state wildlife agencies, they are so dominated by…the hunting community, the [agricultural] community…. There's such a lack of diverse perspectives at the decision-making table. And because of the funding structures, no one else is invited to the table because you have an iron triangle of hunters paying the state agency and the state agency is responsive to the wildlife commissions in the legislature. – Northern Rockies, NGO Representative*

In general, interviewees felt that the federal government has more capacity to implement a wolf reintroduction, such as knowledgeable staff, and funding. The USFWS could act as a

guide for the state agency. A few interviewees also said the state agency can "shift the blame" away from themselves if members of the public are unhappy with management decisions, when the federal government is in the lead. One person said:

> *In some cases it would be good to have the USFWS in charge to take a lot of heat off of the state agencies and teach them- just like we did with the Northern Rocky States, these are some things we did right, things we did wrong. And these are some things you might want to consider so that they kind of have some guidance. – Northern Rockies, Manager*

5.2 Capacities Needed to Support Wolf Reintroduction and Management

Capacities for wolf reintroduction will likely depend on which agency has jurisdictional authority as resources differ across levels of government. Once this oversight is solidified, certain capacities will need to be considered prior to reintroduction in order to support the implementation and success of policy strategies. This section will highlight the key types of capacities discussed: funding mechanisms and knowledge.

5.2.1 Funding

Lack of funding has been an issue for past reintroduction areas, and, therefore, the majority of interviewees warned that Colorado should have funding mechanisms in place before reintroduction occurs. Adequate funding will be necessary for multiple facets of reintroduction, including wolf monitoring equipment, such as GPS collars, and staff capacity dedicated to wolf management, livestock compensation, and public engagement efforts (e.g. stakeholder workshops, public meetings, etc). One interviewee commented:

> *Funding is always an issue. I don't know many states that don't have funding issues... Sometimes there's money there when [wolves] are endangered and then when they're delisted, the money goes away and the states have to make up for any short falls and so on. – Northern Rockies, Manager*

Funding sources in Colorado will most likely differ based on the listing status of the wolf. If the wolf is listed as endangered, it is more likely the federal government will provide funding

for reintroduction and subsequent management. If the wolf is delisted at the time of reintroduction or thereafter, the state will most likely need to provide more funding. Some delisted states, such as Montana, still receive federal funding for management, but interviewees said the funding is minimal and cannot be relied upon to offset all costs. For state-run wolf management programs, the majority of funding comes from the wildlife management agency. Both past reintroduction areas have utilized funds from NGOs such as Defenders of Wildlife and Natural Resource Defense Council. In the past, funds from these organizations have been put towards cost-sharing efforts for livestock depredation mitigation and compensation programs.

Several interviewees were concerned that reliance on CPW revenue from hunting and fishing licenses may cause social tolerance issues amongst certain stakeholders, and that groups purchasing such licenses should not feel they bear the brunt of financing wolf reintroduction, which might exacerbate conflict because these groups likely did not vote for reintroduction. For example, in Colorado, CPW is an enterprise agency under state law and generates 90% of its own revenue. Most of this revenue comes from purchases of hunting and fishing licenses, and state park passes. A few interviewees suggested that Colorado shift the financial burden away from those who purchase hunting and fishing licenses. One way to do this would be to use general taxpayer funds for reintroduction and management, including livestock compensation programs. One interviewee explained:

> *I'm thinking that some of this will come from taxpayers at large, rather than people who buy hunting and fishing licenses… that would probably be the preferable way to address concerns about equity that every voter in the state got to say whether they wanted wolves or not….I'm kind of hoping it comes from general revenue sources. – Colorado, Manager*

5.2.2 Knowledge

Many interviewees stated that wolf management takes a cadre of dedicated staff members within agencies and knowledgeable partners, beyond wolf biologists. Some interviewees cautioned that time and budget constraints within agencies have caused significant strain on employees who manage wolves. A few interviewees in the Southwest also felt that as wolf populations grow, the managing agency will need to increase staff, and therefore must find adequate resources to prepare for this growth. Interviewees felt that it was necessary to have staff members that can address social tolerance issues directly. One interviewee from the Southwest felt that finding the right people to lead wolf management within agencies was the key to success. They said, *"If you can find the right person in the state or in the [federal government] and if they could work together…oh my gosh. Stuff would really go well…. It could be hugely successful in Colorado."* Others commented:

> *There's going to need to be a small army of people to deal with the planning of this through regulatory science, through all that kind of stuff.... And I think there's going to be a need for some collection of people from a bunch of disciplines. – Colorado, Manager*

> *I would say [we need people who are] knowledgeable yet flexible and willing to learn. So having the right people is important. And diversity of staff like somebody doing education and outreach and really being the force behind that doesn't need to be a wolf expert. – Southwest, Manager*

5.3 Policy Strategies to Support Wolf Reintroduction and Management

In order to achieve policy goals, certain strategies will need to be implemented; however, overall policy goals and associated strategies will ultimately depend on jurisdictional authority and available capacity. Certain strategies will also needed to be implemented prior to others. Interviewees discussed management and policy strategies, including overall goals, attributes for

success, and barriers for success, around three main themes: regulatory strategies, collaboration, and livestock programs (Table 1.2). This section will highlight key strategies within each theme.

Table 2.2. Strategies and considerations for wolf reintroduction and management

Strategies for Wolf Reintroduction and Management

Policy Goal	**Policy Theme**	**Strategies in Theme**	**Attributes for Success**	**Barriers for success**
Utilize government regulation to enforce more social tolerance and support towards wolves.	Regulatory Strategies	Regulatory Flexibility and Lethal Removal	Tailor management to local customs and concerns over land-use restrictions; flexibility for lethal removal by landowners can increase social tolerance	Restrictions under the ESA; not all stakeholder groups advocate for lethal control
		Management Zones	Balancing multiple use of public lands by prioritizing wolf protections in some areas and human uses in other areas	Need to capture and relocate back inside boundary; restraints ecological success and population recovery; constraints on resources and staff
Increase social tolerance amongst stakeholders a through co-production of policy decisions.	Collaborative Strategies	Stakeholder and Public Engagement	Transparent communication; relationship building in neutral settings; face-to-face interactions; allowing all voices to be heard	Hiding information; managing from behind a desk; not involving certain groups
		Interagency Collaboration	Transparent communication; establishing clear objectives and goals; utilizing formal agreement documents	Undefined goals and objectives; changing goals or objectives without consulting other agencies; lack of communication
Incentivize livestock producers to be more tolerant towards having wolves on the landscape.	Livestock Programs	Compensation Programs	Consistent funding sources; using a multiplier system or "Pay for Presence" program to account for all loss	Untimely payment; difficulty confirming depredation; not accounting for other loss; lack of funding
		Non-Lethal Mitigation Methods (e.g.	Cost-sharing with NGOs and Wildlife Services; effective on smaller home	Expensive; timely; not effective on public lands; lack of standardization and

		fladry and range riders)	ranches; ability to hire someone from local community to range ride	accountability in ranger riders; depredation occurs at night

5.3.1 Regulatory Strategies

In order to facilitate reintroduction, a regulatory framework must be established. The regulatory strategies available for Colorado reintroduction will ultimately depend on if the gray wolf is under federal jurisdictional authority. The majority of interviewees felt that if the gray wolf is protected under the ESA at the time of reintroduction, the USFWS should use section 10 (j) of the ESA should be utilized to provide flexibility. Section 10 (j) allows for the reintroduction of a nonessential, experimental population, meaning the population is not essential to the overall survival of the species. One of the key reasons interviewees advocated for the use of section 10 (j) was because it allowed for more adaptive management and flexibility for managers to lethally remove wolves when necessary and distribute incidental take permits. Incidental take permits allow landowners to lethally remove or harass a "problem" wolf (i.e. one that is depredating livestock, harassing domestic pets, etc). Several interviewees mentioned that landowners felt empowered when they were able to take control of a situation involving a wolf, crediting incidental take permits for increased social tolerance.

The ability to lethally remove wolves was believed to have contributed to an increase of social tolerance amongst stakeholder groups for having wolves on the landscape. Many interviewees stated that, even if wolves are delisted and section 10 (j) cannot be utilized, the state should still allow flexibility for lethal removal. Example statements included the following:

> *I've heard from a lot of folks that they really feel a sense of strong frustration and a lack of empowerment when they're basically faced with losses of livestock…and don't really have the perception of support or ability to respond accordingly… you've got a number of examples where people break the law, they harass or harm or kill wolves... if we don't have the room in the system to provide some [flexibility],*

people are going to continue to illegally harm and kill wolves. – Southwest, Manager

Not having the ability to remove animals, I think has led to more illegal killings… and the potential for less trust and willingness to move forward [from the public]. So recognizing that there's going to be a need for mechanisms in place to remove problem wolves will be really important. – Southwest, Manager

In the Northern Rocky Mountains, where wolves are delisted and management falls to the states, interviewees had differing opinions regarding managers' reliance on lethal removal in order to stabilize population numbers and deal with livestock depredation issues. A few interviewees from this region advocated that lethal removal was a crucial part of wolf management. Others stated, however, that removing problematic individual wolves is not a proper solution due to the fact that another wolf will move into the territory. Those interviewees said that the entire pack must be removed in order to efficiently stop livestock depredations. Still, others noted that this is also not sustainable because a new pack will move into the territory the following year. These statements show the diverse perspectives interviewees had:

You have to be very aggressive in managing that population because what I've learned… is that you have to eliminate 30 to 40% of the population every single year in order to maintain a flat line in their numbers. – Northern Rockies, Manager

There was a few things that I think the wolf program thinks worked like being very proactive with removing the 'bad wolves'. That's such a Band-Aid approach. It's not a good approach, but we are very vigilant in it... It's like you're treating the flu with a Band-Aid. – Southwest, Manager

According to several interviewees, state implemented wolf hunting seasons as a form of lethal control has helped to both establish a feeling of empowerment in communities that do not want wolves on the landscape and stabilize the wolf population. All three of the Northern Rocky Mountain states have established hunting seasons for wolves since delisting. One interviewee commented:

Hunting increased social tolerance tremendously. I can tell you from experience when we had wolves protected and they couldn't be hunted…. hunters were just angry and very difficult. As soon as we opened the hunting season and hunters could get a wolf permit… angst dropped tremendously. It was like somebody turned the switch on. I have never seen anything like it in my life as a professional in terms of the relaxation of the angst." - Northern Rockies, Manager

The majority of interviewees advocated for taking an "all tools" approach as the best management option, meaning a mix of non-lethal (i.e. wolf hazing and depredation mitigation strategies) and lethal measures. Many interviewees advocated for an adaptive management approach and therefore felt that no strategy should be ruled out. Example statements included the following:

I think everything should be on the table, including lethal. You just have to have every option because there's just so many variables once you get on the landscape and there's so many variables between wolf packs and their behaviors, if you don't have all the tools, then you're just shortchanging the whole program. – Southwest, Manager

We have our ways of doing it and we've been successful, but every area and region is different for how they're going to be doing this type of work. You can't just put an umbrella approach and say that this technique is a silver bullet. – Northern Rockies, Manager

The use of management zones to restrict wolf movement and delineate differing levels of protection across the landscape should be a factor of consideration when planning regulation for Colorado reintroduction. This type of zonal management has been implemented by the federal government in the Southwest and the state government in Wyoming. For example, Wyoming is split into three zones: Yellowstone National Park, the trophy game area, and the predator zone. Within Yellowstone National Park, wolves are afforded full protections and are not lethally controlled. Directly outside of the park is the trophy game area where Wyoming Game and Fish, the state wildlife agency, actively manages for wolves, including responding to livestock depredation and establishing a hunting season. If a wolf crosses out of the trophy game area, the

animal enters into the predator zone where wolves are not managed and therefore can be lethally removed by anyone at any time. However, this also means that livestock producers in this area do not receive assistance from state wildlife managers if depredation occurs.

