Policy Lessons for Colorado Wolf Reintroduction

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Summer 2021

Public Lands Policy Group at Colorado State University

Public Lands Policy Group Practitioner Paper # 11

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Public Lands
Policy Group

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Acknowledgements

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Executive Summary

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. 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.

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 perspectives on different jurisdictional authorities, capacities needed, 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.

Findings

Our findings fall into four categories: perspectives on jurisdictional authority, capacities needed, policy and management strategies, and overall challenges. Our findings are presented in a sequence according to their importance and priority for implementation based on interviewee recommendations.

The majority of interviewees advocated for CPW to reintroduce wolves only if they remained delisted from the Endangered Species Act (ESA) because they felt that state agencies were preferable than the federal government to manage wolves and reintroduction. Interviewees felt that this was due to state agencies having more regulatory flexibility and the ability to tailor management plans to state needs. Some said that the public trusts state agencies more than federal agencies; therefore, social tolerance may also increase when management is localized. However, jurisdictional authority will depend on the federal endangered status of the wolf under the ESA at the time of reintroduction in Colorado. If the gray wolf is listed as endangered, 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.

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 less social tolerance of wolves, specifically in the hunting community, since

the majority of revenue comes 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. Recent research has confirmed that hunters and anglers were less likely to vote for reintroduction than the general public (Niemiec et al, 2020; Niemiec et al, In Press). 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, for instance, that it was necessary to have staff members that can address social tolerance issues directly.

Regulatory strategies should be made clear and implemented early on to establish a policy framework, with most interviewees advocating for an "all tools" approach to management, meaning a mix of non-lethal and lethal measures. In general, many interviewees felt that lethal removal of wolves (e.g. removal of problem wolves, establishment of hunting seasons, etc.) was a critical part of management for increasing social tolerance and population control. Another regulatory strategy available is the use of management zones where wolves are afforded different protections across boundary lines. However, interviewees discussed 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.

Interviewees emphasized the importance of establishing collaborative processes with stakeholders (e.g. livestock producers, NGOs, hunters, land owners, etc.) that allow for joint-decision making with managers. Regardless of who convenes, it is important for both managing agencies and stakeholders to be involved. Many interviewees encouraged a "boots on the ground" or face-to-face approach to establish relationships 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.

Livestock depredation programs were also mentioned as a strategy to increase social tolerance amongst stakeholders, particularly within the livestock community, and 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 with confirming a depredation, payments 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, with almost all interviewees mentioning challenges with building social tolerance and acceptance for wolves in Colorado. Another issue mentioned for Colorado was the urban-rural divide and the equitability of urban citizens voting for a reintroduction that will 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, look to past efforts for recommendations on how to move forward, and build collaborative processes and face-to-face relationships to support transparency and trust-building from the outset.

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, an approach grounded in local engagement and state leadership 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 and to build social tolerance.

- A regulatory framework that utilizes a mix of policy approaches along with regulatory flexibility, can help to effectively manage wolves over different temporal and spatial scales. According to interviewees, this mix of tools should also 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 restricting 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 if these are desirable in Colorado.

- 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, but also could include subgroups working on specific topics. For example, livestock producers must

be a part of the decision making process for livestock depredation programs. In addition, face-to-face interactions are the most effective for building relationships and trust with stakeholders.

1. 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.

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 authorities, 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.

2. 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, environmental NGOs are litigating the decision, which also could be reversed due to a change in presidential administration (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.

3. 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). 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 participants.

We used separate interview guides for participants from past reintroduction areas and participants from Colorado. 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.

Table 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

4. Findings

The findings of this study are organized into four major sections based on our research objectives and themes that emerged during interviews: 1) perspectives on 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 priorities for decision makers. It will be important for certain obstacles, 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, sequentially, prior to others to establish a policy framework.

4.1 Jurisdictional authority over wolves

Prior to implementing 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. 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.

