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IMPACTS OF MONTANA PUBLIC WOLF HUNTING AND TRAPPING ON
TOLERANCE AND ACCEPTANCE OF GRAY WOLVES AMONG RURAL
RESIDENT RANCHERS, TRAPPERS, AND BIG GAME HUNTERS

By

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Thesis

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Table of Contents

INTRODUCTION	1
Research Purpose and Questions	1
Statement of Need.....	2
BACKGROUND	4
Early History of Wolves and Humans in America	4
Wolf Recovery	6
Montana State Gray Wolf Management Plan.....	10
RELEVANT LITERATURE.....	15
Wolf Reintroduction Promises: Predicted Impacts and Concerns	16
Environmental Impacts	19
Socioeconomic Impacts	21
Approaches to Wildlife Attitude Studies	22
Research on Public Acceptance of Predators.....	28
METHODS	34
FINDINGS	42
The Politics of Wolf Recovery: Frustration, Inequity, and Distrust.....	44
Need for Management and Control.....	47
The Shape of Management: Allowance of Public Hunting and Trapping.....	47
Intent to Participate in Public Wolf Hunting and Trapping.....	52
Livelihood and Way of Life.....	53
Livestock and Agriculture.....	54
Game Impacts	56
Personal “Affects”, Beliefs, and Attitudes.....	58
Interactions with Predators	60
Cultural and Social Influences	62
Family History	62
Cultural Norms and Values.....	63
Place in the Landscape and Ecosystem.....	64
Noted Changes in Tolerance.....	66
STUDY LIMITATIONS	70
COMPARISON OF FINDINGS TO PREVIOUS RESEARCH.....	73
IMPLICATIONS AND CONCLUSIONS.....	81
REFERENCES	85

APPENDIX A: INTERVIEW GUIDE QUESTIONS	99
APPENDIX B: NORTHERN ROCKY MOUNTAIN GRAY WOLF TIMELINE.....	99
APPENDIX C: TERMINOLOGY	100

List of Figures

Figure 1: US Fish and Wildlife Service graph of annual NRM gray wolf minimum population count trends (USFWS 2014).....	7
Figure 2: Fish, Wildlife, and Parks map of currently known Montana gray wolf pack distributions (FWP 2014).....	15
Figure 3: Study area locations (Neotreks Geospatial Maps 2014)	35
Figure 4: Factors influencing tolerance and acceptance of wolves	43

List of Tables

Table 1: Montana gray wolf demographics documented in Interagency and Montana Fish, Wildlife, and Parks Annual Reports for 2002 to 2013 (MFWP 2003-2014, USFWS 2003-2012).....	12
Table 2: Interviewee demographic data.....	41

Introduction

Throughout both North American and European history societal values have “determine[d] the survival of species such as the wolf” (Musiani & Paquet 2004). Human persecution of apex predators led to extirpation of species such as grizzly bears, European lynx, mountain lions, black bears and gray wolves (*Canis lupus*) throughout extensive portions of their natural ranges. In the United States, wildlife management has been predicated on common law as carried over from Europe, and formalized in an 1896 Supreme Court ruling (Geer vs. Connecticut, 161 U.S. 519). Under the Public Trust Doctrine, wildlife was placed in trust for the “benefit of the people” via state control and regulation (Bruskotter et al. 2013, Bean and Rowland 1997, Smith 2005, and The Wildlife Society 2010). This doctrine has made public support of agency actions and policies a critical factor in predator management. Managing agencies that do not adequately manage for public approval and acceptance of policies and actions may be subverted through legislative or judicial measures (Bruskotter et al. 2009, Zinn & Manfredo 1998, and 50-CFR-17). This has already been seen in the case of Northern Rocky Mountain (NRM) gray wolves. Public pressure and frustration with the Endangered Species Act (ESA) delisting process led a Montanan senator to step outside the bounds of traditional administrative resolution methods to find legislative means to permanently delist Montana wolves. In the state of Montana, nearly sixty percent of land is privately owned and ranching, trapping, and hunting interest groups are powerful lobbies. Acceptance of wolves among these groups and the general public will be crucial for maintaining a viable wolf population.

Research Purpose and Questions

This project sought to examine how Montana public wolf hunting and trapping seasons, recently created under state controlled management, have impacted public acceptance of

Northern Rocky Mountain (NRM) gray wolves within the state. The following research questions were explored through in-depth interviews with members of the ranching and hunting/trapping communities:

- 1) How has the institution of public wolf hunting and trapping seasons impacted Montanan ranchers' tolerance of free-ranging wolves?
- 2) How has the institution of public wolf hunting and trapping seasons impacted Montanan trapper tolerance of free-ranging wolves?
- 3) How has institution of public wolf hunting and trapping seasons impacted big game hunter tolerance of free-ranging wolves?
- 4) What other factors have influenced rancher, trapper, and big game hunter tolerance of free-ranging wolves?

Statement of Need

Siemer et al. (2009) suggest research, policy, and practice conventions necessary to move wildlife management forward. The authors call for research on the relationship of wildlife abundance and human-wildlife interactions, and for research to test managers' assumptions regarding stakeholder beliefs, attitudes, norms, and behaviors in human dimensions of wildlife management. Siemer et al. assert a need for processes that incorporate "scientifically derived insights" about stakeholders and "proactive stakeholder engagement" in many wildlife management decisions. Decker and Enck (2008) and Nie (2003) suggest that in order for wildlife managing agencies to survive in the 21st century they must seek to understand a diverse set of stakeholders and forces affecting participation in fish and wildlife related activities, and determine the best ways to obtain and incorporate public input. Decker and Enck propose that human dimensions research in wildlife management issues can help achieve these critical goals.

In the case of wolf recovery, managing agencies have made the assumption that public hunting and trapping of the species will not only provide for biological control but also provide a gradual pathway to increase public tolerance and acceptance.

In an analysis of potential threats to wolves following the removal of ESA protections, USFWS acknowledged the importance of public opinion and a sociological need for wolf hunting and trapping in the NRM region:

Public hostility toward wolves led to the excessive human-caused mortality that extirpated the species from the [Northern Rocky Mountains]...Because of the impact that public attitudes can have on wolf recovery, we are requiring adequate regulatory mechanisms to be in place that will balance negative attitudes toward wolves in the places necessary for recovery (74 FR 15175).

Since the first official discussions of wolf recovery in the NRM region, the gray wolf issue has had the markings of a “wicked problem.” This concept is best explained as problems that are “ill-defined, and...rely upon elusive political judgment for resolution (Rittel and Webber 1973)”. Solutions to wicked problems are typically unstable and temporary (Buck 2009). Delisting of a species or subspecies from the ESA is rare, and litigation surrounding both the listing and delisting processes may be highly contentious and protracted. Allowance of public hunting and trapping of an endangered species is virtually unprecedented, and yet Montana is faced with this dilemma regarding gray wolves. It is difficult to say if current wolf policies and management in the NRM region will be an ultimate solution for the issue of recovery. The problem has pitted a wide range of stakeholders against each other. Rational dialogue between all stakeholders may be necessary. This thesis may help provide one platform for rancher, trapper, and big game hunter expressions and to test assumptions of how public hunting and trapping seasons have thus far impacted acceptance of wolves among these stakeholder groups.

Background

Early History of Wolves and Humans in America

Gray wolves once ranged across most of the continental United States (U.S.). The first bounty on wolves in the U.S. was set in Massachusetts in the 1600s. In 1875, Wyoming created a statewide bounty for the species, followed shortly by Montana in 1884 (Montana Fish, Wildlife, and Parks [FWP] 2002). Extreme predator control methods led to extirpation of wolves in the lower 48 states in the early 1900s, though some lone wolves were recorded up until the 1960s (FWP 2002). Over the course of 35 years of implementing the Montana wolf bounty at least 80,000 payments were collected (Steinhart 1995). Wolf removal occurred on both private and public lands, including inside the boundaries of Yellowstone National Park.

North American attitudes towards wolves stretch back to European roots in a time where wild nature was portrayed as unknown and savage (Nash 1967, USFWS 1987). When the United States was first colonized the landscape was a vast, unknown wilderness. For settlers, wilderness was synonymous with wildness, and was something to fear and conquer (Nash 1967). It represented an obstacle to the progress of civilization (Nash 1967, Fritts et al. 2003). Wolves embodied that wildness, and were viewed as an uncontrollable threat (Dunlap 1988, Fritts et al. 2003, Mech 1995, Nie 2003, Schwartz 2003 Steinhart 1995). However, recorded attacks on humans from wild wolves (both pups and adults) in North America in the 18th and 19th centuries did not result in any fatalities. Non-lethal attacks from this time include one from a rabid and 16 from non-rabid animals (Linnell et al. 2002). Six recorded accounts of attacks from rabid wolves and 12 from non-rabid wolves did occur in the 20th century, with two fatalities from secondary infections in the rabid attacks (Linnell et al. 2002). Linnell et al. (2002) found parish and administrative records of injury and death from and contact with wild wolves in Europe

stretching back to the 1500s. Linnell et al. note that it is difficult to be certain of the accuracy of attack numbers from this period as potential sources of error in these earlier records may include distortions in oral storytelling, faked attacks, difficulties in language translations, secondary infections rather than actual attacks resulting in mortalities, scavenging mistaken for killings, euphemisms related to superstition, and mistaken identifications of animals.

Dangers to human settlers included more than direct attacks resulting in death or injury. They were a competitor for food resources—like elk and deer—and a mortality source for domestic livestock. An increasing scarcity of wilderness and insulation from threats to livelihoods created by industrialization allowed an appreciation for the wild to slowly develop over time (Nash 1967).

Wolf folklore is thought to be a persuasive influence on public attitudes (Fritts et al. 2003). It perpetuates superstition of the species' essential nature. Stories like “Peter and the Wolf” and “Little Red Riding Hood” consistently portray wolves as evil and malicious characters. This is also evidenced in multiple sections of the King James Bible, such as Mathew 7:15, Acts 20:28-31, Ezekiel 22:27, and Zephaniah 3:3. Some Native American tribes considered wolves as a totem animal, a possible reincarnation for human souls, although not all Native American myths portrayed wolves quite so benevolently (Steinhart 1995, McIntyre 1995, Fritts et al. 2003).