A few interviewees felt that Wyoming's zonal management contributes to social tolerance significantly, appealing both to those who want strict protections for wolves and to those who want to have them lethally controlled. Some interviewees also stated that zonal management has proved to be effective due to the fact that Wyoming has continually kept a wolf population that hits recovery numbers. Others stated that utilizing a predator zone is highly controversial with members of the public who want more protections for wolves. Some interviewees felt that the controversy of this zonal management was the reason Wyoming's management plan was litigated so frequently and that delisting took significantly longer than the other Northern Rocky Mountain states. One interviewee advocated for zonal management by stating:

> *When wolves flow over into places that are human dominated landscapes, you got to kill them because people are just going to go crazy… wolf hatred is culturally embedded… if you just try and protect wolves everywhere, it's not going to work. Where there's few people and low conflict you side with the wolves, where there's a lot of people and lots of conflict you side with people. – Northern Rockies, Manager*

In the Southwest, boundaries are used to limit the range of Mexican wolves to south of Interstate 40 that runs through Arizona and New Mexico. If a wolf crosses this boundary line, the USFWS will capture and relocate the wolf back inside the boundary, or lethally removal the wolf. Several interviewees felt that boundary lines for the Mexican wolf were arbitrarily designated and only used for social tolerance purposes. A few interviewees felt that the need for capturing and relocating wolves that cross the boundary puts significant constraints on staff and resources. A manager from the Southwest voiced this opinion by stating, "*Managing wolves*

inside of a boundary is… just a uniquely bad idea. I understand why people felt like it was necessary to establish a framework, but eventually wolves will make liars out of you when you set up a boundary."

Some also felt that these boundaries limit the ecological success and overall recovery of the Mexican wolf population. Although some scientists have cited that the historical range of the Mexican wolf was south of this border, interviewees felt that this line limits the natural range and colonization that a wolf population normally would establish. Interviewees commented:

> *Mexican wolves would probably be more widespread now if we didn't have boundaries which obviously also takes a lot of personnel time away from managing things…when you're putting all your resources to pulling a wolf back inside an arbitrary line… Boundaries are rough. – Southwest, Manager*

> *I don't want [wolves in Colorado] zoned where if they leave that zone, they're subject to being killed… they should be able to go where they want to go and they will select the best habitat for them better than a scientist would… One of the problems [in the Southwest] has been wolves leaving the reintroduction zone and either being killed or being recaptured and constantly put back in the zone. And I think it's limited to biological success to have them zoned. – Colorado, Manager*

5.3.2 Collaborative Strategies

The majority of interviewees emphasized the importance of collaboration that targets key stakeholders (e.g. livestock, hunting, or conservation communities) in order to garner more support for wolves on the landscape through fostering joint decision-making. Collaborative processes (e.g. outreach and education, stakeholder workshops, professional facilitated meetings, etc.) can be self-regulated by the targeted groups or facilitated by governmental bodies. However, a crucial aspect of these processes is having managers and targeted stakeholder groups working together in some capacity. Interviewees strongly encouraged Colorado to start a collaborative process before wolves are put on the ground. Example statements include:

> *[In past reintroductions] the federal government rammed wolves down people's throat, especially in rural areas…I think the lessons learned are of a more collaborative approach, you're not going to get everybody agreeing on everything, but if everybody is part of the process or feels like they are and working towards a unified goal, I think that is very important. – Colorado, Manager*

> *It's really good to sit down before [reintroduction] with representatives of the [stakeholder] groups and have all those voices in there for how you're going to manage…so some kind of collaborative process for the rules that you're going to go under and then going forward is good. – Southwest, Manager*

Some interviewees felt that collaborative groups in the Northern Rocky Mountains that are self-regulated by target groups, like the Blackfoot Challenge in Montana, have been effective for improving social tolerance towards wolves. These groups have resulted in NGOs, livestock producers, and managers working together to co-generate data, cost-share management efforts, and establish proactive management tools. In the Southwest, a few interviewees felt that partnerships with stakeholders were slower to unfold. Others pointed to the creation of the Mexican Wolf Livestock Council as an ideal collaborative process. This council was created and appointed by the USFWS and includes members from the livestock community and management agencies, including state, federal, and Tribal representatives. The group is responsible for establishing protocols for responding to livestock depredation. Recently the group created what some interviewees described as an innovative way to compensate livestock producers: the "Pay for Presence" program. This program operates in the Southwest and pays producers who have livestock in an area where wolves have established territory, whereas other compensation programs pay producers only for confirmed livestock loss by wolves. An interviewee explained the importance of this joint decision-making:

> *A key ingredient is having people who are experiencing the challenges associated with wolves being on the landscape having some ability to influence management direction… When stakeholders feel like their hands are totally tied and decisions are being made in a vacuum… that's a recipe for anger and frustration. – Southwest, Manager*

Many interviewees felt that for successful collaboration to occur, relationships and trust must be built among stakeholders and managers, often developed through "boots on the ground," or face-to-face interactions. Interviewees noted positive examples of this, such as managers being in the field monitoring for wolves taking the time to approach livestock producers and have a conversation with them. Our interviewees were critical of managers who did not do this. For example, interviewees said:

> *[Past USFWS managers] didn't understand the importance of partnerships and getting boots on the ground and talking to people and shaking hands and asking people, what do you need?... [They] wanted to manage the program behind a desk. – Southwest, Manager*

> *It's the boots on the ground – the blood, sweat, and tears that really matter. It's having those [livestock] producers and other [stakeholders] know that you're out there and on the ground, not just sitting in a cubicle, looking at a computer. – Northern Rockies, Manager*

Several interviewees said if they could sit and have a cup of coffee with a livestock producer or hunter without bringing up the subject of wolves, then later on when they did need talk about wolves, the stakeholders were ready to engage in more productive conversation. This approach allows for trust to be built with stakeholders by fostering a relationship not solely around wolves. One interviewee explained:

> *You can have dinner together and try to just develop a relationship that isn't necessarily tied to the issue… once you have a little bit of a relationship, it's harder to be mean to someone... You've got to build trust and eventually you need those ranchers to kind of become your spokesperson. And that's tough... But it does happen in time. It just takes a lot of work. – Northern Rockies, NGO Representative*

The majority of interviewees emphasized the importance of transparency with stakeholders and the general public through data-sharing and personal relationships. Some felt the best way to have transparency was through scientific data; however, a couple interviewees disagreed, saying that stakeholders are not satisfied with scientific data alone. Instead, allowing

people to feel like their concerns are being heard by managers was emphasized as one of the most important aspects of building relationships. For example, hunters may not be receptive to a manager reciting data about ungulate populations; however, they may rather know that the manger is hearing what they have to say and understanding their frustrations. Interviewees commented:

> *The worst thing that you can do is hide stuff… because there's already a certain part of the population that distrusts the government… but when you can keep [the public] in the loop about what's going on, those things matter. – Northern Rockies, Manager*

> *One thing for certain is that you have to be just absolutely brutally honest with the public on both ends of the spectrum…. The wolf lovers have to understand… some are going to have to die… And the wolf haters have to understand that wolves that don't get involved with livestock, are going to be left alone. – Northern Rockies, Manager*

Most interviewees felt that outreach and education programs were helpful tools for garnering support for wolves on the landscape. These programs included professionally facilitated meetings and stakeholder advisory workshops to inform and receive input from the public. People commented:

> *I think everybody just wants to be heard… So having processes where there are opportunities for the general public to speak, that's important for people to feel as though they are part of the process. – Colorado, Manager*

> *You need that sound base of outreach and education and conversations with the community. That's a thing the Mexican wolf program could do a lot better with, but there's people that are still avidly afraid for their lives [because of wolves]. And so it's taking that time to educate and stop the spread of misinformation. – Southwest, Manager*

In the Southwest, the White Mountain Apache Tribe has had education programs for children that helped build social tolerance in the community. Members of the Mexican wolf reintroduction team visited schools on the Tribe's reservation to provide education programs for children on basic wolf biology. The Tribe also established the Mexican Wolf Tribal Youth

Internship Program in which students were trained to work with the Mexican wolf reintroduction program. One interviewee who worked closely with the Tribe commented:

> *On the reservation, we would do programs for many ages of kids…And the Tribe has had an extremely successful Mexican Wolf Tribal Youth Internship. It's gotten national recognition… it's definitely a position of pride for the tribe. And that's a cultural thing having opportunity for the youth, and particularly the elders too. But since we're talking about fostering the next generation of this focus on these, so that tribal youth internship program has been huge. – Southwest, Manager*

Since Colorado reintroduction will likely occur on public lands and wolves will likely cross jurisdictional boundaries, coordination will be necessary with all land and wildlife managers regardless of who has ultimate jurisdictional authority (i.e. the USFWS or the state wildlife agency). Partnerships and collaboration between relevant state, federal, and Tribal managers are necessary in order to maintain policy and management goals across jurisdictional boundaries. This collaboration is most often established and fostered through the agency with ultimate jurisdictional authority (e.g. the state wildlife agency or the USFWS). One manager from the Southwest said, *"I think issues with wolves will sometimes divide agencies on how they manage, so you have to… establish those relationships and just continue to work through it on the bigger goal."*

Transparency and data sharing among agencies were mentioned as being important for establishing coordinated management. A few interviewees used the example that a state agency should be in communication with Forest Service managers if wolf removal must take place on national forest land. Similarly, Forest Service managers should share data of wolf sightings or depredations on national forest allotments.

Interviewees commonly brought up the need for coordination with Wildlife Services – a federal agency within the U.S. Department of Agriculture – because this agency is the most equipped in investigating livestock depredations and lethal removal of wolves. In the Northern

Rocky Mountains, particularly in Montana, NGOs have partnered with Wildlife Services to provide them the capacity to focus on non-lethal forms of management, such as implementing fladry (i.e. red flagging to scare predators) to prevent livestock depredation. One interviewee commented:

> *By partnering with Wildlife Services, there's all these opportunities to help that agency occupy that space of going to landowners and helping them think more proactively and use new tools… Through [NGO] partnerships with Wildlife Services, we've gone in and talked to the producer about other opportunities… And that has effectively ended that cycle of killing which I think is sort of a win for everybody. – Northern Rockies, NGO Representative*

Formal documents, such as a Memorandum of Understanding (MOU) or Cooperative Agreements, are used in both reintroduction areas to establish a framework for collaboration that enables the agencies to implement long-term management plans. The Mexican wolf program utilizes an Interagency Field Team made up of relevant state, federal, and Tribal land management agencies from Arizona and New Mexico. This has allowed for easier coordination across jurisdictions.

However, several interviewees warned that it has been difficult to collaborate among agencies, pointing to issues within the Mexican wolf program. According to interviewees, the New Mexico Department of Game and Fish ended their partnership with the Mexican wolf program for several years due to differences over management and recovery goals. However, New Mexico signed a new MOU in 2019 to re-join the Interagency Field Team. One interviewee commented on these challenges:

> *Divine intervention is how you keep collaboration going… I think that inherent challenge there is everybody has a different mission… And everybody kind of comes to the table with…a different path from behind that brought them there… And so that collaboration tends to make decisions take longer… And yeah, it's not always easy. – Southwest, Manager*

5.3.3 Livestock Programs

Livestock producers are often considered an important stakeholder in wolf reintroduction and management; therefore, key strategies must be used to target livestock producers in order to incentivize more tolerance towards wolves on the landscape. Often these strategies are a result of collaborative processes and joint decision making between producers and managers. The majority of interviewees considered payment for livestock depredation one of these necessary strategies. However, some interviewees felt that although payment helps, livestock producers are not satisfied with the compensation programs alone. Interviewees explained:

> *Compensation has made it a little more palatable, but what most people don't understand is we don't raise animals to feed to wildlife to be compensated for…If it gets bad enough, we just won't raise the animals and then we'll watch American society suffer and see who gets fed and who doesn't. – Northern Rockies, Livestock Producer*

> *If you were sitting in your bed and every thirty evenings, the boogeyman came out from under the bed and stole 800 bucks from your wallet, sooner or later you'd wait up at night and be like, I'm going to beat that boogeyman over the head with a bat…if you are a rancher and [wolves] are affecting your livelihood, then eventually people are put with no other choice [than to remove wolves]. And so you want to do everything you can to avoid people getting in that position. – Southwest, Manager*