4.1.1 Support for state management

The majority of interviewees felt that the state having management control was ideal and, therefore, advocated that the state have authority over reintroduction and management, if possible. Many felt that social tolerance and public acceptance is greater when state agencies manage wolves. According to interviewees, the public has more trust for state governments than the federal government. Others felt that the local agencies have more regulatory flexibility and the ability to tailor management plans to state needs. For example, one interviewee stated:

> *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 tolerance for species. – Northern Rockies, Manager*

4.1.2 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. 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 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. An interviewee 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*

4.2 Capacities needed to support wolf reintroduction and management

Capacities available will likely depend on which agency has jurisdictional authority. Once this oversight is solidified, certain capacities will need to be considered in order to support the implementation and success of policy strategies. This section highlights the key types of capacities discussed, including funding mechanisms and knowledge.

4.2.1 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.). Funding sources in Colorado will most likely differ based on the listing status of the wolf. 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. Funds from these organizations have been put towards cost-sharing efforts for livestock depredation mitigation and compensation programs. 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. – Northern Rockies, Manager*

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. In Colorado, CPW generates 90% of its own revenue, with most of this coming from purchases of hunting and fishing licenses. A few interviewees suggested that Colorado shift the financial burden away from those who purchase these licenses. One way to do this would be to use general taxpayer funds for reintroduction and management, including livestock compensation programs. An 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. – Colorado, Manager

4.2.2 Knowledge

Wolf management takes a cadre of dedicated staff members within agencies and partners, beyond wolf biologists. Some cautioned that time and budget constraints within agencies have caused significant strain on employees who manage wolves. Interviewees felt that it was necessary to have staff members that can address social tolerance issues directly. An interviewee commented:

I would say [we need people who are] knowledgeable yet flexible and willing to learn. 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

4.3 Policy strategies to support wolf reintroduction and management

The available policy strategies will ultimately depend on jurisdictional authority and capacity, with certain strategies needing to be implemented prior to others in order to establish a balanced framework of policy. 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 2).

4.3.1 Regulatory Strategies

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 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 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 wolf. 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, the state should still allow flexibility for lethal removal. For example, several interviewees felt that state-implemented wolf hunting seasons helped to both establish a feeling of empowerment in communities that do not want wolves on the landscape and stabilize the wolf population. However, there were some differing opinions regarding managers' reliance on lethal removal to stabilize population numbers and deal with livestock depredation issues.

Table 2. Policy strategies for wolf reintroduction and management.

		Strategies for Wolf Reintroduction and Management		
Assumed Policy Goal	**Policy Theme**	**Strategies in Theme**	**Attributes for Success**	**Possible Challenges or Problems**
Utilize government regulation to manage wolves in the context of other land uses.	Regulatory Strategies	Regulatory Flexibility under 10 (j) 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
Increase social tolerance amongst stakeholders through co-production of policy decisions.	Collaborative Strategies	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
		Interagency Collaboration	Transparent communication; establishing clear objectives and goals; utilizing formal agreement documents	Undefined goals and objectives; 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. fladry and range riders)	Cost-sharing with NGOs and Wildlife Services; effective on smaller home ranches; ability to hire someone from local community to range ride	Expensive; not always timely; not effective on public lands; lack of standardization and accountability in ranger riders

A few interviewees 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. 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'….It's not a good approach... It's like you're treating the flu with a Band-Aid. – Southwest, 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:

> *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… if you don't have all the tools, then you're just shortchanging the whole program. – Southwest, Manager*

Interviewees mentioned that 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. In the trophy game area, Wyoming Game and Fish actively manages for wolves, including responding to livestock depredation and establishing a hunting season. In the predator zone, wolves are not managed and therefore can be lethally removed by anyone at any time.

A few interviewees felt that Wyoming's zonal management contributes to social tolerance significantly because it appeals both to those who want strict protections and to those who want wolves lethally controlled. One Northern Rockies manager advocated for zonal management, explaining: "*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.*"

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 this controversy was the reason Wyoming's delisting took significantly longer than the other Northern Rocky Mountain states.