Arguably, some of the best and worst attributes that are seen in human society are reflected in our conceptualizations of wolves. Wolves have been perceived as having strong social structures built around a nuclear family unit. They are thought to loyally care for injured and infant pack members and communicate in order to efficiently work together in hunting large prey. However, perceptions of wolves have also included negative attributes like violence and

aggressiveness between packs and enjoyment of killing prey beyond what is needed for food. Wolf biologists have disproven some of both positive and negative attributes ascribed to the species; however public beliefs regarding them persist.

As noted by Coleman (2003), the process of extirpating wolves from the U.S. may provide a negative reflection of humanity in the methods utilized in wolf eradication. Measures were extensive and at times displayed a brutality not commonly evidenced in most species removals. He describes a 1937 den hunting manual produced by the United States government which lays out some methods used at the time. These include: wire wrapped around metal forks used to snag pup fur and withdraw them from the den, smoke fed into dens to encourage pups to surface, and discharge of BB pellets from shotguns to take pups without first extricating them from earthen dens. Pups removed from the den were typically clubbed to death or used as lures to draw in adults of the same pack. McIntyre (1995) cites other historic accounts of wolf hunting and trapping that include descriptions of setting fire to them; dragging them to death behind horses; catching and releasing individuals with orifices sown shut, spines or hamstrings severed, or intentionally infected with sarcoptic mange by veterinarians; and baiting of both adults and pups with strychnine laced meat (McIntyre 1995). This is not to say that all wolf removals evidenced a violation of ethics or fair chase principles. More common measures, some currently practiced in Montana, included rifle and bow hunting of adults and use of foothold traps and wire snares (Coleman 2003, McIntyre 1995).

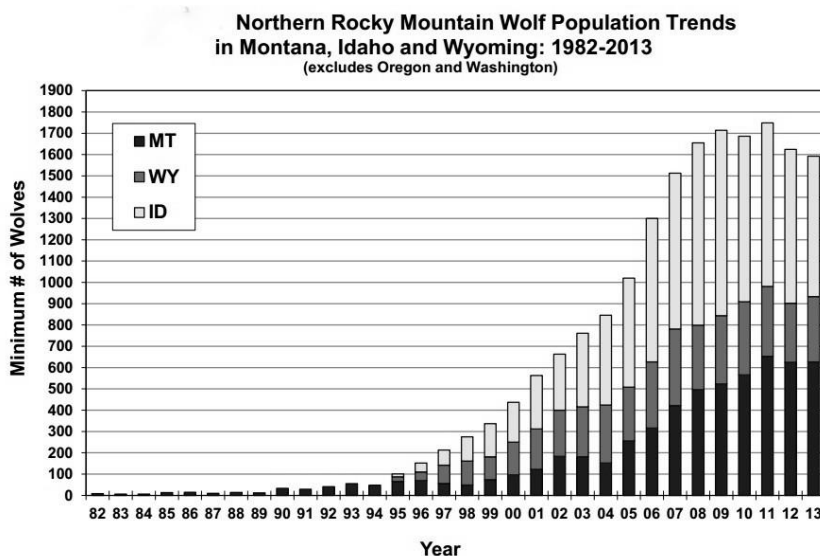
Wolf Recovery

In 1973, the gray wolf became one of the first species to be listed as endangered under the newly created Endangered Species Act (ESA) (38-FR-14678). Wolves began to naturally re-

colonize Montana and the Great Lakes region in 1979 and on through the 1980s, dispersing down from populations in Canada.

In 1980, a Northern Rocky Mountain Wolf Recovery Plan was created, with amendments added in 1987 (USFWS 1980 and 1987). In 1994, wolves in Idaho, a portion of Montana, and Wyoming were designated as a nonessential experimental population (59-FR-60252 and 60266). The nonessential experimental designation indicates that NRM gray wolves are not essential for the overall survival of the species (USFWS June 8, 2014). The designation change allowed for managing agencies to treat this segment of the population similar to a federally threatened rather than endangered species, with greater flexibility and discretion. This facilitated the intentional reintroduction of 66 wolves from Alberta and British Columbia into Yellowstone National Park (YNP) and designated Wilderness areas of Central Idaho (FWP 2002). Reintroductions were completed in 1995 and 1996. Population numbers increased fairly rapidly and wolves began to spread out across the three states (See Figure 1) (USFWS 2000-2014).

Figure 1: US Fish and Wildlife Service graph of annual NRM gray wolf minimum population count trends (USFWS 2014)



In 2003, wolves throughout the NRM region were down-listed to threatened status under the ESA. In 2008, a final ruling made by the U.S. Fish and Wildlife Service (USFWS) removed the NRM population from the Endangered Species List (73 FR 10514 to 10560). Wyoming, Idaho, and Montana all proposed hunting seasons following delisting. However, litigation brought by nonprofit organizations led to the district court granting a preliminary injunction to maintain wolf management under federal protection in light of an absence of proof of genetic connectivity between the three subpopulations (73-FR-75356 to 75371).

In 2009, wolves were once again delisted in Montana and Idaho, following a ruling by the federal district court judge (74-FR-15123 to 15188). Wyoming remained under federal protection due to an inadequate state management plan (Jimenez 2012). Wyoming's management plan allowed for a dual classification of gray wolves; with wolves in the northwestern portion of the state to be managed as a trophy/game species, and in the rest of the state to be managed as a predatory animal with no restrictions on lethal removals, known as the Predatory Animal Area (PAA). A small, overlapping middle area, known as the Wolf Seasonal Trophy Game Management Area (SWGMA) was designed to fluctuate between the two classifications in order to allow for increased protection of a movement corridor between the Greater Yellowstone Area, Idaho, and Montana subpopulations during the portion of the year most dispersal occurs. Under the game classification, wolves could only be publicly trapped or hunted during a regulated season, while under the predatory animal classification they could be killed on-sight year round. USFWS sought to require the state of Wyoming to manage wolves under a single classification statewide, allowing for wolves to naturally disperse across the state in a fan-like pattern, with removals only in areas of continual conflict with humans (Jimenez 2012). A District Court judge overruled the restriction in 2010, allowing USFWS to influence

the size of the Wolf Trophy Game Management Area (WTGMA) and the SWTGMA, but not to disallow the existence of the PAA (09-CV-00118-ABJ)

Both Montana and Idaho instituted a public wolf hunt for the 2009 to 2010 season. Litigation was once again filed to challenge the legality of removing only portions of a population from ESA listing. In early 2010, the district court judge once again ruled that wolves must be relisted in Montana (as well as Idaho), and that the federal decision to delist them had been politically, not biologically, motivated (75-FR-65574 to 65579). This decision halted the wolf hunting seasons prior to the states' intended closing dates, although 68 wolves were legally taken in Montana before the injunction .

In 2011 a rider was attached to a Congressional legislative budget, removing NRM wolves throughout a large portion of their range from protection for a final time (76-FR-25590 to 25592). The rider was proposed by Montana Senator John Tester under public pressure from state constituents (Johns 2003). Wolves in Idaho and Montana, as well as parts of Oregon, Utah, and Washington, were delisted, once again allowing public wolf hunts in Idaho and Montana beginning in the 2011 to 2012 season. The rider did not allow for any further judicial appeals based on interpretation of Endangered Species Act or 1980 Wolf Recovery Plan language. In 2012, non-profit environmental organizations instead pursued an appeal challenging the constitutionality of delisting a species via legislative means; however it was denied in the Ninth Circuit Court of Appeals (11-CV-35661). Concerns persist among conservation groups regarding the precedent set by passage of the Congressional rider.

Wyoming received delisting in 2012 with a revision of their state wolf management plan (77-FR-55530 to 55604). Idaho and Montana have now concluded their third, full length, consecutive hunting and trapping season (fourth overall), while Wyoming has concluded its

second full season. In June 2013, as a result of the successful re-establishment of wolves in the NRM and Great Lakes region, the USFWS proposed delisting of gray wolves throughout the entirety of their historic range (78-FR-35663 to 35719). The public comment period on this policy ended March 27, 2014. The final ruling decision will not affect the status of wolves within the NRM area.

Montana State Gray Wolf Management Plan

Under federal protection, NRM wolves could only be legally and intentionally killed if a) there was an immediate threat to human life, b) after a permit was obtained through demonstration of livestock depredations, c) by Wildlife Services in response to depredations, or d) when predation on ungulate herds was deemed to be unsustainable (USFWS 1994). Wolf growth and movement was unrestricted, except in areas of continual conflict with livestock or depleted ungulate populations (Jimenez 2012). Under federal protection, there was roughly a 20 to 30 percent annual wolf mortality rate. Of those known wolf deaths in the years since reintroduction, 75 to 80 percent were attributed to human-related causes, primarily due to depredations removals (Jimenez 2012b). Wolf populations showed rapid growth under federal protection, reaching biological carrying capacity within the Greater Yellowstone Area (GYA) but not within Montana or Idaho, which has encouraged dispersals away from the GYA (Smith 2012, Mills 2012).

State control has been desired by both managers and the general public in Montana for the greater management flexibility and discretion it allows. This includes implementation of public wolf hunting and trapping seasons. For Montana to retain control of wolf management, there must consistently be at least ten breeding pairs and 100 individuals (USFWS 2009).

Montana is reliant on Wyoming and Idaho doing the same, and movement corridors between them must be maintained to allow for genetic connectivity (USFWS 1994).

Key objectives of the Montana Fish, Wildlife, and Parks (FWP) Gray Wolf Management and Conservation Plan are to control wolf population numbers, to maintain at least fifteen breeding pairs and 150 individuals, to reduce impacts on ungulate populations, and to decrease conflict with livestock owners (FWP 2002). FWP has intended to balance the “needs of wolves and people (FWP 2003).” According to FWP wolf specialist, Elizabeth Bradley (2012), the intention is not to altogether remove wolves from the landscape but to reduce the population density across the state. While the Montana wolf subpopulation may not have reached the biological carrying capacity, FWP believes that it is reaching a social carrying capacity (Bradley 2012).

In 2009, 72 of the Montana wolf quota of 75 animals was met, with the majority (two thirds) of deaths consisting of juveniles and yearlings (See Table 1 below for Montana wolf demographics since the population reached de-listing numbers in 2002) (FWP 2009). Creel and Rotella (2010) estimated that, together with predator control, the 2009 hunt resulted in a 44 percent mortality rate of Montana wolves and a 37.1 percent mortality rate of the combined Idaho and Montana wolf population.