In the Northern Rocky Mountains, most compensation programs pay producers for confirmed livestock that have been depredated upon by wolves; however, a major issue of livestock depredation is the difficulty to identify or find depredated livestock to confirm the kill was done by a wolf. Some states, such as Wyoming, use a multiplier system in which producers are paid a certain ratio of confirmed livestock loss to expected actual loss. Interviewees explained the difficulties:

[Ranchers] major complaint [in reintroduction areas] was that the government is parsimonious in verifying a wolf kill, so that they feel like there are more wolf kills than they are compensated for. And those are not able to be verified because the animals too heavily scavenged… And you can't really tell if a wolf did it or not. – Colorado, Manager

I think [ranchers] also get frustrated in having to have reliance on a confirmed kills… because I can't find all my kills, I just know what's missing and then I have to find it and it has to be in good enough condition that somebody can get there and investigate it and has to make this determination and then I wait to get that report… then things get lost, things get tied up. So I think [ranchers] would overall appreciate not having to go through that confirmed depredation. – Southwest, Manager

Some interviewees mentioned that compensation does not account for other losses that producers experience. For example, when there is a threat of a predator, livestock experience weight loss from stress, causing the monetary value of the animal to diminish. Additionally, a couple interviewees mentioned that livestock producers are not paid in a timely manner, sometimes taking a year to reach the producer. The Mexican Wolf Livestock Council created the "Pay for Presence" program to combat these issues. One interviewee explained about the program:

It's a pay-for-presence system saying, "Hey, if the wolves are present where you're raising cattle, then there's a payment associated with that"…the idea is to shift wolves away from being a problem and towards being either neutral or maybe even where people want them out on the landscape… so if you can do that economically, you take away half of the arguments that are out there, half of the difficulties, but it takes a fair amount of money. – Southwest, Manager

According to many interviewees, a lack of stable funding sources for the Pay for Presence program, and compensation programs in other areas, have impacted overall effectiveness of these systems. In the Southwest, the federal government helps subsidize the Pay for Presence program because the Mexican wolf is still under federal jurisdiction. In the Northern Rocky Mountains, funding differs by state. Some states rely on a Livestock Loss Board

to dictate the amount of money given to producers. Often state wildlife agencies use funds provided by outfitter permits for livestock compensation.

Some interviewees also brought up non-lethal depredation mitigation strategies, such as fladry, that incentivize producers to be more tolerant towards wolves. Fladry, red flagging that hangs on fencing to scare predators, was considered successful only in certain situations. According to several interviewees, smaller pastures near home ranches have seen more success with the use of fladry. Some interviewees felt that on public land allotments, fladry becomes difficult due to the expansiveness and ruggedness of the landscape. Despite cost-sharing programs with NGOs and Wildlife Services, hanging fladry on public lands can also be costly. One manager from the Northern Rocky Mountains said, *"NGOs love to push fladry. It's expensive, it's time consuming…You have restrictions on fencing on public lands, and fladry doesn't work with wolves."*

Several interviewees felt that range riders were the most effective non-lethal measure for depredation mitigation. Ranger riders, people usually on horseback who monitor livestock, have the ability to be on the ground actively watching for wolves, while also monitoring to make sure the herds stay together. These programs are also often funded through cost-sharing programs with NGOs. Some interviewees felt that livestock producers accepted ranger riders over other methods because it gives them the opportunity to hire someone from the local community. Interviewees commented:

> *One of the most effective [methods] is range riders because someone's checking on the cattle more often, keeping them together…range riders are very good. If an animal was killed on a grazing allotment or is found dead on grazing allotments, they can get Wildlife Service out there in a timely manner so that there can be an investigation and determine whether or not it was wolves or grizzly bears. – Northern Rockies, Manager*

In my experience, the range riders are accepted [by ranchers]. That's when they come from within that community, rather than hiring somebody who got training [elsewhere] and is hired by the government and comes down to do it. Somebody who is there, the other neighbor's nephew, it's far more likely to be accepted. – Northern Rockies, Manager

However, a few interviewees felt that range riders were not efficient, especially on larger public land allotments. These interviewees expressed issues with the standardization of range rider practices and the lack of accountability. Depredations also often occur at night when range riders are not on duty. Interviewees explained:

There's very little accountability and there's no uniform standards for what a range rider does…. The term is kind of used ubiquitously. And so there were some issues... where they found out these range riders were collecting a paycheck when they were at the bar out of town, 50 miles away…while they were supposed to be on the clock range riding. – Southwest, NGO Representative

Most of this depredation is going on in the dark, after evening hours and typically before the sun's up. So it is frustrating when you're out there all day thinking you're doing a good job and then you wake up and there's two dead calves. – Northern Rockies, Manager

5.4 Challenges Associated with Wolves on the Landscape

Interviewees referred to two main themes of challenges associated with having wolves on the landscape: social issues and managing public lands. This section will highlight key challenges within each theme based on interviewees' perspectives.

5.4.1 Social Tolerance Issues

Due to the intensity of polarization around wolf management, interviewees felt that most of their work was dedicated to managing people rather than wolves (Table 1.3). A few interviewees brought up the issue of differing values amongst stakeholder groups. Some felt that wildlife and land management agencies often cater to groups with utilitarian values (e.g. managing wildlife for human benefit, needs of humans take priority over wildlife, etc). However, these interviewees felt that other social values must be taken into account when managing for

wolves. For example, one interviewee commented on a Tribal nation's values towards past wolf reintroduction:

> *The Tribe from the start sort of viewed the wolf reintroduction opportunity as an expression of cultural renewal because at that point close to two centuries of ecological and cultural erosion of the integrity of the ecology and the culture in their region. So from that standpoint, wolf reintroduction was in their minds a step toward equitability. – Northern Rockies, Tribal Nation Manager*

Some interviewees also warned of the "urban-rural divide" challenge in Colorado. The majority of votes for wolf reintroduction in Colorado came from urban populations, despite the fact that rural communities will be more directly impacted by the reintroduction. Interviewees felt that this must be taken in account when trying to create an equitable management plan that accounts for both those who voted for reintroduction and those whose livelihoods will be impacted by the decision.

Table 2.3. Interviewee quotes depicting the social issues that arise in wolf management.

Quotes on Interviewees Perceptions of Social Tolerance Issues
You think they're a glamorous species, but they're not, if you're an administrator of an agency and you're dealing with wolves, you're dealing with a lot more headaches. – Southwest, Manager
Wolves bring with them a lot of baggage, whether it's warranted or not, from those who love wolves and those who hate wolves. – Northern Rockies, Manager
That's the hard part for wildlife biologists… a lot of us got in this field to stay away from people… dealing with people is the last thing we want to do. – Northern Rockies, Manager
There's only two things wolves really need to be successful. One is they need something to eat… and two, they need relative freedom from human persecution. – Northern Rockies, Manager
It's both magic and tragic to have wolves in the ecosystem, that's for sure. They certainly bring some real benefits, but they come with some real issues. Most of those issues, I guess would generally be classified as political. – Northern Rockies, Manager
I mean wolf management is people management… you talk to anyone [managing wolves], they comment that wolves are boring and the people are interesting. And that's where the challenge really lies. – Colorado, Manager
Well the wolf is probably the most polarizing animal in North America and the most volatile issues we deal with are social ones. – Northern Rockies, Manager

The biology of the wolf, that management is a pretty easy task. I think the tougher part of is the social aspect of it and trying to appease or satisfy all interested parties, whether a consumptive user, non-consumptive user, agricultural versus tourism, you name anybody that may have an interest in that of wolves. – Northern Rockies, Manager

Wolves are a lightning rod issues… they are the abortion issue of wildlife management. I mean it's hand in hand combat and everyone is polarized and no one's changing their mind. – Northern Rockies, Manager

The social aspect, I don't know how you tackle it… I'd say, breathe and have a glass of wine, because it just takes time… And I got a thick skin and I've aged [from wolf management]. I probably look like an 80 year old, and I'm only 40 years old. – Northern Rockies, Manager

5.4.2 Public Lands Management

Some interviewees expressed the challenge of having to manage for the recovery of wolves while managing for other uses of public lands such as livestock grazing, recreation, species recovery, hunting, etc. One interviewee felt that there must be trade-offs between species recovery and a working landscape (e.g. livestock grazing). They said that the public lands system should benefit as many people as possible, and therefore managers must take into account the different values that people have regarding natural resources. For example, this interviewee stated:

> *I think a lot of the tension around wolf recovery and these trade-offs of thinking about the highest and best use of our public land system, it draws into question some really important concepts about who the beneficiaries are of the public land system, conversations around the shifting values that people have with respect to wildlife…And when we have these kinds of conflicting uses, when we have situations where it's species recovery versus working landscapes…I mean there's a reason these are really complicated and intense discussions because there's such a different value lens that people are putting on the conversation. – Southwest, NGO Representative*

6. Conclusions and Recommendations

Our research explored lessons learned in the Northern Rocky Mountains and Southwest wolf reintroduction areas, along with Colorado land and wildlife manager perspectives about the planned reintroduction of wolves in 2023. These findings reveal potentially valuable

management and policy strategies and considerations for wolf reintroduction. Although each reintroduction area is different, we found that people faced challenges and shared lessons learned that are transferable across different reintroduction contexts. Here we synthesize suggestions for wolf reintroduction and management based on the perspectives and recommendations of interviewees in this study.

Ultimate policy and management strategies available will be dependent upon which agency has jurisdictional authority over the gray wolf; this will need to be consider prior to any implementation of strategies. However, regardless of if the federal government or state government has authority, a bottom-up approach to management will be helpful for increasing social tolerance towards wolves on the landscape. Our findings suggest that keeping wolf management decisions as local as possible increases trust between the public and managers, therefore promoting more collaborative processes for management decisions. If the gray wolf is endangered at the time of reintroduction, CPW will need to come to an agreement with the USFWS over management decisions. Section10 (j) of the ESA should be utilized in order to allow for flexibility. However, it is also important to note that having the ESA as a regulatory umbrella over management can help address the challenges of capacity that state agencies face, as well as concerns over population recovery.

Capacity issues, such as funding, should be addressed prior to reintroduction in order to support policy implementation, however funding will be dependent on which agency has decision making power. Diversifying funding sources to better leverage the resources of those who voted for wolf reintroduction may be helpful to address issues of equity. If CPW is the primary funding source for reintroduction, using taxpayer money may be helpful to better represent values outside of the those who traditionally fund the agency (i.e. hunting and fishing

communities). Partnering with NGOs who have an interest in wolf reintroduction will also be a helpful way to cost-share efforts, as well as diversify sources of knowledge within management.

The managing agency should use a regulatory approach that allows for a mix of policy tools (e.g. incentives or financial assistance), along with regulatory flexibility. This can help achieve policy goals of effectively manage wolves over different temporal and spatial scales, while fostering more social tolerance towards wolves. This mix of tools will include both lethal removal and non-lethal measures. One way to utilize a mixed tool approach would be to only lethally remove problem wolves after non-lethal measures have been utilized and proved ineffective. The extent of lethal removal possible will be dependent on the endangered status of the wolf. Other tools, such as education, regulation, and collaborative approaches will also add value for managing reintroduction.

Managing wolves differently across geographic zones may be helpful to address the challenges associated with mixed public land uses, but this also brings specific challenges. For example, in areas primarily used for livestock grazing allotments, wolves could be managed more heavily through extensive monitoring, implementation of non-lethal mitigation measures, and if necessary, lethal removal. In other areas with less human use and more habitat, wolves could be allowed to exist freely without human intervention. As seen in the Southwest, restricting movements by capturing and relocating wolves can cause capacity issues for managing agencies and restrict the growth of wolf populations. Allowing for wolves to cross borders without mandatory removal could be more effective. Either way, zonal management is difficult to establish prior to reintroduction due to the unpredictability of wolf movements; therefore, an adaptive approach to setting management zones should be used.