Several interviewees felt that boundary lines for the Mexican wolf were arbitrarily designated and limited the ecological success and overall recovery of the Mexican wolf population. 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. This need for capturing and relocating wolves also puts significant constraints on staff resources, such as time and funding. An interviewee 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*

4.3.2 Collaborative Strategies

The majority of interviewees emphasized the importance of collaboration that involves key stakeholders (e.g., livestock, hunting, and 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. The 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. One person explained:

> *[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 having everybody part of the process working towards a unified goal. – Colorado, Manager*

Some interviewees felt that self-regulated collaborative groups in the Northern Rocky Mountains, like the Blackfoot Challenge in Montana, have been effective for improving social tolerance towards wolves. These groups have involved NGOs, livestock producers, and managers working together to co-generate data and cost-share management efforts. Others pointed to the creation of the Mexican Wolf Livestock Council in the Southwest as an ideal collaborative process. This council was 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, including the "Pay for Presence" program. This program 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, 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 between 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. 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. Our interviewees were critical of managers who did not do this. Interviewees explained:

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

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. – Northern Rockies, NGO Representative

The majority of interviewees emphasized the importance of transparency with stakeholders 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. An interviewee 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

Since Colorado reintroduction will likely occur on public lands and wolves will cross jurisdictional boundaries, 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 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. – Southwest, Manager

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.

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. The New Mexico Department of Game and Fish previously ended their partnership with the Mexican wolf program 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 so that collaboration tends to make decisions take longer. – Southwest, Manager

4.3.3 Livestock Programs

The majority of interviewees considered payment for livestock depredation a necessary strategy for garnering social tolerance towards wolves amongst livestock producers. However, some felt that although payment helps, producers are not satisfied with the compensation programs alone. An interviewee 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. – Northern Rockies, Livestock Producer

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. 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. However, 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. One interviewee explained:

> *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... but it takes a fair amount of money. – Southwest, Manager*

Some interviewees brought up non-lethal depredation mitigation strategies, such as fladry. 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. 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 felt that livestock producers accepted ranger riders over other methods because it gives them the opportunity to hire someone from the local community. However, a few interviewees felt that range riders were not efficient due to 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. An interviewee explained:

> *There's little accountability and there's no uniform standards for what a range rider does... There were some issues... where range riders were collecting a paycheck when they were at the bar out of town, 50 miles away...while they were supposed to be range riding. – Southwest, NGO Representative*

4.4 Other Perspectives about Social Tolerance towards Wolves

The main challenge interviewees associated with wolf management and reintroduction were factors of social tolerance. Due to the intensity of polarization amongst the public about wolves, interviewees felt that most of their work was dedicated to managing people rather than wolves (Table 3). A few interviewees brought up the issue of differing values amongst stakeholder groups. Some felt that 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 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 had occurred. So wolf reintroduction was in their minds a step toward equitability. – Northern Rockies, Tribal Nation Manager

Some interviewees 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 3. Additional data for perceptions on social tolerance issues

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
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
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
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. Conclusions and Recommendations

Our research explored lessons learned in the Northern Rocky Mountains and Southwest wolf reintroduction areas, along with Colorado 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.

Ultimately, 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 more local and state-led 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. If the gray wolf is endangered at the time of reintroduction, section10 (j) of the ESA should be utilized 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.

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. 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), since these communities are less likely to support wolf reintroduction efforts (Niemiec et al, 2020; Niemiec et al, In Press). 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 flexible regulation. This can help achieve policy goals of effectively manage wolves over different temporal and spatial scales. 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 proven ineffective. The extent of lethal removal possible will be dependent on the endangered status of the wolf. Although past studies have shown lethal control does not necessarily lead to more social tolerance towards wolves (Browne-Nunez et al, 2015), our interviewees thought otherwise. Further research is needed on this topic. Other tools, such as education, regulation, and collaborative approaches will also add value for managing reintroduction. Each type of tool requires different capacities and targets different groups; tracking policy efficacy and equitability over time will be valuable to ongoing program improvement.

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 increase social tolerance 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 professionally 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. Interviewee 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.

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