Table 1: Montana gray wolf demographics documented in Interagency and Montana Fish, Wildlife, and Parks Annual Reports for 2002 to 2013 (MFWP 2003-2014, USFWS 2003-2012)

	Year											
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Mortalities (total)	79	49	46	60	65	102	185	255	179	216	324	335
Depredation	26	34	39	35	53	73	140	145	141	64	108	75
Legal hunt	N/A	N/A	N/A	N/A	N/A	N/A	N/A	72	N/A	121	175	231
Illegal	5	6	2	3	4	?	?	16	13	8	12	10
Other human caused	20	6	9	12	9	21	32	12	16	10	19	16
Unknown	1	2	1	5	1	5	9	12	9	5	5	2
Natural	1	3	4	5	2	3	4	2	0	7	5	1
Pups	61	56	57	75	80	163	147	166	140	27 ¹	-	
Dispersal losses	9	4	2	2	5	1	13	15	2	5	8	2
Successful breeding pairs	17	10	15	19	21	39	34	37	35	39	37	28
Total end-of-year individuals	183	182	153	256	316	422	497	524	566	653	625	627

1. Only the western portion included the minimum number of surviving pups in the annual report

Despite the public wolf hunting—through which 121 individuals were removed—and depredation killings—through which 64 individuals were removed—the wolf population grew 15 percent from December 2010 to December 2011 (Hanauska-Brown 2011). One potential flaw in these population trend numbers is that with the wolf hunt extended through February, mortalities occur after the December 31st count that do not get factored into totals for that hunting season (MFWP 2011).

In the 2011 to 2012 season the Montana public wolf hunt restrictions excluded the use of trapping, but included rifle and bow hunting. One wolf tag was allowed per hunter with a statewide quota of 220 wolves and a season ending in January. The state was divided into Wildlife Management Units (WMUs), all of which had individual quotas. The season was extended through February 15th when the quota was not met by the specified season closure date

(December 31st). In the 2011 to 2012 hunting season, 45 mortalities occurred after the end of December (Bradley et al. 2012). These mortalities are included for the following year's count, despite the fact that over the year, transient wolves may fill in any of the gaps left by those mortalities. (Bradley et al. 2013)

By the end of 2012, the wolf population decreased by four percent. Minimum counts showed a population of 653 individuals in 2011 decreasing to 625 in 2012. Breeding pairs decreased from 39 to 37, however the number of packs increased from 130 to 147. From year to year in western Montana the minimum population count decreased from 147 individuals to 93. At the conclusion of the Montana 2013 to 2014 seasons the harvest totaled 230. 144 wolves were removed through hunting and 86 through trapping; an additional 70 were removed by wolf management officials and private landowners in response to livestock depredations.

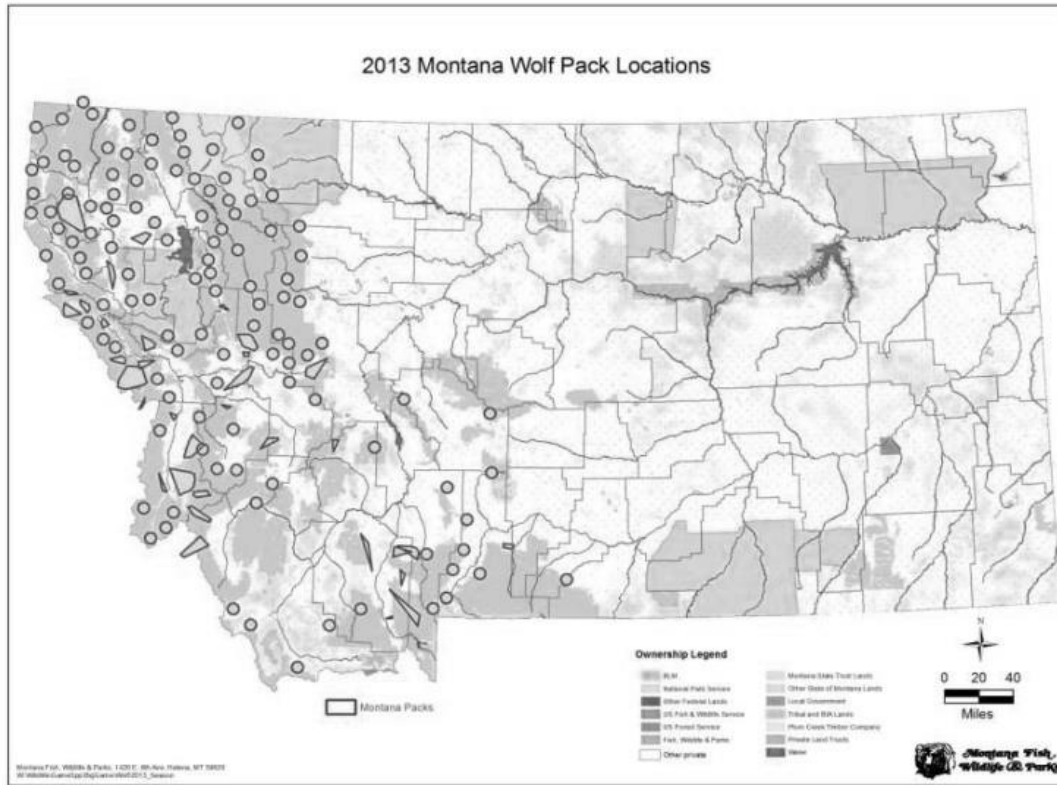
Some changes were made to the regulations for the 2012 to 2013 hunting season. Allotments were increased from one wolf per person per season to three wolves. Only one of the three could be obtained through rifle hunting. Trapping was included, allowing use of foothold traps but not wire snares. Montana required a free wolf trapping course before purchasing a wolf tag with the intent to trap. There was no statewide quota, and only two WMUs had individual quotas (Bradley 2012). Since then the season has been set to close on February 28th. The extension of the hunting season will now overlap the start of the wolf breeding season, which can last from late January or early February through March (FWP 2012 & 2013b).

By the end of 2013, minimum wolf populations were at 627 individuals and 28 breeding pairs (See Figure 2 for currently known wolf pack locations). A total of 335 mortalities included 75 depredation removals, 231 legally harvested, 10 illegal removals, 10 deaths from other human-related causes, one natural death, and two deaths from unknown causes (FWP 2013).

In the 2013 to 2014 season, several additional changes were implemented. The number of permits allowed per hunter or trapper was further increased from three to five. All five removals are unrestricted in type (bow hunting, rifle hunting, and foothold traps). Electronic calling machines are allowed as a lure, although baiting continues to be prohibited. The general rifle season has been extended to March 15th. Wire snares continue to be prohibited and proof of a state wolf trapping course is still mandatory. Traps must be checked every 48 hours. The penalty for illegal take of a gray wolf is set by FWP at a \$1,000 fine. Hunting and trapping regulations are adjusted yearly based on environmental conditions and fluctuations in population numbers.

Montana regulations allow landowners to remove a wolf or wolves caught in the act of harassing or attacking livestock. Permits can be issued to remove wolves suspected of causing but not actually caught in the act of committing depredations. FWP attempts to act swiftly to discourage or remove depredating individuals before others in the pack learn the behavior (Bradley 2012). In the event that the behavior is spread throughout a pack, all individuals in the pack may be removed (Bradley 2012).

Figure 2: Fish, Wildlife, and Parks map of currently known Montana gray wolf pack distributions (FWP 2014)



Relevant Literature

Ultimately, it is public beliefs and perceptions of the species in Montana, rather than biological facts, which will determine survival of this subpopulation (Fritts et al. 2003). As the NRM wolf population approached qualification for ESA delisting, the Northern Rockies Wolf Recovery Coordinator for USFWS speculated that wolf management has nothing to do with wolves (FWP 2003). He went on to say experience living with wolves will in time moderate attitudes towards the species among regional residents (FWP 2003). The preponderance of the scientific research supports the idea that the NRM wolf population will remain biologically viable (legally recovered) over the long term with current state management regulations. A surprisingly low level of dispersal between the subpopulations is theoretically required to maintain genetic connectivity (Mills 1996, Smith 2012, Vonholdt 2010). Rapid reproduction and

the ability to disperse over long distances from source populations like YNP and the Canadian Rockies provide some measure of resiliency (Mills 2012). The impact of wolf harvest on the population will depend on timing of hunting and trapping seasons, weather, level of other human-caused mortality, and density dependent disease (Adams 2008, Bradley 2012, Brainerd et al. 2008, Fuller et al. 2003, Gude et al. 2011, Hebblewhite 2012, Haber 1996, Mech & Boitani 2003, Mills 2012, The National Research Council 1997, Peterson et al. 2003, Rachael 2012).

Wolf Reintroduction Promises: Predicted Impacts and Concerns

The Wolf Recovery Plan, as amended in 1987, paved the way for gray wolf reintroductions in the NRM area. Following NEPA guidelines, USFWS created an Environmental Impact Statement and allowed for public comment in a variety of forms. The Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) were released in 1994. The Recovery Plan and NEPA documents not only made the NRM gray wolf reintroductions legally possible, they set public expectations for the wolf re-establishment process. The public perception of these documents as promissory commitments continues despite the fact that they are intended for guidance, analysis, and identification of pre-existing legal regulations but are not themselves legally binding, regulatory documents (U.S. Government Accountability Office 2005). Under the guidelines dictated by USFWS in the 1994 FEIS, the wolf population is considered recovered while at least 300 individuals and 30 breeding pairs (known as the 30-300 rule) are established and successfully reproducing, with 10 breeding pairs and 100 individuals in each of the three states, and significant genetic connectivity between them to ensure long term population viability. However, in this study's interviews 'recovery' is at times used synonymously with the term 're-establishment' which is considered in literature as a physical process of recolonizing historic territory rather than a specific policy.

The social ramifications of perceived lack of adherence to recovery guidelines, and perceived failures to fully incorporate socioeconomic concerns of rural Montana residents were topics frequently mentioned in interviews for this study and will be further discussed in the “Findings” section below. In general, lack of procedural adherence and scientific rigor in drafting of recovery and management plans and EISs, as well as agency failures to subsequently comply with these documents, can in many cases lead to litigation from non-governmental organizations, the public, state or federal governing bodies, or other managing agencies.