Collaborative processes that allow for joint decision-making between stakeholders and managers may help reduce social tolerance issues towards wolves, especially in regard to aspects of management that directly affect certain groups. For example, livestock producers should be consulted on decisions regarding depredation compensation and non-lethal mitigation measures such as fladry or range riders. These processes can be convened by the lead agency or stakeholder groups but will need to involve both sets of governmental bodies and members of the public. In order to have effective collaboration, clear management goals and targets will need to be set prior to reintroduction via management plans that are co-generated amongst all relevant partners (i.e. livestock producers, hunters, NGOs, federal and state agencies, Tribal Nations, and other members of the public and stakeholder groups). It is also important for mangers to remain as transparent as possible when sharing information about wolves in order to build trust with partners. This information sharing can be done through outreach such as professional facilitated meetings, stakeholder workshops, or education programs. However, according to our findings, collaboration with stakeholders is most effective when done through face-to-face relationship building in neutral settings (i.e. while working in the field, approaching producers on their ranches, or talking over coffee).

While our work provides important perspectives on lessons learned and suggestions for the future, some limitations exist within this study. Due to legal constraints, members of CPW could not discuss the details of the ballot initiative until after the election. Interviewees perceptions may have been changed by the election results. Also, it is important to note that a robust analysis on stakeholder perspectives was not included as that was not the goal of this study. Other studies done within Colorado highlight the need to account for the diverse perspectives of stakeholders and the public in future decisions (Niemiec et al., 2020). As

Colorado prepares to reintroduce wolves, it is important for wildlife managers to consider the challenges and opportunities of different paths forward, drawing on the lessons of the past to lead a successful wolf reintroduction program.

CHAPTER 3 – USING A POLICY DESIGN PERSPECTIVE FOR CARNIVORE REINTRODUCTION: TOOL CHOICES FOR WOLF REINTRODUCTION IN COLORADO

1. Introduction

Carnivore reintroduction requires a variety of policy tools to support inclusive and equitable management approaches. Past carnivore reintroduction and management efforts can provide valuable lessons on available policy tools for future reintroductions. This research investigated these lessons using a policy design perspective on the policy tools utilized in past wolf reintroductions in the western United States. This synthesis of past tools can better inform future policy design for places like Colorado, USA, that are embarking on wolf reintroduction and contribute to our understanding of how to design policy approaches for complex wildlife management issues across jurisdictions.

In 2020, Colorado citizens voted to approve a ballot initiative to reintroduce gray wolves *(Canis lupus)*, requiring the state wildlife agency, Colorado Parks and Wildlife (CPW), to conduct reintroduction west of the continental divide in Colorado by the year 2023. Although prior data predicted the measure would pass overwhelmingly, the initiative passed by less than two percentage points (Niemiec et al., 2020; Colorado Election Results, 2020). This narrow passage is an indication of the contention and polarization that is often associated with wolf reintroduction (Bruskotter, 2013). This includes polarization between the values of those who see wolves as a way to return to the ecosystem to its natural state and those who see wolves as a threat to rural livelihood, such as livestock farming and hunting (Niemiec et al., 2020). This has resulted in social tolerance issues amongst certain groups in past reintroduction areas, leading to an increase in illegal poaching and harassment of wolves (Naughton-Treves et al., 2003). The

task of creating a management plan that is not only inclusive and equitable for all stakeholders, but also ensures a level of social tolerance towards having wolves on the landscape falls to CPW.

In anticipation of this ballot initiative, we conducted interviews with federal, state, and Tribal land and wildlife managers (referred to collectively herein as "managers") who either worked previously on wolf reintroduction or who currently manage wolves in two prior reintroduction areas: the Northern Rocky Mountains (i.e. Idaho, Montana, and Wyoming) and in the Southwest Mexican gray wolf recovery area (i.e. Arizona and New Mexico). Interviews were also conducted with state and federal managers from Colorado who will be tasked with managing the upcoming reintroduction efforts. The objectives of this study were to synthesize the policy and management tools utilized in these past reintroduction areas and capture specific suggestions for Colorado through a policy design perspective. This included the evaluation of policy tools, capacities needed for successful reintroduction, and other relevant considerations.

1.1 Background on Past Wolf Reintroductions

The gray wolf and its subspecies once inhabited the majority of the United States, with a population estimated around 2 million (Wayne et al., 1992; Phillips et al., 2003). By 1970, wolves were eradicated from the majority of the United States due to lethal persecution and negative public attitudes towards wolves (Mech & Boitani, 2003; Bangs et al., 2005). Over time, attitudes towards wildlife conservation in the United States have started to shift (Bruskotter et al., 2007). This is evidenced by the passing of major environmental laws in the 1960s and 1970s, including the Endangered Species Act of 1973 (ESA). The gray wolf and the Mexican gray wolf (*Canis lupus baileyi)*, a subspecies of the gray wolf, were among the first species to be listed as "endangered" (Parsons, 1998; Woolston, 2013). As with all listed species, the ESA mandated the U.S. Fish and Wildlife Service (USFWS)—the Department of Interior agency that oversees

implementation of the ESA for most species—write recovery plans for the gray and Mexican gray wolves (Malcolm & Li, 2018). Both recovery plans cited reintroduction as a way to restore the populations (USFWS, 2019).

The 1995 reintroduction in the Northern Rocky Mountains marked the return of wolves into the western United States (Weaver, 2020). These wolves have been a source of intense political controversy for several decades (Nie, 2003; Boyce, 2018). After reaching recovery goals, the Northern Rocky Mountains distinct population of gray wolves was delisted under the ESA in 2008 (DOI, 2016). In accordance with the original recovery plan, the USFWS turned management authority over to the states upon review of individual management plans from Idaho, Montana, and Wyoming (USFWS, 1987; USFWS, 1994). However, the state plans lacked adequate protections for wolves, particularly in Wyoming, and the delisting decision did not withstand legal challenge (NPS, 2020). Meanwhile, debate surged throughout the country over whether wolves in the area had recovered to the point of ensuring long-term population viability (Bergstrom et al., 2009; Bruskotter et al., 2010). Both of these issues were raised in court, causing the subject of wolf delisting to become an ongoing legal battle. In 2011, Congressional members from Idaho and Montana delisted the wolf via a policy rider on a congressional spending bill that bypassed the ESA requirements (Fitzgerald, 2011). Wyoming continued their own legal battles, until a 2017 court decision allowed for delisting within the state (Sims et al., 2020). Today, all of the Northern Rocky Mountains distinct population is delisted from the ESA in Wyoming, Idaho, and Montana, with the state wildlife agencies managing current wolf populations. It should also be noted that as of October 2020, the USFWS passed a rule to federally delist all gray wolves from the ESA (USFWS, 2020). However, due to litigation by

various environmental groups and a change in the presidential administration, this decision could be overturned (Arellano, 2021).

In the Southwest, the Mexican gray wolf program has followed a different trajectory. The USFWS established a recovery area spanning from southeastern Arizona into southwestern New Mexico (USFWS, 2001). Prior to the 1998 reintroduction, the only known Mexican wolves lived in captivity (Holaday, 2003). The subspecies population has been significantly slower to recover compared to the Northern Rocky Mountains gray wolf population (USFWS, 2018). The Mexican wolf retains the endangered status, with full management authority falling to the USFWS. Many cite social tolerance factors (i.e. level of human acceptance towards wolves on the landscape), including conflict with livestock and lethal removal of wolves, as the causes of slow recovery (Mech, 2017; Walsh, 2019). This has also led to legal challenges, with the USFWS being sued numerous times by members of both the livestock industry and environmental groups; this is most often due to the continuous changes to recovery and management plans made by the USFWS (Fitzgerald, 2018).

Both the Northern Rocky Mountains and the Southwest programs have utilized specific tools to facilitate wolf management. For example, both reintroduction areas established compensation programs to account for livestock loss to wolves (DeCesare et al., 2018). Collaborative tools (e.g. educational and outreach programs, facilitated workshops) have also been used with stakeholders to build social tolerance towards wolves through joint decision making (Walsh, 2019). In the Northern Rocky Mountains where the gray wolf is no longer listed as endangered, Idaho, Montana, and Wyoming follow individualized management plans that rely on hunting seasons for wolf population control and a mix of lethal and non-lethal measures (e.g. depredation mitigation, hazing, monitoring) (IWAC, 2002; MFWP, 2002; WGFC, 2011). In

Wyoming, zonal management is used to split the state into three zones: Yellowstone National Park where wolves are fully protected, the trophy game area where wolves are actively managed by the state wildlife agency, and the predator zone where wolves are not managed or given any protections (WGFC, 2011). In the Southwest, where Mexican wolves are still endangered and jurisdictional authority falls to the USFWS, boundary lines are also used to restrict movement. If a wolf crosses a pre-determined boundary, the animal will be captured and relocated inside the boundary, or lethally removed (USFWS, 2017).

For both reintroductions, the USFWS relied heavily on an amendment to the ESA, section 10 (j), that allows for the reintroduction of nonessential experimental populations of endangered or threatened species. This means that the reintroduced population is not critical to the overall survival of the species and can be lethally removed if need be (DOI, 2016; Fitzgerald, 2018). The utilization of section 10 (j) for wolf reintroduction has been a crucial policy tool, affording the USFWS more flexibility to tailor management to local customs and concerns over land-use restrictions (Bramblett, 2001; Nie, 2001).

Based on this history, a key question for Colorado is how to avoid similar legal and social conflicts that have occurred in past reintroductions, while simultaneously considering the tools that have proved to be effective in other states. Examining both the Northern Rocky Mountains and Southwest reintroductions can reveal a wider suite of policy tools available and inform how tools can be tailored to different contexts.

1.2 Policy Design and Tools for Carnivore Reintroduction

Wolf reintroduction and subsequent management requires a variety of policy tools. This mix of tools is often referred to as a policy design: the process of identifying policy goals and associated policy tools in an iterative process to apply and calibrate policy tools for specific

contexts across different levels of governance (Borrás & Edquist, 2013; Howlett, 2019). A portfolio of tools is needed to meet diverse policy goals in order to address the trade-offs associated with different policy tools (Gunningham & Sinclair, 1999; Schirmer et al., 2012).

Policy tools are diverse and include policies to support education and capacity building, create collaborative processes, put in place incentives, or apply and enforce regulations. Tools allow governments to influence, enforce, or discourage behavior of specific policy targets (i.e. actors who will respond to the policy tool) and achieve policy goals (Schirmer et al., 2012). All tools have associated, implicit assumptions about existing drivers of behavior, implementation or enforcement capacities, and how the policy targets' behavior will be affected (Schneider & Ingram, 1990). For example, an assumption associated with livestock compensation programs (i.e. the policy tool) could be that livestock producers (i.e. the policy target) would be more tolerant and less likely to illegally harm wolves (i.e. changed behavior of target) when a compensation program is in place. Not all tools work in the same capacity or under the same assumptions (Czech & Krausman, 2001). For instance, regulatory tools assume a certain degree of enforcement capacity, whereas incentive tools assume targets are aware of issues but need money or other motivation to compel them to act. Policy tools also must be accompanied by certain capacities (e.g. funding, knowledge, staff positions) in order to be successful. Sometimes capacity is a result of the implementation of other policy tools (e.g. education programs, taxation). Capacity building programs are a type of policy tool to addresses barriers, such as lack of information, skills, or other resources needed for policy targets to make decisions or take action (Schneider & Ingram, 1990).

The authority to define policy goals and implement tool choices is dependent on the policy actors involved, traditionally referring to governmental bodies such as state and federal

agencies. However, there has been a shift towards more bottom-up design of policy, leading to an increase of community-based actors taking part in the policy design process (Howlett et al., 2009). When designing policy, an important question is to assess how to target different actors and integrate different policies (Borras & Edquist, 2013; Howlett, 2019). Because policy targets are diverse and acting across different contexts (e.g. government agencies and private landowners both can be policy targets), multiple policy tools are necessary for achieving goals (Howlett, 2009). This requires both a portfolio of tools to reach different targets and policy integration, which refers to a design with policy goals and policy tools that are coherent (e.g. multiple goals are not contradicting each other) and consistent (e.g. policy tools support achievement of the goals) (Howlett & Rayner, 2007; vonHedemann et al., 2020). An important component of policy integration is concerned with the management of cross-cutting issues that transcend jurisdictional boundaries; therefore collaboration and coordination across sectors and organizations is essential for achieving integration and addressing scalar mismatches, when the scale of the environmental management challenge is mismatched with jurisdictional arrangements (Meijers & Stead, 2004; Candel & Biesbroek, 2016; vonHedemann et al., 2020). Cross-jurisdictional integration and collective action also allow for government actors to leverage capacity through partnerships with non-state actors (Schultz et al., 2018; Cyphers & Schultz, 2019).

Carnivore reintroduction can create policy design and integration challenges because of the need to work across various sectors and governance levels. A mix of policy tools is needed to address the complex policy goals of carnivore reintroduction due to the diversity of targets (e.g. stakeholder groups such as livestock producers and NGOs, or land management and regulatory bodies at different levels of governance, such as state and federal), the trade-offs that come with

singular tools, and the need to increase capacity. Coherence within carnivore reintroduction policy can be a challenge. For example, due to the plurality of attitudes humans have towards land management and carnivores, it can be difficult to align the often conflicting priorities and goals regarding the presence of these animals on multi-use landscapes (Carter & Linnell, 2016; Expósito-Granados et al., 2019).

1.3 Summary and Purpose of Study

As Colorado prepares to reintroduce wolves, managers can look to past wolf reintroductions in neighboring states for suggestions on effective tools. Managers will need to consider the portfolio of policy tools and capacities needed to create an efficient policy design and avoid integration challenges. This will include an array of policy goals, as Colorado will need to account for the diversity of targets involved in this issue. In order to avoid scalar mismatches, Colorado must address issues of coherence by working across sectors and jurisdictional boundaries.

Our study investigated policy tool choices for Colorado based on manager perspectives from the Northern Rocky Mountains, the Southwest, and Colorado. We sought to answer the following research objectives:

1. Identify the policy tools utilized in previous wolf reintroductions and subsequent management, including perspectives on:
    a. Tool choices and overall effectiveness of tools.
    b. Specific information on the capacities needed for successful reintroduction.
    c. Other considerations.
2. Synthesize specific considerations and suggestions for Colorado managers to take into account for wolf reintroduction.

2. Methods

For this project, we utilized qualitative social science research methods to uncover the perceptions and opinions of key players involved in wolf management and reintroduction. Colorado sits in a unique place, geographically positioned between two of the most high-profile wolf reintroductions in the United States. The Northern Rocky Mountains reintroduction of gray wolves occurred just north of Colorado in Wyoming, Montana, and Central Idaho. The Mexican wolf was reintroduced to the southwest in New Mexico and Arizona. These past efforts in neighboring states offer important lessons on wolf reintroduction in the western United States, including valuable perspectives on the management and policy strategies available to Colorado.

Data was collected through semi-structured interviews to facilitate a deeper understanding of human perceptions by allowing for flexibility and organic exploration of topics that draw from participants personal experiences (Glesne, 2011). Our sample was derived from three geographic locations- the Northern Rocky Mountains (Idaho, Montana, and Wyoming), the Southwest (Arizona and New Mexico), and Colorado (Table 2.1). Our interview participants were separated into two groups: those from past reintroduction areas (i.e. the Northern Rocky Mountains and the Southwest,), and Colorado participants. These two groups received separate interview guides that included questions designed with our research objectives in mind (Appendix A).

Table 3.1. Geographic location of participants and the number of participants from each region.

	Northern Rocky Mountains	**Southwest**	**Colorado**
States included	Idaho, Montana, and Wyoming	New Mexico and Arizona	Colorado
Number of Participants	15	11	8

Our initial list of participants included managers from the USFWS, National Park Service, U.S. Forest Service, Wildlife Services--U.S. Department of Agriculture, Tribal Nations, and state wildlife agencies. Interviewees from both groups were identified through purposive sampling where we preselected interviewees from government websites and wolf management reports, and snowball sampling, where interviewees recommended potential future candidates (Tongoco, 2007; Heckathron & Cameron, 2017).

A total of 34 interviews took place between May and November of 2020. Of those interviewees, 18 were from federal agencies, 13 from state agencies, and 3 from Tribal Nations. Each confidential interview lasted approximately 45-60 minutes and took place via phone call or video chat. Interviews were recorded with permission from the participant and transcribed. All interviews were conducted in accordance with an approved human subjects research protocol from our university. Analysis included the qualitative coding process in which segments of data were sorted into categories based on our research objectives and other major themes that emerged during the interview process (Appendix B). Integrated throughout this report are quotes from interview participants. These quotes succinctly illustrate notable concepts in interviewees own words. To give context while maintaining confidentiality, quotes are labeled with the geographic region of the interview participant. An identifying number is also used to distinguish between interviewees.

3. Findings

The findings of this study are organized into two major sections based on our research objects: (1) perspectives on tools used in past reintroductions and subsequent management, and (2) specific considerations and suggestions for Colorado. We offer examples of our data in text, with additional data provided in Appendix C.

3.1 Perspectives on Tools used in Past Reintroductions and Management

We begin this section exploring the policy tools identified by our interviewees. The policy tools discussed can be put into three overarching categories of tools: regulatory tools. procedural tools, and financial incentive tools. Tool types are presented in a sequenced order of priority for implementation, as it will be important to establish some tools prior to others. Tools are also linked to corresponding policy goals, attributes of success, and barriers to success (Table 2.2). We then focus our discussion on the capacities mentioned for successful wolf reintroduction. This section will conclude with an overview of other considerations that emerged in our interviews, including issues of jurisdictional authority.

Table 3.2. Tool types for wolf reintroduction and management

Policy Tools for Wolf Reintroduction and Management

Policy Tool Type	**Implicit Policy Goal**	**Authority to Implement**	**Specific tools**	**Attributes for Success**	**Barriers for success**
Regulatory Tools	Utilize government regulation to enforce more social tolerance towards wolves; ensure long term survival of wolf populations.	State, federal, Tribal governments	Regulatory Flexibility and Lethal Removal	Tailor management to local concerns over land-use restrictions; flexibility for lethal removal can increase social tolerance	Restrictions under the ESA; not all stakeholder groups advocate for lethal control
			Management Zones	Balancing multiple use of public lands by prioritizing wolf protections in some areas and human uses in others.	Limits ecological success and population recovery, constraints on resources and staff
Procedural Tools	Increase social tolerance amongst stakeholders through co-production of	State, federal, Tribal governments; community-based groups	Stakeholder and Public Engagement	Transparent communication; relationship building in neutral settings; face-to-face interactions	Hiding information; managing from behind a desk; not involving certain groups

	policy decisions.		Cross-agency Collaboration	Establishing clear objectives and goals; utilizing formal agreement documents	Undefined goals and objectives; lack of communication
Incentivize Tools	Incentivize livestock producers to be more tolerant towards having wolves on the landscape.	State, federal, Tribal governments; community-based groups	Compensation Programs	Consistent funding sources; using a multiplier system or "Pay for Presence" program to account for all loss	Untimely payment; difficulty confirming depredation; not accounting for other loss; lack of funding

3.1.1 Tools Identified

A variety of regulatory tools, top-down government enforced directives that steer targeted behavior through threat of sanctions, will need to be implemented prior to other tool types in order to establish a policy framework (Howlett, 2019). The policy goal associated with regulatory tools is increasing flexibility within management in order to promote more social tolerance towards wolves on the landscape. For example, the majority of interviewees felt that the federal government utilizing section 10 (j) of the ESA was a critical regulatory tool to provide flexibility for adaptive management and the ability to lethally remove wolves. Many interviewees felt regulation by state and federal governments that allows for lethal removal of wolves was necessary and led to an increase of social tolerance amongst the public towards having wolves on the landscape. Several interviewees also felt that state regulated hunting seasons in areas where wolves are delisted significantly increased social tolerance amongst communities who traditionally did not want wolves on the landscape. Comments on flexibility and lethal removal included the following:

> *Having that flexibility [to lethally remove wolves] versus being like, oh, well they're an endangered species so they're going to stay alive despite how many cattle they've killed…. that's just not going to go over on the multi-use landscape. That's going to breed more frustration from the stakeholder…. having flexibility of management factors into the give and take of the relationship [with stakeholders]. – Southwest, 7*

Most interviewees felt that an "all tools" approach was the best regulatory option, meaning a mix of non-lethal (i.e. wolf hazing and depredation mitigation strategies) and lethal measures. Interviewees stated that in order to allow for a truly adaptive approach to management, no tool should be ruled out. Managers should be able to respond how they see fit depending on the situation. Example statements included the following:

> *If you're in the position of managing, you have to look at all the tools in the toolbox to be able to handle issues that will arise. And so lethal control obviously is one. – Northern Rocky Mountains, 14*

> *You just have to have every option on the table because there's just so many variables once you get on the landscape and there's so many variables between wolf packs and their behaviors, if you don't have all the tools, then you're just shortchanging the whole program. – Southwest, 11*

Zonal management (i.e. using boundaries to limit wolf movement or protection) was also brought up as a regulatory tool that has been implemented by federal and state governments. A few interviewees felt that Wyoming's state implemented zonal system attributes to social tolerance by appeasing to those who want strict protections for wolves and to those who want to have them lethally controlled. However, in the Southwest, several interviewees felt that boundary lines established by the federal government for the Mexican wolf were arbitrarily designated and only used for social tolerance purposes. If a wolf crosses this boundary, the USFWS must capture and relocate the animal back inside the boundary, or lethally remove the animal. Some interviewees stated that this puts significant strain on staff capacity and limits time spent on other facets of management. Some felt that these boundaries limit the ecological success and overall recovery of the Mexican wolf population. Although scientists have cited that the

historical range of the Mexican wolf was south of this border, interviewees felt that this line limits the natural range and colonization that a wolf population normally would establish. An interviewee explained:

> *You're trying to recover Mexican wolves and these wolves are moving into habitat north of an arbitrary line, and you're saying, in order for them to contribute to recovery, they need to be near the core population….. But if you left them there, they would probably establish themselves as a population… I think that if wolves are allowed to disperse and set up shop and establish themselves in an area where wolves historically existed, that to me is part of recovery. – Southwest, 8*

Procedural tools are often used to re-organize traditional governance structures to involve non-state actors in policy processes, often through co-management practices (Howlett, 2019). The majority of interviewees emphasized the importance of utilizing these types of tools to target key stakeholders (e.g. livestock, hunting, or conservation communities). The policy goal in using these tools is to promote social tolerance towards wolves through co-production of policy decisions. The tools mentioned to achieve this were collaborative based approaches, such as formal collaborative groups with stakeholders and managers. These types of collaborative processes can be self-regulated by targeted groups, like the Blackfoot Challenge in Montana, or facilitated by governmental bodies, like the USFWS appointed Mexican Wolf Livestock Council in the Southwest. However, a crucial aspect of these processes is having managers and targeted stakeholder groups working together in some capacity. These groups help to co-generate data, cost-share management efforts, and establish more proactive management tools. Many interviewees also discussed the importance of having a mix of procedural and information based tools, such as outreach and education through professionally facilitated meetings, stakeholder advisory workshops, and youth education programs. The majority of interviewees emphasized the importance of managers building trust with stakeholders and the public by establishing

personal relationships and maintaining transparency in communication. Interviewees commented:

> *You have to have [stakeholders] engaged. They have to have a voice and feel heard… [You need a] collaborative group effort of people who want to accomplish something. – Northern Rocky Mountains, 18*

> *It's important that information be transparent and presented in totality and not cherry picked or tailored to what people view as interests of the attendees of that meeting. If it's a meeting full of concerned hunters, presenting a bunch of information about elk populations isn't telling them the whole story.… it's an opportunity to educate the public more broadly. – Northern Rocky Mountains, 19*

Procedural tools for cross-agency collaboration between state, federal, and Tribal agencies was mentioned as a critical part of management and reintroduction. Often, these processes are implemented by the lead agency (e.g. the state wildlife agency or the USFWS). Formal documents, such as Memorandums of Understanding (MOUs) and Cooperative Agreements, have been used in both reintroduction areas to establish a procedural framework that enables agencies to implement long-term management plans. However, several interviewees warned that it can been difficult to establish procedural processes among agencies, pointing to misalignment of management and recovery goals between agencies. An interviewee commented on these struggles within the Mexican wolf program:

> *I think the relationship between [the state and federal agencies] was strained when no one knew what the goal was and what [the USFWS] would potentially take on as a management leader… [The question was] how do you work collaboratively, in a collaborative manner towards something that you don't know what your final goal is? – Southwest, 5*

The majority of interviewees also mentioned the necessity of financial incentive tools that pay non-state actors in order to encourage certain behavior (Howlett, 2019). For wolf reintroduction and management, these tools are commonly compensation programs for livestock depredation. These programs target livestock producers with a goal of incentivizing more tolerance towards wolves on the landscape, potentially limiting lethal harm. Often, decisions

regarding these programs are made within collaborative process involving livestock producers, other stakeholder groups, and governmental bodies. However, according to many interviewees, capacity issues (e.g. lack of funding) have impacted the overall effectiveness of these compensation programs. Some interviewees also felt that although payment helps, livestock producers are not often satisfied with compensation programs alone. An interviewee explained:

> *The compensation program is a wonderful thing… It helps build some tolerance, but the majority of the producers will tell you that they would rather have their calf or their cow than be compensated and have wolves eat or attack or harass them. – Northern Rocky Mountains, 6*

In the Northern Rocky Mountains, most compensation programs pay producers for confirmed livestock that have been depredated upon by wolves; however, a major issue is the difficulty to identify or find depredated livestock to confirm the kill was done by a wolf. Some interviewees also mentioned that compensation does not account for other losses that producers experience, such as cattle weight loss from stress. The Mexican Wolf Livestock Council, a USFWS appointed collaborative group, has created a tool to combat these issues, called the "Pay for Presence" program. This program aims to incentivize producers to actively want wolves on the landscape by paying them for raising cattle within active wolf territory, regardless of if depredation is confirmed.