The Wolf Recovery Plan, as described in the document’s preface, is “intended to provide direction and coordination” of efforts to re-establish at least two western gray wolf populations in the NRM (USFWS 1987 p. iv). The FEIS is more detailed and provides for the specifics of intentional reintroductions in the region. Sections of the Recovery Plan focus on the importance of public acceptance of gray wolf re-establishment. In many sections, there is a call for intensive public education and outreach efforts regarding the particulars of wolf ecology and management and the ESA and NEPA process in general (USFWS 1987). Establishing cooperative relationships with private landowners in prime wolf habitat is deemed a high priority, as opposed to condemnation of their concerns and practices (USFWS 1987). Agencies are charged with the critical responsibility of minimizing and mitigating for any potential conflicts with human interests. The document acknowledges that reestablishment of wolves in the NRM “cannot succeed without public acceptance (USFWS 1987 p.26).” Throughout the entire document, the crucial nature of managing public perceptions and minimizing misconceptions of agency actions and policies is anticipated, such as in the following statement:

Success of recovery efforts hinges, to a large degree, on the support and acceptance of plan objectives by the public. A strong information and education effort is necessary if public support is to be obtained (USFWS 1987 p.42).

and:

Affecting a viable wolf recovery program also depends on the cooperation of and coordination with local ranchers, sportsmen, trappers, as well as the livestock industry (USFWS 1987 p.43).

It goes on to emphasize that a strong need for establishing public and agency acceptance of wolf control measures following de-listing. For example, the un-amended 1980 edition of the Wolf Recovery Plan states:

The failure of the federal government and society to recognize this course of action as essential to survival of wolves in the Northern Rockies will only serve to head it toward extinction (USFWS 1980 p.15)...

The 1987 version of the plan further recommends that state wildlife agencies classify wolves as a furbearer or game species and implement public hunting and trapping following ESA delisting, while closely regulating “seasons, methods, and limits (USFWS 1987 p.41 to 42).” The plan specifically states that any wolf preying on livestock will be removed (USFWS 1987).

In the 1994 FEIS, predicted impacts of wolf reintroduction are examined only to the point of estimated delisting of the DPS in 2002 (USFWS 1994). The document provides five alternatives for addressing wolf recovery in the NRM region including: 1) the preferred alternative of reintroduction of experimental populations; 2) natural recovery—wolves remain protected under the ESA and no intentional reintroductions occur—; 3) no wolf—shoot-on-sight removals legalized, preventing re-establishment of wolves in the U.S. portion of the NRM outside of Glacier National Park—; 4) wolf management committee—wolves reintroduced as an experimental nonessential population in Yellowstone National Park (YNP) but limited to natural recovery in Idaho and Montana—; and 5) reintroduction of non-experimental wolves—wolves reintroduced to YNP and Central Idaho, but not designated as a nonessential experimental population (USFWS 1994). Reintroduction of an experimental population is listed in the FEIS

as the preferred alternative and was chosen for implementation. The designation is allowed under section 10(j) of the ESA and provides for the discretion of the USFWS to reintroduce a threatened or endangered species outside of its current range but within its historic range. As previously mentioned, this designation requires slightly less stringent management regulations in order to facilitate greater social acceptance of wolf reintroduction and recovery (USFWS June 8, 2014).

FEIS impacts are delineated based on recovery areas rather than state boundaries. The three valleys examined in this thesis vary in specific initial recovery area location. Within Montana, recovery areas have been bounded by both Highway 15 and Highway 90. The Bitterroot Valley is considered to lie within the Central Idaho Recovery Area (CID), while the Blackfoot and Ninemile Valleys have been included in the Northwestern Montana Recovery Area and were not considered part of the experimental nonessential population range. Despite this delineation, the Ninemile Valley appears to be included as part of the CID primary FEIS analysis area. Impacts in the FEIS are specific just to the nonessential experimental population. Under the preferred alternative, environmental and socioeconomic impacts are based upon legally recovered subpopulations of 100 individual wolves and 10 breeding pairs in each state and not the more than 700 wolves that currently reside in Montana.

Environmental Impacts

The 1994 FEIS examines impacts to ungulate and other prey species populations as well as potential wolf population growth. Wolves were expected to naturally recover in the NRM region without human intervention; however, it was estimated that such a process would be slow and sporadic. The preferred alternative was intended to provide more control over the wolf population growth rate and uniformity of recovery across the tri-state area (USFWS 1994). This

uniformity of wolf re-establishment rates was hoped to minimize human-wolf conflict between individual states (USFWS 1994).

According to the FEIS language, rangelands were severely impacted in the latter half of the twentieth century due to grazing from overly large populations of deer and elk. This phenomenon, once noted by Aldo Leopold in New Mexico, has been a motivating factor for wolf restoration (Leopold 1949). Wolf reintroductions were expected to create a moderating effect on ungulate population numbers and prevent extreme swings in population rates, essentially limiting ungulate population boom-bust growth cycles (USFWS 1994). The reintroduction of an experimental population of wolves was expected to cause a manageable reduction in elk herds by 5 to 10 percent in the CID (USFWS 1994). No other significant big game species reductions were expected in this recovery area (USFWS 1994). If effects on big game were found to be significant, nonessential experimental status would allow for nonlethal removal of wolves (USFWS 1994). Removals would only be considered if big game reductions would threaten wolf recovery or substantially reduce their prey base (this concept is not expanded upon in the 1994 FEIS). The extent to which ungulate herds would be affected was based primarily on modeling studies, such as Boyce and Gaillard (1992), Bartholow (1985), and Mack and Singer (1992).

Over the years following the 1995-96 reintroductions, nonlethal removals, in the form of physical relocation, in Montana were frequent until NRM gray wolves met legal recovery targets for delisting in 2003. However, the removals have been determined necessary in response to livestock depredations rather than predation on ungulates. Following 2003, no relocations for any reason have occurred (FWP 2003-2014).

Socioeconomic Impacts

Socioeconomic impacts mentioned in the 1994 FEIS were closely tied to environmental impacts. Negative socioeconomic impacts were expected for ranching and big game hunting communities. Harvest rates were predicted to decline in reaction to the decrease in ungulate population numbers. Hunting regulations are adjusted annually, and as populations decrease or increase the number of permits issued changes in kind. In the CID, there was expected to be a reduction in hunter harvest of female elk by 10 to 15 percent with a negligible impact to deer, bighorn sheep, mountain goat, and moose harvest. In total there was predicted to be a \$757,000 to \$1,130,000 loss in hunter benefits and \$572,000 to \$857,000 loss in hunter expenditures throughout this recovery area. Losses independent to the state of Montana are not delineated in detail.

CID livestock depredations were expected to be as many as 17 cattle and 92 sheep annually, totaling approximately \$2,923 to \$18,503. The FEIS concludes that wolf depredations would not be a major cause of livestock losses as compared to other causes, such as weather, health, birthing, poisoning, or theft. Private compensation funds, mainly provided by the conservation group Defenders of Wildlife, were expected to alleviate pressure on livestock producers and increase acceptance of wolves within the ranching community.

Some positive socioeconomic impacts were anticipated in the 1994 FEIS. Visitor use to Central Idaho was predicted (based on a 1993 regional and national survey conducted by a University of Montana researcher) to increase following wolf reintroduction. Visitor use was predicted to show an increase of approximately eight percent by nonresidents and two percent by residents, though a dollar value could not be estimated. The overall value of wolves in the CID was expected to be \$8.5 million annually. This value included existence value as well as dollars generated by increased tourism. Later valuations of wolves in the CID, as included in the Idaho

and Montana state wolf management plans, find that boosts associated with visitor use for the most part did not materialize as they have in the GYA. (USFWS1994)

When it comes to setting public expectations in the 1994 EIS and 1987 Recovery Plan, there are some basic tenants for delisting and maintaining long-term state management. As mentioned, there must be at least 100 individuals and 10 breeding pairs each in Wyoming, Montana, and Idaho for at least three years to delist and no eminent threat of the subpopulations falling below that level to prevent relisting (USFWS 1987). Genetic connectivity must exist between the subpopulations. Delisting from the federal protection has carried the promise of provision for classifying gray wolves as a game and/or predatory species, hunt- and trappable by the public (USFWS 1987). Other than proof of genetic connectivity, all of the above conditions were met by 2003, but delisting, and with it wolf trapping and hunting, did not occur until many years later.

Approaches to Wildlife Attitude Studies

Measurement of public attitudes regarding desired wildlife levels has predominantly followed three separate but related approaches, Wildlife Acceptance Capacity (WAC), normative beliefs, and social psychology (Bruskotter 2013). Recent research has used a broad, hybridized version of WAC and normative beliefs, and has recently incorporated examination of psychological factors (Bruskotter et al. 2009, Riley & Decker 2000). For the purpose of this study, a hybridized model of the three approaches is the most useful, as WAC (the intended approach) on its own could not provide for a fully nuanced examination of the data.

WAC, defined by Decker and Purdy (1988) and derived from cultural and biological carrying capacity concepts, refers to a maximum level of wildlife that can exist in an area as limited by human tolerance (Bruskotter et al. 2009, Carpenter et al. 2000). WAC is considered

subjective to communities' and individuals' perceptions (Zinn et al. 2000, Carpenter et al. 2000). It is influenced by characteristics of a wildlife species, past experiences, situational specifics, and psychological variables like values, beliefs, and attitudes (Zinn et al. 2000). WAC changes over time as human perceptions and values change, and may be swayed by managing agencies' outreach efforts (Zinn et al. 2000). Zinn et al. (2000), Carpenter et al. (2000), and Schusler et al. (2000) suggest that utilization of WAC is most useful at the community level and with weighted consideration of the different stakeholders within those communities.

FWP uses a similar WAC concept in gauging attitudes towards wildlife and wildlife management, though the agency refers to it as 'social tolerance' (FWP 2013). State agency designed mail-back surveys, sent out to the general Montanan public as well as to specific stakeholder groups, have attempted to use responses measured along a Likert Scale to gauge WAC for wolves and other wildlife species in the NRM and approval for agency actions and policies, however such studies are lacking in deep explanations of attitudes (Lewis et al. 2012, IDFG 2008). The Likert Scale has also been used in quantitative wildlife attitude studies conducted by independent researchers.