3.1.2 Capacities Needed

Capacities are needed to support the implementation and success of policy tools. Many interviewees emphasized the necessity of funding mechanisms as a form of capacity. Adequate funding is necessary for multiple facets of management, including support for staff capacity, compensation programs, and public engagement efforts. Lack of funding has been an issue for past reintroduction areas. Interviewees mentioned that funding sources have changed, often depending on the endangered status of the wolf. However, this has led to instability of funding

over time. For state-run wolf management programs, the majority of funding comes from the wildlife management agency, often relying on hunting and fishing license fees as revenue. Both past reintroduction areas have been able to leverage funding through NGOs, such as Defenders of Wildlife and Natural Resource Defense Council, in order to cost-share efforts for livestock depredation mitigation and compensation.

According to interviewees, capacity for a dedicated and knowledgeable staff has been important for recovery efforts. Some felt that having diverse knowledge sets among staff (e.g. wolf biologists, social scientists, outreach specialists, etc.) dedicated to specific facets of management is important for policy tools to be successful. Specifically, interviewees felt that it was necessary to have staff members that can address social tolerance issues directly.

3.1.3 Other Considerations

Due to the history of delisting and relisting of the gray wolf under the ESA, many interviewees brought up opinions on the differences between state and federal authority over wolves. The majority of interviewees felt that having management as localized as possible was ideal, advocating for state authority over wolves. Many felt that social tolerance and public acceptance is greater when state agencies have management authority. According to interviewees, the public has more trust for state governments than the federal government. Also, local state agency managers often have pre-established relationships with key stakeholders. Others felt that the local agencies have more regulatory flexibility and the ability to tailor management plans to state needs. Coordination is also easier at the state level because there are less political barriers to overcome. An interviewee commented:

> *I think there's a popular perception among our local constituents that state management is better…. there's almost always skepticism of federal management. – Northern Rocky Mountains, 5*

A few interviewees felt that federal authority by the USFWS was preferable because of the ability to use regulatory tools for species protections, such as the ESA . Under federal protection, the gray wolf receives less lethal persecution. Interviewees also felt that the federal government is less likely to be "captured" by local interests than the state agency. In part, this is due to the diversity of funding the federal government can utilize as compared to state agencies who often rely on hunting license profits. A few interviewees also said the state agency can "shift the blame" away from themselves if members of the public are unhappy with management decisions, when the federal government is in the lead. An interviewee explained:

> *We live in an impure world and local government is subject to hijacking in politics. And most of the time it's okay, but in the case of wolf management, I worry about it because the end result is wolves are going to die. – Northern Rocky Mountains, 2*

3.2 Considerations and Suggestions for Colorado

In this section, we will synthesize more specific considerations and suggestions interviewees provided for Colorado reintroduction. One of the key considerations that all of our interviewees discussed was the need to address issues of social tolerance towards having wolves on the landscape. In order to do this, the majority of interviewees suggested utilizing procedural tools, such as establishing collaborative processes. Building personal relationships with key stakeholders and the public prior to reintroduction was also highly suggested. During these processes, interviewees recommended that managers remain transparent in communication and allow for stakeholders to their opinions are being heard. One interviewee commented:

> *The first strategy has to be a very robust engagement with [stakeholders]…. we don't want them to think like this has been done to them…. We need to come up with engagement strategies that empower and include the diverse stakeholders from across all sections of the state and especially on the Western slope where these animals are going to originally be put. – Colorado, 11*

Many interviewees also felt that using an adaptive management approach through regulatory flexibility could help address issues of social tolerance. This approach would allow for a mix of tools including both lethal removal and non-lethal measures. The majority of interviewees strongly recommended that regulation allows for lethal removal as a management option. Therefore, interviewees recommended that if the gray wolf is endangered at the time of Colorado reintroduction, section 10 (j) of the ESA must be used to provide this flexibility and the ability to use some lethal control. However, most interviewees suggested that if it were possible, Colorado should only reintroduce wolves if they are delisted from the ESA. As of October 2020, the USFWS passed a rule to federally delist the gray wolf; however, litigation from several wildlife NGOs and the changing of the presidential administration may result in this rule being overturned. An interviewee explained the importance of flexibility if the gray wolf is endangered:

> *If Colorado's reintroduction is going to be of a federally listed species, the number one policy tool to use is to reintroduce as an experimental population [under section 10 (j)]…. there's more flexibility afforded in terms of how the animal can be managed… Every tool available will be beneficial. – Southwest, 5*

Some interviewees also voiced concerns over the use of zonal management in Colorado. Managing wolves differently across geographic zones may be helpful to address the challenges associated with mixed public land uses but also brings specific challenges. As seen in the Southwest, restricting movements by capturing and relocating wolves can cause capacity issues for managing agencies and restrict the growth of wolf populations.

Interviewees also brought up considerations of capacity for Colorado. The majority of interviewees warned that Colorado should have funding mechanisms in place before reintroduction occurs. Funding sources in Colorado will most likely differ based

on the listing status of the wolf. If the wolf is listed as endangered, it is more likely the federal government will provide funding for reintroduction and subsequent management. If the wolf is delisted at the time of reintroduction or thereafter, the state will have to provide for funding.

Several interviewees were concerned that reliance on CPW revenue may cause social tolerance issues amongst the public, specifically in the hunting community. Most of CPW revenue comes from purchases of hunting and fishing licenses. A few interviewees suggested that Colorado shift the financial burden away from those who purchase hunting and fishing licenses, so that this community does not feel they are inequitably financing wolf reintroduction, which might exacerbate conflict. One way to do this would be to use general taxpayer funds for reintroduction and management, including livestock compensation programs. One interviewee explained:

> *I'm thinking that some of this will come from taxpayers…rather than people who buy hunting and fishing licenses…. that would probably be the preferable way to address concerns about equity that every voter in the state got to say whether they wanted wolves or not… I'm hoping it comes from general sources. – Colorado, 10*

Finally, many interviewees repeated a similar sentiment for Colorado managers, saying, *"Don't reinvent the wheel."* This meant that interviewees felt as if Colorado should not try to take an innovative approach to management or reintroduction. Instead, interviewees encouraged managers look to other states for tool suggestions and base management off of the lessons that can be learned from previous reintroductions.

4. Discussion

Given the complex and often polarizing nature of carnivore reintroduction, it is necessary for managers to thoughtfully consider available policy tool choices. As Colorado prepares for wolf reintroduction, the synthesis of tools used in prior reintroduction areas can better inform

future policy design. This research utilized a policy design perspective to investigate the lessons from past wolf reintroductions in the western United States in order to contribute to a deeper understanding of how to design policy for complex wildlife management issues.

In order to have a successful policy design, a mix of policy tools is necessary; a single tool approach would be ineffective because no single tool is flexible enough to successfully address the complicated nature of conservation problems and target the diversity of actors involved (Gunningham & Sinclair, 1999; Schirmer et al., 2012). Our findings reinforce this with evidence that supports an "all tools" approach to wolf reintroduction, meaning that a mix of tools including procedural, incentive, and regulatory approaches are needed for managing reintroduction. A portfolio of tools is also necessary to address diversity of goals and targets across different levels of governance (Schirmer et al., 2012; Howlett, 2019). This can be seen in our findings through the call for tools to target an array of actors, including stakeholder groups such as livestock producers, NGOs, and hunters, and regulatory bodies such as state, federal and Tribal managing agencies.

A diversity of actors can also help governments to leverage capacity through cross-jurisdictional partnerships (Schultz, 2018; Cyphers & Schultz, 2019). In our findings, we found evidence of this through managing agencies partnering with stakeholder groups, such as NGOs, to cost-share efforts. In general, our findings support literature that calls for policy tools to be accompanied by capacities to address barriers to implementation (Schneider & Ingram, 1990). For example, our findings emphasize the need to have secure funding mechanisms in place prior to wolf reintroduction; managers suggested tools such as taxation to satisfy the diversity of actors involved and address issues of equity.

Due to the multiplicity of attitudes these actors can have towards carnivores, it can be a challenge to address conflicting goals and integrate policy across jurisdictional boundaries (Carter & Linnell, 2016; Expósito-Granados et al., 2019). Different tools are needed for addressing the conflicting goals of different targets across various jurisdiction. For example, financial incentive tools will be useful for targeting livestock producers but may not be useful for targeting the hunting community because most hunters will not experience economic loss due to wolves. Governments can self-impose regulatory tools, such as agencies responding to ESA restrictions and guidelines, but are harder to impose on private citizens due to the culture of individualism and adversity to top-down control in the United States (Schneider & Ingram, 1990). Private citizens are likely to respond negatively to ESA restrictions on private property, especially in regard to a controversial species like the wolf. Tool choices must be tailored to the specific target and jurisdiction; not all tools work the same in different contexts. Utilizing an adaptive and evidence-based approach to track the reintroduction process will be helpful in order to monitor tool implementation choices across jurisdictions and allow changes to be made if goals are not being met or policy targets are not responding as desired

Our findings support existing literature that calls for procedural policy tools such as collaborative processes to address these issues of scale through coordination across sectors and organizations to better align governing institutions and carnivore-occupied landscapes with the goals of local stakeholders and communities (Folke et al., 2007; Carter & Linnell, 2016; Schultz et al. 2019; Savage et al., 2020). In order to achieve this, managers must implement a combination of procedural tools, including supporting collaborative processes, like the Blackfoot Challenge or the Mexican Wolf Livestock Council, and educational and outreach programs such as professionally facilitated meetings and stakeholder advisory workshops. These processes will

rely on transparent communication between managers and the public in order to build relationships. Collaborative process are most effective when trust and relationships are established between participating parties (Wilson et al., 2017). Our findings suggest that more localized, on the ground management helps to build these relationships and form more productive collaboratives, further supporting literature that calls for decentralized, bottom-up approaches to governance to address issues of integration and scale (Di Minin et al., 2016; Savage et al., 2020).

7. Conclusion

The purpose of this research was to identify the policy tools utilized in previous wolf reintroductions in the western United States and their perceived efficacy, provide specific suggestions for future policy design in Colorado, and contribute to a larger body of literature on utilizing a policy design approach for wildlife management. This research can better inform managers by providing valuable perspectives on the challenges and opportunities of different paths forward, drawing on the lessons of the past to lead future successful carnivore reintroduction programs.