Normative beliefs are considered to be culturally shared attitudes regarding the acceptability of certain behaviors. The normative belief approach is applied to wildlife in regard to wildlife management actions, policies, and outcomes (Bruskotter et al. 2009, Zinn et al. 2000, Zinn et al. 2008, and Decker et al. 2006).

This third method of evaluating public attitudes towards wildlife has been derived from theories in social psychology. It focuses on risk perception and hazard acceptance. Most economic theory would suggest that risk assessment—such as cost-benefit analysis—is approached consciously and rationally; however hazard acceptance theory suggests that risks and

benefits associated with a hazard are instead a measure of subconscious social trust for managing agencies (Bruskotter 2009, Siegrist 2000, Siegrist et al. 2000, Slovic 1999).

In examining psychological factors, Griffin et al. (1999) and Bruskotter (2009) assert that trust in the managing agencies increases both acceptance of information provided by agencies and willingness to follow agency recommendations. Bruskotter states that, when it comes to carnivore management, risk control is as equally influential as perception of risk and potential benefits. There are 3 factors that influence risk control perception: self-efficacy, response-efficacy, and internal locus of control (Bruskotter & Wilson 2013, Floyd et al. 2000). Self-efficacy is defined as an individual's belief that they have an ability to participate in certain actions (Bruskotter & Wilson 2013). Response efficacy is considered to be an individual's perception that their own actions can determine personally desired outcomes (Bruskotter & Wilson 2013). Internal locus of control is belief that people's actions may result in positive outcomes and an avoidance of negative outcomes (Bruskotter & Wilson 2013). Siegrist and Cvetkovich (2000) find that perceived control over hazards from wildlife can moderate the influence that trust placed in agencies will have on acceptance.

Affect, another social psychological factor, has been examined for its influence on wildlife acceptance. Affect, as defined by Damasio (1996), is a "psychosomatic response to a stimulus based on past direct and indirect experiences with the stimulus." Like trust for the agencies, affect may often operate subconsciously to influence beliefs and behaviors both directly and indirectly (Bruskotter 2013, (Bechara et al. 1997, and Zajonc 2000). In examining attitudes towards wolves Slagle et al. (2002) find that a positive affect towards the species increases perceived benefits and support for wolf recovery, while Johansson and Karlsson (2011)

found that fear of wolves and other predators based on negative affects increases perception of risk and lack of control.

Returning to normative theory, Manfredi et al. (2003) posit that value orientations are foundational to formation of attitudes, norms, and behaviors. In a 1988 phone survey study in Norway Bjerke et al. outline a scale of potential values and attitudes specific to wolves. Six categories along the scale include dominionistic, ecologicistic, moralistic, naturalistic, negativistic, and utilitarian. Bjerke et al. define dominionistic a desire to control wolves; ecologicistic as concern for the interactions with wolves and their environment; moralistic as a strong opposition to perceived harm or cruelty to wolves; naturalistic as having a primary concern for “recreational contact” with wolves or wolf habitat; negativistic values and attitudes as indifference, dislike, or fear of wolves; and utilitarian values and attitudes—common to rural areas of the NRM (Hunter & Brehm 2004)—as prioritizing “material benefits” for human communities over conservation of wolves and their habitat. Similar categories were first explored in relation to wildlife in the U.S. by Kellert (1976, 1980, 1982, and 1985). These studies delineate additional value orientation categories, such as humanistic—a deep emotional attachment to wildlife (Vale 2005). In a more liberal definition of naturalistic attitudes, Kellert considers it to simply reflect affection for the outdoors (Vale 2005). This scale has formed the basis for a multitude of wildlife attitude and value studies. These studies seek to draw out correlations between attitudes and values and demographic information. Demographics commonly examined include age, ethnicity, gender, location (urban and nonurban), and education.

Trends from Kellert’s work, as discussed in Vale (2005), show advanced age, rural upbringing, and male gender to be associated with utilitarian and negativistic values (as well as with naturalistic values in males), and youth and female gender to be associated with humanistic

and moralistic values. Also evident are connections between urban upbringing in areas with human populations of 10,000 to 50,000 individuals with naturalistic values, higher education with naturalistic and ecogistic values, and a lack of higher education with utilitarian values. Additional ties are found between ecogistic and dominionistic values in hunters and naturalistic values in professional trappers. (Vale 2005)

This scale has also proven to be a useful tool for tracing the development of historic to modern views. Demographic trends show increases over time in urbanization, affluence, education, and geographical mobility (Manfredo et al. 2011). Manfredo et al (2009) suggest that individuals' values are generally formed during childhood and change little in adulthood. They assert that major shifts in value in fact occur over generations due to changes in "prevailing conditions and needs of society." In modern post-industrial societies, like those found throughout much of North America, there has been a cultural shift away from "traditional" values centered around religion to "secular" values based in rationality (Inglehart & Welzel 2005). As economic well-being increases, there is a corresponding decrease in resource-based subsistence needs. Values have shifted as a reflection of this evolving insulation from nature (Inglehart & Welzel 2005, Manfredo et al. 2011). In an examination of attitudes towards wolves in U.S. and Canadian news print media between 1999 and 2008, Houston et al. (2010) find that expressions of negative opinions have increased over time. They also indicate that negative expressions have been highest in states and provinces with emerging wolf populations or in those located inside of federal wolf recovery zones.

Conflict over wolf re-establishment may arise from value clashes between rural Montanans and the general U.S. population. Organ and Fritz (2000) suggest that in general, hunting is competing with an increasing number of stakeholder and interest groups for a voice in

wildlife management. Treves (2009) states that policy-makers must seek a balance between utilitarian values present in user groups like big game hunters and the preservation values found in the general public. In Montana, trappers and big game hunters have maintained a strong influence on wildlife management. The FWP budget is primarily and directly supported by these stakeholders; however, FWP has acknowledged a need for balance of the hunting, trapping, and ranching interests with non-use interests (FWP 2011). On their website, FWP describes “good wildlife management” as incorporating both ecological and sociological concepts (FWP 2014). Sociological concepts include recognition of human impacts on wildlife, managing for culturally acceptable wildlife population levels, and a priority of wise-use over preservation. Public hunting and trapping seasons are listed as important regulatory management tools, while evaluation and dissemination of social and economic considerations are listed as research priorities.

Unlike much of the general population in the U.S., rural communities in Western Montana may not be to a large extent insulated from nature in income generation and maintenance of cultural way of life. It is possible that public wolf hunting and trapping may alleviate some of this tension and increase tolerance by generating financial incentives in areas where locals live alongside and in conflict with wolf populations (Loveridge et al. 2006). Increased removal of problem animals may also help to increase tolerance at the local level; however it is debatable that if public hunting and trapping can be so well-targeted (Loveridge et al. 2006, Taylor 1994). Data from FWP annual reports (1999-2013) to USFWS (a requirement prior to ESA delisting and for the first five years after it) show some decrease in the number of problem wolves lethally removed by Wildlife Services since the advent of public hunting and trapping. It is unclear from the reports whether instances of livestock depredation have

decreased or if public hunting and trapping have provided an alternative and compensatory system of removal.

Bruskotter and Fulton (2012) suggest that difficulty in discussion of wildlife acceptance in the scientific literature has arisen from some definitional ambiguity. They suggest a separation of the term ‘stewardship’ from ‘acceptance’ and ‘tolerance,’ with stewardship implying action and acceptance and tolerance implying passivity. They suggest that intolerance also requires active behaviors, and that lack of tolerance or acceptance should be considered as the polar opposite of stewardship. Dixon (1995) defines stewardship specifically as a “moral obligation to care for the environment and the actions undertaken to provide that care (Powers 2009).” A call for improved accuracy in this terminology was levied years earlier by Gigliotti et al. (2000) in a special issue of *Human Dimensions of Wildlife* devoted to the concept of wildlife acceptance. Authors equating the terms “acceptance” and “tolerance” in the scientific literature may continue to perpetuate ambiguity. Considering the relative youth of this field of research, further definition of the terms in a more consistent manner may be yet to come.

Research on Public Acceptance of Predators

Research to date on public acceptance of large carnivores has typically followed a questionnaire format (Williams et al. 2002, Naughton-Treves et al. 2003). These have taken the form of mail-in, phone, and in-person surveying methods. The literature on attitudes towards large carnivores is lacking in qualitative material. There is a gap in research to back up the assumption, made in management documents, that public hunting and trapping of carnivore species impacts tolerance and acceptance for them (USFWS 1994, USFWS 1987). In Utah, Alaska, and Sweden researchers examining the acceptability of lethal control of wolves, find that while nonlethal actions are generally preferred, lethal actions (including public hunting and

removals by government managers) are accepted where human resources are considered to be impacted or at risk (Ericsson et al. 2004, Bruskotter et al. 2009, and Decker et al. 2006). Other studies specific to wolves examine differences in acceptance levels between different stakeholder and interest groups. These studies find that attitudes can vastly differ based on such things as age, rural or urban location, whether or not participants are involved in ungulate hunting, knowledge of the species, and occupation (Andersone & Ozolinš 2004, Heberlein & Ericsson 2005, Jons 2013, Karlsson & Sjöström 2007, Riley 2000, Bjerke et al. 1998).

Williams et al. (2002) review 38 quantitative surveys conducted on attitudes towards wolves between 1972 and 2000. The authors report that overall 35 percent of ranchers and farmers interviewed held positive attitudes toward wolves, slightly more than half the amount of respondents that held positive attitudes in the general public (61 percent). Nearly 70 percent of environmental and wildlife conservation group respondents surveyed held positive attitudes. Attitudes held in the U.S. were more positive than attitudes held in Europe. Williams et al. find that across all surveys reviewed, negative correlations are present between attitudes towards wolves and the factors of age, general rural residence, ranching, and farming. Positive correlations are shown with education and income.

In a study of perceptions of large carnivores in Latvia, Andersone and Ozolinš (2004) distribute questionnaires to the general public through primary schools and to hunters through a popular hunting magazine. Sources of information on carnivores vary between the groups. Within the school sample, age, education level, and gender of respondent (determined by family birth order) impact the support for brown bear protection, fear of encounters, and perception of the overall population numbers. In the hunting sample, a smaller proportion of respondents support protection, and a higher proportion support control efforts and expressed fear of

encounters. In regards to wolves and lynx, Andersone and Ozolinš find that an increase in age in the school sample was correlated with an increase in negative attitudes towards the species and decreased desirability of protections. More urban residents than rural residents desired protection for wolves and lynx and more females than males expressed fear of them. A smaller proportion of respondents from the hunting sample perceived lynx and wolf populations to be too low and fewer favored protections, possibly due to competition with hunters for roe deer.

Decker et al. (2006) examine perceptions of wolves and bears in Alaska. The authors conclude that acceptance of lethal control of the species increases with the perceived impact to moose and caribou populations. They conclude that tolerance of both species and of management actions should be considered context and impact density dependent.

With the re-establishment of wolves in Scandinavia, Ericsson et al. (2004) and Heberlein and Ericsson (2005) utilize nationwide surveys to examine perceptions of lethal removals of the species and differences between rural and urban respondents. Ericsson et al. (2005) separate respondents based on participation in hunting activities and residence in or outside of current wolf range. A majority from each of the four separate groups support lethal removals when livestock depredations and incidents of wolves entering populated areas occur, but do not support removals based on fear alone or impacts to game. Heberlein and Ericsson (2005) strangely find that multigenerational urban residents expressed the most negative attitudes towards both hunting and wolves than residents with any kind of exposure to rural ways of life due to lack of interest in the topic.

Karlsson, and Sjöström (2007) also examine attitudes towards wolves in Sweden obtained through a survey questionnaire, modeling them in relation to distance from current wolf territory. They find that as distance from current wolf territory increases, perception of the

importance of this issue decreases. In slight contrast to Herberlein and Ericsson, they find that attitudes decrease in negativity the further residents live from wolf territory. Karlsson, and Sjöström assert that indirect experiences with wolves, communicated through media, friends, and relations are critical in determining an individual's attitude toward them.

One example of a quantitative study that specifically sought to determine changes in attitudes towards wolves was conducted by Majic and Bath (2010). This study uses in person surveys conducted in three regions of Croatia in 1999 and 2003 to determine any changes in attitudes. In two regions the authors find that attitudes were more neutral in 2003 than in 1999, with simultaneous decreases in support for wolf conservation as well as wolf control measures. They state that changes seen between the two years are due to actual changes in opinion rather than changes in sample population demographics. The authors posit that attitudes towards wolves were related to age, with increasing age correlated with increase in support for wolf control and decrease in support for wolf conservation. Overall changes in the two regions may be due to a decrease in political salience and polarity of the issue. Government created efforts sought to mitigate impacts to livestock producers, while the public lost interest as the emotional heat of initial legal protections for wolves faded. Conflict over wolves in the third region may not have been as great originally due to a lack of livestock production, and it was not a focus for campaigns to change public opinion over the years. Interestingly, change was seen in this study in the most polarized opinions, rather than those considered neutral. Surveys were conducted in interviewee residences in-person. (Majic and Bath 2010)

Williams et al. (2002) describe a cohort affect, similar to that discussed by Majic and Bath (2010), present throughout studies examined in their literature review. While older generations examined currently have negative attitudes towards wolves it is unlikely that

younger generations will develop increasingly negative attitudes. They suggest that if experiences with wolves increase negative sentiments in the general public, that intentional reintroductions of the species—when successful at reaching legal recovery levels—will increase frequency of encounters and therefore cause an overall decrease in positive attitudes. On this last note, researcher and manager opinions on whether or not attitudes towards wolves will change over time appear to directly contrast with each other.

In direct opposition to the Williams et al. (2002) conclusion, Ed Bangs, lead NRM Wolf Recovery Coordinator, asserts in a 2003 interview that increased experiences with wolves will actually reduce extreme views by bringing actual wolf behavior rather than myth and superstition, to the foreground (FWP 2003). Bruskotter et al. (2012) propose that more research is needed to examine underlying motivations of wolf recovery opposition. This call for more academic research is made in response to an editorial by Treves and Martin (2011) questioning whether big game hunters will actively steward wolf populations following the switch to state management.

Work by Bright and Manfredo (1996) and Wilson (1997) suggests that opposition of wolf recovery by hunters has been primarily symbolic and value-dependent and therefore is unlikely to change. The authors do argue that if the main motivation in opposing wolves has instead been, or will be, focused on a need to maintain ungulate populations for human harvest, intolerance of the species may be reduced through allowance of public hunting and trapping seasons. This is contingent on public perceptions that the harvests are effectively reducing wolf population numbers (Bruskotter et al. 2012). Loveridge et al. (2006) suggest that if the intent of hunting and trapping is purely recreational, then killing quarry is not necessary to result in a positive experience. If the goal is the pursuit of prey rather than the actual take it might lessen

the real impact of the public wolf seasons by minimizing the actual number of mortalities. Meanwhile, the funds generated through the public seasons promote conservation of wildlife and wildlife habitat through purchase of permits from state agencies, and boost local economies through purchase of gear and equipment (Loveridge et al. 2006).

Conservation of potentially threatened and endangered species through hunting has been used in Africa and Europe with big game as well as with waterfowl species in the U.S., though the benefits and drawbacks remain controversial and in need of further study (Loveridge et al. 2006, Murphree 2001, Jackson 1996, MacDonald & Johnson 2000, Wilkie & Carpernter 1999).

In a literature review of research into the potential for the hunting community in the U.S. to act as ecosystem stewards, Holsman (2000) states that most studies have thus far been focused on stewardship behaviors in general environmental issues. Holsman goes on to say that there is a need for research focused on stewardship by hunters particular to wildlife conservation. There is also need to examine under which conditions stewardship develops and holds true. Treves (2009) states that when implementing public hunting of predators careful monitoring of attitudes is required both before and after implementation to ascertain politically viable hunting levels.

In a study funded by a collection of federal and state wildlife management agencies and conservation group Defenders of Wildlife, Montag, Patterson, and Sutton (2003), examined the political and social viability of compensation programs for predator depredations of livestock. The study was conducted in Idaho, Montana, and Wyoming. Wildlife biology researchers divided the study into three parts: a mail survey sent out to 1,959 members of the general population with a 43.9 percent response rate, a mail survey sent to 1,200 ranchers with a 51.1 percent response rate, and 79 qualitative rancher interviews. Results from all three portions of the study show that the general public and ranchers at the time of the study both agreed that

society should bear the financial responsibility of depredations when reintroductions occur and federal ESA listing hampers ranchers' ability to directly control problem predators. The study also suggested that allowing lethal take in protection of livestock was at the time considered more favorable than compensation programs due to a belief that depredation payments do not directly reduce occurrences. Concerns over protection of private property rights were frequently expressed in interviews. This study was not specific to wolf management in the NRM and was conducted in 2000 to 2001 prior to wolves meeting delisting criteria laid out in the 1994 wolf reintroduction FEIS and 1987 Gray Wolf Recovery Plan (Montag et al. 2003)

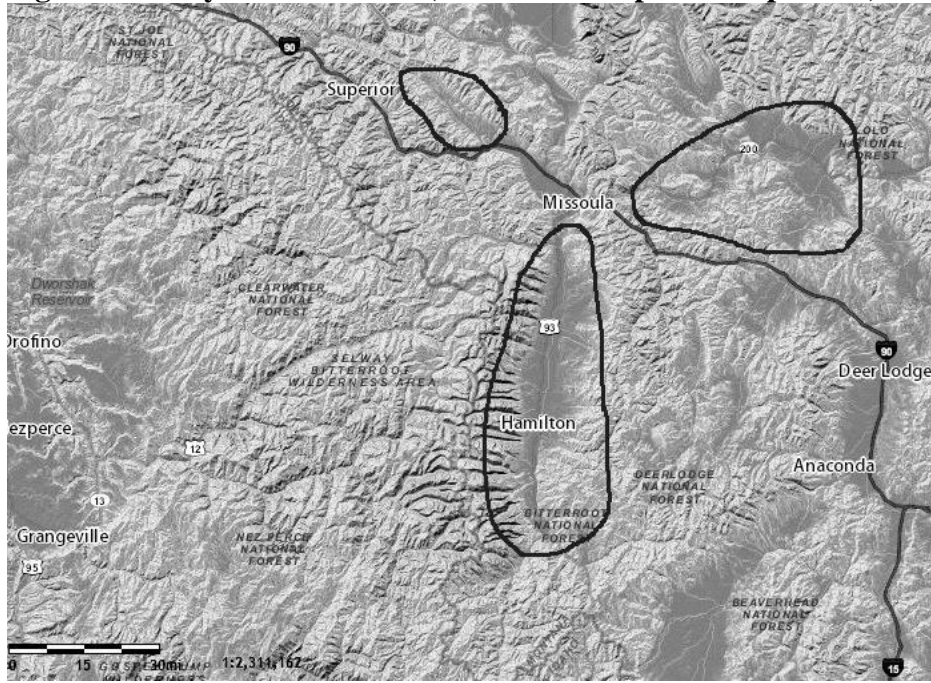
Survey data lends itself well to stratifying responses, especially given the large sample size possible with the questionnaire format. While the quantitative questionnaire format has been beneficial in drawing correlations such as these across a range from 'strong agreement' to 'strong disagreement' position statements along the Likert Scale, they do not provide full, in depth explanations of individual attitudes (Warren & Karner 2009). As this section would seem to suggest, there is still a need for independent qualitative research into the complex relationship between public acceptance of the return of wolves to the rural landscape and public wolf hunting and trapping. The subsequent section outlines the research methods used in this study to qualitatively assess social acceptance of wolves. The sampling frame, interview guide design process, and interview selection criteria are presented in detail.

Methods

Data was gained through qualitative semi-structured, informal interviews (Corbin & Strauss 2008, Warren & Karner 2009) with residents of three separate geographical areas: the Blackfoot, Bitterroot, and the Ninemile Valleys (See Figure 3 for map of study areas). We sought to uncover the impact of public wolf hunts on the attitudes of rural Montanan ranchers,

trappers, and big game hunters regarding wolf recovery using a method formally approved by the University of Montana Institutional Review Board.