While this research provides important perspectives on policy design for future reintroduction, some limitations exist within this study. Due to legal constraints, members of the state wildlife agency, CPW, could not discuss the details of the Colorado ballot initiative until after the election. Interviewees perceptions may have been changed by the election results. This study was also conducted during the COVID-19 pandemic, limiting our interviews to be done over the phone or video-chat. In-person interactions may have resulted in the elucidation of other perspectives Also, it is important to note that a robust analysis on stakeholder perspectives was not included in this study. Other studies done within Colorado highlight the need to account for

the diverse perspectives of stakeholders and the public in future decisions (Niemiec et al., 2020). As Colorado prepares for reintroduction, further research capturing stakeholder perspectives should be conducted and accounted for in future policy design.

Although this research identifies policy tool choices and synthesizes suggestions for Colorado, future carnivore reintroduction will be dependent on specific temporal and spatial scales; there is not a one-size-fits-all approach to policy design. Colorado's policy design for wolf reintroduction may be similar to other western states, but tools, capacities, and considerations will need to be tailored to specific localities. Colorado is also a unique case study of wolf reintroduction as this is the first time a state is reintroducing wolves via ballot initiative rather than federal oversight. Therefore, wolf reintroduction in Colorado may prove to be different than previous reintroductions. Colorado's policy design choices should be evaluated for efficacy over time in order to better understand the overall success of the reintroduction. This can be done by using pre-established criteria, such as Doremus's (2003) metrics for evaluating conservation tool choices, suggesting policy makers evaluate policy tools for feasibility, effectiveness, fairness, and future implications.

CHAPTER 4 – CONCLUSION

In this thesis I explored the policy tools and strategies available for carnivore reintroduction, focusing on past wolf reintroductions in the western United States in order to inform future reintroduction in Colorado. My objectives were to: (1) identify policy tools and strategies used in past wolf reintroductions, and (2) capture policy and management suggestions and considerations for Colorado reintroduction. I was able to address these objectives through interviews with land and wildlife managers, and divergent stakeholder groups.

Key findings were discussed in Chapter 2, the practitioner report for CPW and other interested organizations. I found that one of the most challenging aspects of wolf reintroduction and subsequent management were and will continue to be social tolerance issues amongst stakeholders and members of the public. Most of the policy tools discussed by interviewees were implemented to increase social tolerance towards having wolves on the landscape. These tools included collaborative processes such as outreach and education programs, livestock compensation programs, regulatory flexibility that allowed for lethal control, and zonal management systems. Interviewees recommended that Colorado thoughtfully consider all stakeholder perspectives in management decisions. Managers should work to establish relationships and build trust with stakeholders through transparent communication. Certain capacities, such as funding mechanisms and knowledgeable staff, are also critical for tool implementation to be successful. Diverse funding sources, such as taxation, should also be considered in order to address issues of inequity within the traditional funding mechanisms of state wildlife agencies. I also found that a major challenge of wolf reintroduction is managing wolves on multi-use public lands. In order to avoid human-carnivore conflict on these

landscapes, cross-jurisdictional planning and collective action will be needed, relying upon more bottom-up, decentralized forms of governance. In light of this, my findings suggest that state managers may be better equipped than federal managers to handle management of wolves in order to effectively account for issues of social tolerance at local levels.

In Chapter 3, my peer reviewed article, I elaborated on these findings by utilizing a policy design lens to examine policy tools, capacities needed, and challenges of policy integration. This research opens up further discussion regarding policy design and tool choices for carnivore reintroduction and management. It is important for managers to consider policy tools that support inclusive and equitable management approaches, address the multiplicity of actors involved, and integrate policies across jurisdictions. Future research could be done to assess Colorado's policy tool choices for these criteria in order to evaluate the success of wolf reintroduction policy design. Our study parallels broader literature regarding conservation policy design for complex wildlife management and also adds to the growing body of literature on human-carnivore conflict and management. This research can inform future and current wildlife managers on the available policy tool choices for carnivore management and offer considerations to take into account prior to a reintroduction.

This study offers valuable perspectives from key managers and divergent stakeholders with experience working on challenging wolf reintroduction and management. However, limitations within the study did exist. The study was limited to a subset of potential interviewees because some managers and stakeholder representatives did not respond or declined to participate in this study. Our sample is potentially skewed in that it represents only those willing to participate and some representatives, such as those from certain Tribes and federal organizations like the Bureau of Land Management, were not interviewed. It is also important to

note that the COVID-19 pandemic significantly impacted the communities we reached out to, particularly certain Tribal Nations, and likely prevented them from being able to participate in this study. We also had to conduct interviews over the phone or video chat because of the pandemic. In-person interviews could have elucidated different perspectives and answers from our interviewees. Legal barriers also prevented the Colorado state wildlife agency, CPW, from participating until after the November 2020 election. This may have affected results in that participants perspectives could have changed after the ballot initiative passed. Our study also had limited interviews with individual landowners, NGOs, and other stakeholder representatives. Future research could be done to investigate questions of policy design in regard to stakeholder targets. For example, research could look more specifically at how specific policy tools, like a compensation program, target specific actors such as livestock producers.

Future research can address these gaps and potentially incorporate a more robust stakeholder analysis, as this was not the purpose of our study but remains an important aspect of carnivore reintroduction and management. After Colorado reintroduces wolves, further research could evaluate overall effectiveness of the design Colorado implements using criteria from the policy design literature. Implementing the policy tool choices I have identified in this thesis will require thoughtful consideration and action across various levels of governance. However, the results from this study should provide managers with a suite of tool choices that can have the potential to implement a successful carnivore reintroduction in Colorado and elsewhere.

REFERENCES

Arellano, D. (2021). *NRDC Files Lawsuit to Protect Endangered Gray Wolf.* https://www.nrdc.org

Bangs, E. E., Fontaine, J. A., Jimenez, M. D., Meier, T. J., Bradley, E. H., Niemeyer, C. C., ... & Oakleaf, J. K. (2005). Managing wolf-human conflict in the northwestern United States. *Conservation Biology, 9*, 340.

Bergstrom, B. J., Vignieri, S., Sheffield, S. R., Sechrest, W., & Carlson, A. A. (2009). The Northern Rocky Mountain gray wolf is not yet recovered. *BioScience*, *59*(11), 991-999.

Borrás, S., & Edquist, C. (2013). The choice of innovation policy instruments. *Technological forecasting and social change*, *80*(8), 1513-1522.

Boyce, M. S. (2018). Wolves for Yellowstone: dynamics in time and space. *Journal of Mammalogy*, *99*(5), 1021-1031.

Bramblett, B. (2001). Wolves in the West: The Triumph of Section 10(j) of the Endangered Species Act. *Public Land & Resources Law Review, 22,* 133-146.

Bruskotter, J. T. (2013). The predator pendulum revisited: Social conflict over wolves and their management in the western United States. *Wildlife Society Bulletin*, *37*(3), 674-679.

Bruskotter, J. T., Schmidt, R. H., & Teel, T. L. (2007). Are attitudes toward wolves changing? A case study in Utah. *Biological conservation*, 139(1-2), 211-218.

Bruskotter, J. T., Toman, E., Enzler, S. A., & Schmidt, R. H. (2010). Are gray wolves e endangered in the northern Rocky Mountains? A role for social science in listing determinations. *BioScience*, *60*(11), 941-948.

Candel, J. J., & Biesbroek, R. (2016). Toward a processual understanding of policy integration. *Policy Sciences*, *49*(3), 211-231.

Carroll, C., Fredrickson, R. J., & Lacy, R. C. (2014). Developing metapopulation connectivity criteria from genetic and habitat data to recover the endangered Mexican wolf. *Conservation biology*, *28*(1), 76-86.

Carter, N. H., & Linnell, J. D. (2016). Co-adaptation is key to coexisting with large carnivores. *Trends in Ecology & Evolution*, *31*(8), 575-578.

Colorado Election Results (2020). *Colorado Election Results & Data* https://www.sos.state.co.us/pubs/elections/resultsData.html

Cyphers, L. A., & Schultz, C. A. (2019). Policy design to support cross-boundary land management: the example of the Joint Chiefs Landscape Restoration Partnership. *Land use policy*, *80*, 362-369.

Czech, B., & Krausman, P. R. (2001). The endangered species act: history, conservation biology, and public policy. JHU Press.

DeCesare, N. J., Wilson, S. M., Bradley, E. H., Gude, J. A., Inman, R. M., Lance, N. J., ... & Smucker, T. D. (2018). Wolf-livestock conflict and the effects of wolf management. *The Journal of Wildlife Management*, *82*(4), 711-722.

Department of Interior- DOI. (2016). *The Status of the Federal Government's Management of Wolves*. www.doi.gov/ocl/management-wolves#main-content

Di Minin, E., Slotow, R., Hunter, L. T., Pouzols, F. M., Toivonen, T., Verburg, P. H., ... & Moilanen, A. (2016). Global priorities for national carnivore conservation under land use change. *Scientific reports*, *6*(1), 1-9.

Expósito-Granados, M., Castro, A. J., Lozano, J., Aznar-Sanchez, J. A., Carter, N. H., Requena-Mullor, J. M., ... & Martín-López, B. (2019). Human-carnivore relations: conflicts, tolerance and coexistence in the American West. *Environmental Research Letters*, *14*(12), 123005.

Fitzgerald, E. A. (2011). Delisting wolves in the Northern Rocky Mountains: Congress cries wolf. *Envtl. L. Rep. News & Analysis*, *41*, 10840.

Fitzgerald, E. A. (2018). The Lobo Limps on from Limbo: A History, Summary, and Outlook for Mexican Wolf Recovery in the American Southwest. *Colo. Nat. Resources Energy & Envtl. L. Rev.*, *29*, 223.

Folke, C., Pritchard Jr, L., Berkes, F., Colding, J., & Svedin, U. (2007). The problem of fit between ecosystems and institutions: ten years later. *Ecology and society*, *12*(1).

Glesne, C. (2011). Prestudy tasks: Doing what is good for you. *Qualitative research and educational sciences: A reader about useful strategies and tools*, 1-37.

Gunningham, N. and Sinclair, D. (1999). Regulatory pluralism: Designing policy mixes for environmental protection. *Law & Policy, 21*(1), pp.49-76.

Heckathorn, D. D., & Cameron, C. J. (2017). Network Sampling: From Snowball and Multiplicity to Respondent-Driven Sampling. Annual Review of Sociology. 43(1), 101–119.

Hendricks, S. A., Clee, P. R. S., Harrigan, R. J., Pollinger, J. P., Freedman, A. H., Callas, R., ... & Wayne, R. K. (2016). Re-defining historical geographic range in species with sparse

records: implications for the Mexican wolf reintroduction program. *Biological Conservation*, *194*, 48-57.

Holaday, B. (2003). *Return of the Mexican gray wolf: Back to the blue*. University of Arizona Press.

Howlett, M. (2009). Governance modes, policy regimes and operational plans: A multi-level nested model of policy instrument choice and policy design. *Policy Sciences*, 42(1), 73-89.

Howlett, M. (2019). *Designing public policies: Principles and instruments*. Routledge.

Howlett, M. & Rayner, J. (2007). Design Principles for Policy Mixes: Cohesion and Coherence in "new Governance arrangements'*, Policy and Society* 26:4, 1-18.

Idaho Legislative Wolf Oversight Committee (2002). Idaho Wolf Conservation and Management Plan. *56th Idaho Legislature*

Malcom, J. W., & Li, Y. W. (2018). Missing, delayed, and old: The status of ESA recovery plans. *Conservation Letters*, *11*(6), e1260

Mech, L. D. (2017). Where can wolves live and how can we live with them?. *Biological conservation*, *210*, 310-317.

Mech, L. D., & Boitani, L. (2003). Wolf social ecology. *Wolves: Behavior, Ecology, and Conservation*

Meijers, E., & Stead, D. (2004). Policy integration: what does it mean and how can it be achieved? A multi-disciplinary review. In *Berlin Conference on the Human Dimensions of Global Environmental Change: Greening of Policies-Interlinkages and Policy Integration. Berlin*.

Montana Fish, Wildlife and Parks- MFWP. (2002). Montana Wolf Conservation and Management Planning Document. *Montana Fish, Wildlife & Parks*. Helena, Montana.

National Park Service- NPS. (2020). *Yellowstone: Wolf Restoration.* www.nps.gov/yell/learn/nature/wolf-restoration.htm

Naughton-Treves, L. I. S. A., Grossberg, R., & Treves, A. (2003). Paying for tolerance: rural citizens' attitudes toward wolf depredation and compensation. Conservation biology, 17(6), 1500-1511.