Figure 3: Study area locations (Neotreks Geospatial Maps 2014)



Research areas were selected based on a number of factors. These are rural communities within a hundred mile radius of the University of Montana’s main campus in Missoula. Geographic proximity to Missoula provided control for the project budget while providing physical ease of access. I had prior familiarity with the cultural dynamics of each area. These communities have strong past and present ties to natural resource derived livelihoods, particularly ranching and hunting. They fall within current and historic ranges of known wolf packs. The three sites were not intended to be compared and contrasted to each other directly. The selection of them was instead intended to represent a potential range of rancher, hunter, and trapper attitudes towards predator conservation in rural western Montana.

The Blackfoot Valley, located northeast of Missoula, has received national attention and funding through the landowner-based conservation efforts of the collaborative nonprofit group

known as the Blackfoot Challenge. Through the Blackfoot Challenge, agencies such as the USFWS and FWP and conservation groups such as the Nature Conservancy have cooperated with landowners to further conservation of natural resources (i.e. conservation easements and agreements) in a working landscape. Regarding predator-livestock conflict management, some residents in the Blackfoot have worked with the Challenge to build electrified calving enclosures, hire range riders to guard high depredation-risk areas, and develop guidance for nonlethal removal of predators from livestock and backyard areas (Blackfoot Challenge 2014).

Communities in the Bitterroot Valley south of Missoula also have a history of cooperation with governmental agencies, conservation groups like the Five Valley Land Trust, and University of Montana researchers. However, they have traditionally leaned conservative on private property rights and governmental intervention (i.e. voting against land use zoning) (City-Data 2014). Citizens in the Bitterroot have publicly expressed concerns regarding wolf depredation of livestock and over-predation of ungulate herds in the area.

The Ninemile Valley is unique in that it has a large amount of public land (roughly eighty percent). Like the Bitterroot, Ninemile is currently facing large-scale human population growth with the growing concern for establishment of conservative land-use restrictions. The community has ties to a few citizen-based conservation efforts, such as land trust programs, the Ninemile Wildlife Working Group, and Trout Unlimited (Natural Resource Conflict Resolution Program [NRCRP] 2008). Shifts in land use have occurred as large landowners retire and sell off portions of their property (NRCRP 2008). Residents in the Upper Ninemile are decreasingly dependent on livestock production for livelihood (NRCRP 2008). Wolves have been documented by FWP, the University of Montana, and USFWS in the Ninemile since 1990, having naturally dispersed from Canada via Glacier National Park (GNP) and the Bob Marshall

Wilderness (Bass 1992). While evidence of transient wolves had been found in other portions of Montana since extirpation in the 1930s, the Ninemile wolves were one of the first confirmed packs to breed outside of GNP (Bass 1992), with the possible exception of a den site USFWS believed to be active in 1987 on the Blackfeet Reservation (Bass 1992). The Ninemile female first settled and reproduced near the town of Marion in northwestern Montana in 1989 (Bass 1992). The male was shot by a rancher, while the female and her pups were relocated in 1989 to the Great Bear Wilderness due to livestock conflict (Bass 1992). The pups disappeared, but the female dispersed to the Ninemile area and bonded with a male wolf dispersed from Idaho in 1990 (Bass 1992). Of the three study sites, the Ninemile is the closest to Missoula (NRCRP 2008), located just twenty miles from the city, and it may be the most influenced by Missoula's liberal culture.

For each of the three sample sites, I used purposive sampling to identify potential interviewees (Berg 2009 as cited in Goe 2010 and Phillips 2010). Initial interviewees were identified via personal and professional connections to key informants (Warren and Karner 2009). Key informants included members of the Blackfoot Challenge, Montana Fish, Wildlife, and Parks, the U.S. Forest Service, Montana Trappers Association, and Defenders of Wildlife as well as a journalist with ties to the University of Montana and a resident of the Blackfoot Valley. Further interviewees were identified using a snowball method of sampling (Berg 2009, Warren & Karner 2009).

To minimize bias inherent to snowball sampling, multiple informants were selected for each area when identifying potential initial interviewees. Consent was sought (opt-out confidentiality) from these individuals to use their names, in an introductory statement, when contacting other area residents. A total of ten interviews were sought from each area. In seeking

interviewees, I attempted to speak with a cross section of ranchers, trappers, and big game hunters from each area. The potential for a range of perspectives depended on both societal/cultural (i.e. stakeholder and interest groups) and individual/contextual (i.e. individual beliefs and perceptions of risk) factors (Bruskotter et al 2009).

The number of usable interviews collected totaled twenty. Four interviews were with married couples, while the other sixteen were with individuals. An additional three interviews, however, were determined to not meet the predetermined subject qualifications for this study. Two of the three disqualified interviewees held primary residence outside of the study locations. One holds a share to a family ranching operation in the Blackfoot Valley while the other conducts business in the Bitterroot Valley, but both identified Missoula as their current, full-time home. The third disqualified interviewee does currently reside within the study area, however has not and does not participate in big game hunting, trapping, or ranching. Eight interviews were obtained from the Blackfoot Valley and six from both the Bitterroot and Ninemile Valleys.

Timing of this study impacted the number of interviews collected. During the months of July and August ranchers were occupied with harvesting hay and alfalfa for livestock winter feed. Attempts to establish meetings and communication with ranchers at that point were initially rebuffed by some, requesting that I contact them again at a later date post-hay-harvesting. Re-establishing contact at a later date was possible for all but one of these individuals.

Entrée to interviewees' homes was sought, creating a space to conduct the interviews that maximized assurance of anonymity and confidentiality, helping to build a more private and comfortable rapport than could be found through interviews in public spaces such as bars or cafes (Warren & Karner 2009). Additionally, interviewing subjects in the space of their own

homes increased convenience on their behalf. Not all interviewees chose to be interviewed in their homes, with one conducted in a coffee shop, two in parking lots, one in a nursing home, and one in an empty fire hall.

Interviews followed a general interview guide, with six open-ended questions, developed prior to any field work (see Appendix A). Interview guide questions established individual's backgrounds, experiences with wolves, and knowledge of other community members' experiences with wolves. The interview guide was designed in this way to create a soft lead-in to asking the controversial question of whether or not interviewees have actively participated in wolf hunting or trapping or intend to do so in the future. These behaviors are one reliable measure of tolerance or intolerance (Bruskotter & Fulton 2012). Acts of tolerance and intolerance are considered more extreme than passive attitudes of tolerance and intolerance (Bruskotter et al. 2009 and Bruskotter & Fulton 2012). For example, a person who pursues hunting of wolves is considered to be less tolerant than a person who simply speaks of a desire to hunt wolves in order to reduce or eliminate the population numbers. The act of killing a wolf is not necessarily indicative of intolerance on its own and must be linked to an underlying motivation. Follow-up probes were used to explore responses and encourage elaboration of the most relevant information. Interviewees were asked to clarify their attitudes towards the presence of wolves if it was not stated by the end of the interview. This question was not initially present on the interview guide; however while transcribing the first set of interviews it became apparent that directly asking it might be necessary when dealing with more reserved participants. In order to further clarify attitudes, interviewees were asked to identify any events or experiences which could influence their opinions in the future.

Following the interviews, participants were asked to fill out an index card with basic demographic data (See Table 2 below). Questions listed on the card included age, gender, city and state of birth, and the number of years lived in Montana. This information was gathered post-interview because it was not critical for analysis. Including these demographics in the main interview could have lowered the quality of key responses by setting a tone of brief, yes or no responses. The literature review indicated that past studies conducted on public acceptance of carnivores have examined the associations of attitudes with demographic data, such as age, education, occupation, gender, and location. Responses from the index cards lend additional insight on interviewee attitudes towards wolves.

Sixteen interviewees were male, and seven were female. Nearly all participants' livelihoods were closely tied to natural resources (particularly wildlife). Three interviewees identified themselves as trappers and thirteen as hunters. Eleven listed their last occupation as a rancher while nine stated that their last occupation was other than ranching. Two were professional trappers and one was a taxidermist. Three were last employed in government positions, one in construction, one as a consultant, and one as a teacher. Regarding the age of interviewees, three were in their thirties, nine in their fifties, four in their sixties, one in their seventies, and five in their eighties. Length of residence in Montana varied widely. Only one interviewee stated that they have lived in Montana for less than ten years. Three have resided in Montana for between twenty-one to thirty years, four for between 31 and 40 years, one for between 41 and 50 years, five for between 51 and 60 years, two for between 61 and 70 years, and two for between 81 and 90 years.

Table 2: Interviewee demographic data

Interview	Last Occupation	Age	Gender	Length of Residence in MT (years)	Trapper	Hunter
1	Taxidermist	---	M	21-30	Y	Y
2	Trapper	61-70	M	61-70	Y	N
3	Rancher	51-60	M	51-60	N	Y
4	Rancher	51-60	M	31-40	N	Y
5	Rancher	51-60	M	51-60	N	N
7	Rancher	31-40	M	31-40	N	Y
8a	Rancher	81-90	M	81-90	N	N
8b	Education, Rancher	81-60	F	61-70	N	N
10	Rancher	51-60	F	41-50	N	N
11	Rancher	61-70	F	31-40	N	N
12	Rancher	81-90	F	51-60	N	N
13a	Government	61-70	F	11-20	N	Y
13b	Government	61-70	M	11-20	N	Y
14	Rancher	51-60	M	11-20	N	Y
15	Rancher	71-80	F	21-30	N	N
17	Government	51-60	M	31-40	N	Y
18	Rancher	51-60	M	51-60	N	N
19	Rancher	51-60	M	51--60	N	Y
20a	Rancher	81-90	M	81-90	N	Y
20b	Teacher	81-90	F	---	N	N
21	Environmental Consultant	31-40	M	31-40	N	Y
22	Construction	51-60	M	21-30	N	Y
23	Trapper, Writer, Photographer	31-40	M	0-10	Y	Y

(Interviews 6, 9, and 16 not included as they were deemed unusable within the study parameters)

Interviews were designed to be twenty to thirty minutes in duration. In actuality, interviews lasted from 16 minutes to an hour and a half. Duration of interviews was dependent on participants' schedules and willingness to discuss the topic. No interviewees declined to answer questions laid out in the interview guide.