Nie, M. A. (2001). The sociopolitical dimensions of wolf management and restoration in the United States. *Human Ecology Review*, 1-12.

Nie, M. A. (2003). *Beyond wolves: The politics of wolf recovery and management*. U of Minnesota Press.

Niemiec, R., Berl, R. E., Gonzalez, M., Teel, T., Camara, C., Collins, M., ... & Hoag, D. (2020). Public perspectives and media reporting of wolf reintroduction in Colorado. *PeerJ*, *8*, e9074.

Parsons, D. R. (1998). " Green fire" returns to the Southwest: reintroduction of the Mexican wolf. *Wildlife Society Bulletin*, *26*, 799-807.

Phillips, M.K., Henry, G., & Kelly, B.T. (2003). Restoration of the red wolf. In Wolves: Behavior, ecology, and conservation, eds. L. David Mech and Luigi Boitani, 272-88. Chicago: The University of Chicago Press.

Savage, J. M., Hudson, M. D., & Osborne, P. E. (2020). The challenges of establishing marine protected areas in South East Asia. In *Marine Protected Areas* (pp. 343-359). Elsevier.

Schneider, A., & Ingram, H. (1990). Behavioral assumptions of policy tools. *The Journal of Politics,* 52(2), 510-529.

Schirmer, J., Dovers, S., & Clayton, H. (2012). Informing conservation policy design through an examination of landholder preferences: a case study of scattered tree conservation in Australia. *Biological Conservation 153* (2012): 51-63.

Schultz, C. A., Mclntyre, K. B., Cyphers, L., Kooistra, C., Ellison, A., & Moseley, C. (2018). Policy design to support forest restoration: the value of focused investment and collaboration. *Forests*, *9*(9), 512.

Sims, C., Aadland, D., Finnoff, D., & Hochard, J. (2020). What are the benefits of delisting endangered species and who receives them?: Lessons from the gray wolf recovery in Greater Yellowstone. *Ecological Economics*, *174*, 106656.

Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection. Ethnobotany Research and Applications. 5, 147–158.

US Fish and Wildlife Service, Department of the Interior- USFWS. (1987). Northern Rocky Mountain Wolf Recovery Plan.

US Fish and Wildlife Service, Department of the Interior- USFWS. (1994). The reintroduction of gray wolves to Yellowstone National Park and central Idaho: final environmental impact statement. *Helena (MT): USFWS*.

US Fish and Wildlife Service, Department of the Interior- USFWS. (2001). Mexican Wolf Reintroduction Program: Three-Year Review Workshop. *Arizona.*

US Fish and Wildlife Service, Department of the Interior- USFWS. (2017). Mexican Wolf Recovery Plan: First Revision. *New Mexico.*

US Fish and Wildlife Service, Department of the Interior- USFWS. (2018). Mexican Wolf Experimental Population Area Statistics. *New Mexico.*

US Fish and Wildlife Service, Department of the Interior- USFWS. (2019). *Red Wolf.* www.fws.gov/southeast/wildlife/mammals/red-wolf/.

US Fish and Wildlife Service, Department of the Interior- USFWS. (2020). *Gray Wolf (Canis lupus)* https://www.fws.gov/home/wolfrecovery/.

vonHedemann, N., Wurtzebach, Z., Timberlake, T. J., Sinkular, E., & Schultz, C. A. (2020). Forest policy and management approaches for carbon dioxide removal. *Interface focus*, *10*(5), 20200001.

Walsh, L. (2019). A Zero-Sum Politics of Identification: A Topological Analysis of Wildlife Advocacy Rhetoric in the Mexican Gray Wolf Reintroduction Project. *Written Communication*, *36*(3), 437–465.

Wayne, R. K., Lehman, N., Allard, M. W., & Honeycutt, R. L. (1992). Mitochondrial DNA variability of the gray wolf: genetic consequences of population decline and habitat fragmentation. *Conservation Biology*, *6*(4), 559-569.

Weaver, J. (2020). BOX 1.1 Wolf History and Surveys in Yellowstone National Park. *In Yellowstone Wolves* (pp. 6-12). University of Chicago Press.

Wilson, S. M., Bradley, E. H., & Neudecker, G. A. (2017). Learning to live with wolves: community-based conservation in the Blackfoot Valley of Montana. Human–Wildlife Interactions, 11(3), 4.

Woolston, C. (2013). Gray wolves left out in the cold: US plan to remove federal protection elicits howls of protest. *Nature*, *501*(7466), 143-145.

Wyoming Game and Fish Commission- WGFC. (2011). Wyoming Gray Wolf Management Plan. *Wyoming Game and Fish Commission, Cheyenne, WY. 61 pp.*

APPENDIX A – INTERVIEW GUIDES

Guide 1 – Past Wolf Reintroduction Area Interview Guide

Background

1. Can you tell me about your professional background?
2. What role do/did you play in wolf management/policy implementation?

Wolf Reintroduction

1. What strategies were/are implemented in regard to wolf reintroduction/management in your region?
2. Which strategies were successful?
    a. Can you discuss why?
3. Can you discuss whether some strategies were not successful or didn't work as intended?
4. Did any strategies work against each other or send mixed messages in some way?
5. Amongst partners and stakeholders, what strategies used were considered the most equitable?
6. How feasible would you consider the implementation of these policy tools?
    a. Did you run into difficulties with implementation?
7. What capacities (e.g. funding, knowledge, skills, staff positions, etc), if any, had to be utilized for reintroduction and management efforts?
    a. Where were you able to get those capacities from?
    b. Are there any capacities that you wish you had that you do not?
8. Do you anticipate any future changes to wolf management in your state?
    a. Would you like to see any changes?
    b. What does the future look like for the current strategies in place?

Colorado Suggestions

1. If wolves are reintroduced into Colorado, do you have any specific suggestions for managers or policy makers there?
2. If any, what lessons have you (or your agency) pulled from other states management plans?
    a. What are other states doing right?
    b. What are other states doing wrong?

Conclusion

1. Is there anything else you want to tell me or that we should talk about?
2. Do you have any other recommendations for people I can talk to about strategies and implementation? I am interested in getting differing perspectives.

Guide 2 – Colorado Manager Interview Guide

Background

1. Can you tell me about your professional background?
2. If wolves are reintroduced in Colorado, what role do you foresee yourself and your team playing in that?
    a. Is this something you have been actively discussing and planning for?

Wolf Reintroduction

1. If any, what strategies do you think Colorado would need to employ if wolves were reintroduced? [Prompt different types of strategies if necessary (compensation, regulation, education, collaboration)]
2. Can you talk about how you plan for these strategies to work together?
3. If any, what states are you in contact with about their policy and management strategies?
    a. Do you foresee any needs that Colorado may have that would differ from other states reintroduction programs?
4. Amongst partners and stakeholders, what strategies do you think would be considered the most equitable?
5. How feasible would you consider the implementation of these potential strategies ?
    a. Did you foresee running into any difficulties with implementation?
6. What capacities (e.g. funding, knowledge, skills, staff positions, etc), if any, do you foresee needing in Colorado
    a. Where do you think you will be able to get those capacities from?

Conclusion

1. Is there anything else you want to tell me or that we should talk about?
2. Do you have any other recommendations for people I can talk to about policy tools and implementation? I am interested in getting differing perspectives.

APPENDIX B – CODING TREE

Final Coding Tree

I. Strategies Mentioned
   a. Collaboration
      i. "Boots on the ground"
      ii. Education/outreach
      iii. Cross-agency collaboration
      iv. Stakeholder engagement
   b. Livestock Programs
      i. Compensation programs
         1. Pay for Presence
         2. Confirmed Depredation
      ii. Non-lethal Mitigation
         1. Fladry
         2. Range Riders
   c. Regulatory Flexibility
      i. Lethal
      ii. Non-lethal
      iii. All tools
      iv. Section 10 (j)
      v. Zonal Management

II. Capacities Needed
   a. Funding
   b. Staff
   c. Knowledge

III. Jurisdictional Authority
   a. State
   b. Federal
   c. Unsure

IV. Challenges
   a. Social Tolerance
      i. Diverse values
      ii. Rural vs urban divide
   b. Public Lands Management
      i. Managing multi-uses

APPENDIX C – ADDITIONAL DATA

Appendix C. Additional data on major themes discussed in results.

	Themes	Example Quotes
Policy Tools	Procedural Tools (e.g. collaborative forums, outreach and education, MOUs)	*Having an MOU that outlines [agency coordination], having regular quarterly meetings with signatories of the MOU really helps to guide all the different agencies and gets everybody on the same page and focus on the same goals. – Southwest, 13* *I would say a key ingredient is… having open processes that incorporate input into management decisions from people who are living with wolves day in and day out… And having people feel like there's some degree of empowerment. – Southwest, 12* *Everybody wants to be heard…So having processes where there are opportunities for the general public to speak, that's important for people to feel as though they are part of the process ….getting public input and using these stakeholder advisory group processes can provide a lot of really important information. - Colorado, 1*
	Financial Incentive Tools (e.g. compensation depredation programs)	*My initial reaction to [Pay for Presence] was that it sounds like a bribe, like a way to try to achieve social tolerance by paying people to accept it, [but] I am hearing that [managers] are seeing positive behavior change [in producers]….now I think it is a good program because it's all about, 'does it change behavior and raise tolerance?' – Southwest, 10* *Number one most important thing is to build tolerance toward wolves. And to do that, you have to work on getting buy-in from the livestock producers, because they're the ones that could be impacted by wolf problems…. The way to do that is a compensation program conducted by professionals. – Northern Rocky Mountains, 17* *Show me the money. You know what I mean? When [producers] are losing dollars, there's no tolerance…. compensation is probably the strongest [for building] tolerance. – Northern Rocky Mountains, 7*
	Regulatory Tools (e.g. section 10 (j), lethal control, zonal management)	*I think people appreciate that management flexibility [under 10 (j)]… a lot of it has to do with a perception of having more opportunity to deal with the problem yourself rather than waiting for somebody else to come deal with it for you. – Northern Rocky Mountains, 9* *I think there has to be room for some combination of tools… we should be exhausting all non-lethal possibilities…If we get to the point where you have a*

		sufficiently populous number of wolves on the landscape… then I think having some lethal management options on the table early on makes sense. – Southwest, 12 *I would say lethal removal is something that's hard for a lot of people to swallow, but it's the most effective way to put an end to livestock depredations by wolves. – Northern Rocky Mountains, 17*
Capacities Needed	Funding	*Could CPW fund the program? Yes. But there would be a cost benefit analysis of okay, we're going to do wolf reintroduction, which is fairly pricey to do it, but maybe at the expense of…core programs that hunters and fishers really want… then they're paying for something that they may not have really thought too highly about. So that's a hard discussion there. – Colorado, 11* *I don't want to say it's all about the dollar, but boy funding is so important. – Southwest, 6*
	Knowledgeable Staff	*The main thing is having knowledgeable people in those key positions. I would say knowledgeable yet flexible and willing to learn... having the right people is important. And diversity of staff like somebody doing education and outreach and really being the force behind it that doesn't need to be a wolf expert. – Southwest, 2* *That's where the rubber meets the road for a large carnivore management. You have to have people that are in a position to respond, and it is their job to respond. – Northern Rocky Mountains, 4*
Jurisdictional Concerns (e.g. opinions on state or federal authority	State Authority	*For public tolerance sake, which is pretty important, the more local the better. So I would say CPW is probably going to be the best agency to implement that. – Northern Rocky Mountains, 3* *My gut reaction is to keep this kind of thing at the lowest level possible and organic with the community… because ultimately that's where success lies is the communities and their tolerance for species. – Northern Rocky Mountains, 4*
	Federal Authority	*If you find wolves beneficial in some way, you'd want to maintain that federal protection because you think it provides wolves additional protections… a lot of that comes down to human caused mortality. – Northern Rocky Mountains, 9* *Having that authority under the umbrella of the USFWS makes perfect sense because they have those ESA protections. But also because in general, the USFWS and the feds tend to be better funded. – Southwest, 13*