All participants gave written consent to digitally record the interviews. Interviewees were made aware of their right to halt the recording at any point in the interview as well as the anonymity of recording files. This served to alleviate any concerns or suspicions interviewees

had about the presence of the recorder. The gradual progression of the interview questions further served to alleviate any initial hesitancy and create a positive rapport. Recorded data were submitted to a transcription service, based out of Colorado, to be transcribed verbatim.

All data collected and transcribed were edited to obscure any identifying marks or names of interviewees, with names replaced with the date interviews were recorded and the numerical order in which they occurred. The interview key and a copy of original, unedited data were kept separately from edited data. Both were stored in locked file cabinets in separate locations. Written informed consent to conduct the interviews and use the digital recorder was sought from all participants prior to interviews (Warren and Karner 2009). Consent could be rescinded by participants at any point during the study.

Transcribed and edited data was coded using NVivo software. Major themes and categories were extracted for examination and discussion. Roughly a dozen themes were identified, with various sub-themes examined under each. (Warren & Karner 2009, Corbin & Strauss 2008)

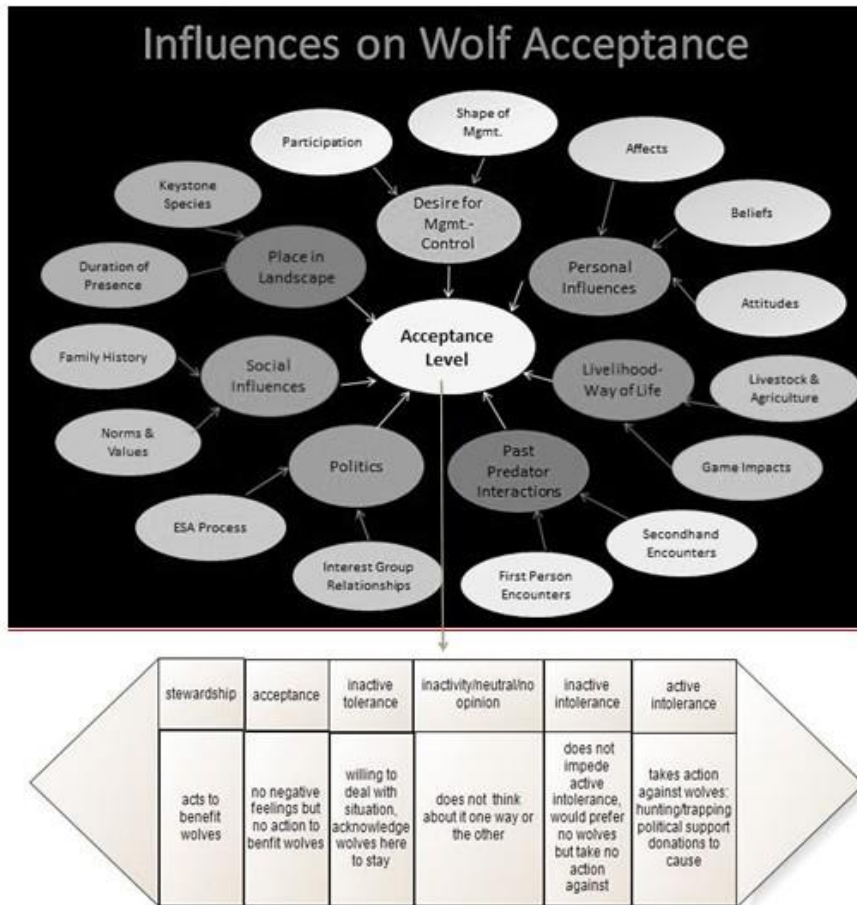
Findings

Utilizing NVivo, eight main themes (nodes) were identified in the interview data. These include: 1) the consequences of political maneuvering (frustration, perceived inequity, and mistrust); 2) the need for management and control of the wolf population; 3) wolf-related impacts to interviewees' livelihood and way of life; 4) personal beliefs, affects, and attitudes; 5) previous interactions with predators; 6) cultural influences; 7) the place and impact of wolves in the ecosystem; and 8) noted changes in opinion. Most themes were further divided into subthemes, and the connections between all themes and subthemes were examined from there.

Themes were identified based on frequency of occurrence in interview data and how essential they seemed in shaping attitudes of interviewees, for example if something was mentioned with intensity or as a central detail in responses.

The presence or absence of the public wolf hunting and trapping seasons is not the sole determining factor of tolerance or intolerance of wolves. The pattern of determinant factors instead more closely represents a web of influence than a direct line of cause and effect (See Figure 4 below). To find the answers to this study’s research questions all of these themes and subthemes and the connections between them must be examined. As Nie (2003) wrote, wolf opposition in particular is much more complicated than it seems. Attitudes towards NRM wolves and wolf recovery are inextricably linked to a host of underlying circumstances.

Figure 4: Factors influencing tolerance and acceptance of wolves



The Politics of Wolf Recovery: Frustration, Inequity, and Distrust

One of the three most frequently mentioned factors influencing interviewees' attitudes towards wolves was stakeholder and interest groups' political maneuvering and its ramifications. Due to the controversial process of delisting Northern Rocky Mountain gray wolves from the Endangered Species Act, some interviewees reported a polarization of personal views, and the views of their community, over the decades since re-introductions were proposed. Some expressed frustration with the process, while others expressed frustration with governmental agencies or those stakeholder groups considered to be in direct opposition of wolf policy and management determination. One hunter expressed his frustration with the process and desire for increased control of population numbers by simply stating:

I'm a supporter of the ESA, but the population's gotten so out of control it makes me not as comfortable with [it]. (Mulder 9-8-13)

A trapper spoke at length about a perception of injustice in Endangered Species Act regulations. Two examples were given to illustrate the point. The first is in relation to an incident where a wolf radio collar was found floating down the Blackfoot River attached to a milk jug:

If I see you kill a person or I have information relating to that and I turned that in, and that information leads to your arrest and conviction I can get up to a \$1,000 reward...If I knew that you killed a wolf... and I was to turn that in and it led to your arrest and conviction I can get up to a \$10,000 reward. Where's the morality that a human's life is worth less than an animal's? (Mulder 7-13i-13)

In the second example, a connection is made between the ranching community's frustrations over a shifting political landscape and a specific act of poaching¹:

¹ Subject was not directly asked about incidents of poaching and expressed no knowledge of the identity of those who committed them.

...that wolf that was hung on the stop sign in Helmville, there's a political statement...the day before the Governor's Tour, where the governor and a bunch of ranchers were driving around... lo and behold there's a dead wolf hung with heavy bailing twine on the stop sign in Helmville (Mulder-7-13i-13).

As mentioned in Bruskotter et al. (2009) and Bruskotter and Fulton (2012) poaching may be considered one of the greatest acts of intolerance towards a predatory species. Poaching of wolves in Montana would be physically difficult to carry out and potentially involve a high risk of heavy penalty. Under state management of wolves, illegal take carries a penalty of \$1,000, while under federal ESA protections penalties included fines and jail time (2013-14 regulations). While penalties for poaching a NRM gray wolf were higher when the population was federally protected, poaching of a regulated game species is stringently enforced by FWP. A decision to poach would either need to be made rationally and provide high perceived benefits, or be made irrationally and be despite the many risks. This logic may be negated if perceived risk is low. Montana is a vast state and game managers and law enforcement cannot be everywhere at every time.

Distrust, anger, and frustration have been directed in multiple directions: back-and-forth between environmental NGOs (i.e. Montana Trappers Associations, Rocky Mountain Elk Foundation, and Defenders of Wildlife, etc.) and ranchers, trappers, and big game hunters; between ranchers and hunters or trappers; between hunters and trappers; and employees and non-employees of state and federal agencies. Some statements made on this aspect of the politics theme were expected to emerge, such as:

There's not one single thing that HSUS (Humane Society of the United States) has done to help an animal in its entire existence. The sole purpose of the organization is to make money... The people who live here, all of 'em in the rural areas are against having this many wolves (Mulder-10-22-13)...

Other comments were novel. The collaborative nature of the Blackfoot Challenge combined with frustration over the ESA process and a perception that control of the wolf population through liberal trapping is a critical and immediate need may have driven one trapper to make the following comment:

We should come to the table and work together on it instead of creating a lawsuit or starting a lawsuit and just postponing this, and postponing that, putting this off and putting that off...the way that it has gotten out of control to the point that it has, that's what makes me so sick (Mulder 7-12-13).

This sentiment was echoed by a fifth generation cattle rancher:

... because of the way [wolves] were introduced, I think it's a really strained relationship between producers and both environmentalists and the agencies that were charged with reintroducing them...and I think it's unfortunate that we end up with these kinds of fights in a court of law and not another forum, because there's always a winner and a loser in a court system, and only half the people are happy. It's just not conducive to good management. So any time we can stay out of court, both parties are better off (Mulder-9-13-13i).

Attitudes towards wolves at times seemed to be a reflection of a strong valuation of private property rights and anti-federalist attitudes. Some interviewees considered, or knew friends and family who considered, the intentional reintroductions of wolves to the region to be a violation of their rights and a financial or emotional burden unfairly imposed on rural residents and state governments.

The clash between some ranchers and the hunting/trapping community appears to stem in part from disagreement over management priorities and a perception that the other user groups have stronger political clout. One couple was in the process of losing their ranch, a property that has belonged to the family for multiple generations. There may be extraneous factors at play in this situation, however the perception was that wolf re-establishment was a causal factor in the ranch's bankruptcy. For them, state control and management has come too late to ameliorate wolf depredation stress and pressure on their livestock:

The emphasis on trapping...and having a hunting season on wolves didn't get very far when they were just concerned about the livestock growers...But when the elk numbers started to decline, then that became serious. And of course, hunting's a big thing in this state (Mulder 8-16-13)...

Need for Management and Control

The majority of interviewees expressed dominionistic attitudes towards the Montana wolf population, indicating a desire for control and management in one form or another. If there has been a singular social intent of instituting public wolf hunting and trapping, it is to increase the perception that those individuals most directly impacted by wolf recovery now have an increased ability to exert direct control over the threat (FWP 2002).

The Shape of Management: Allowance of Public Hunting and Trapping

Interviewees varied in beliefs about what form control and management should take. Some expressed the opinion that all forms of management should be allowed. This includes measures already taken like the use of foothold traps, electronic callers, and rifle and bow hunting. It also includes measures not currently allowed in the state of Montana such as use of wire snares, poison baiting, and aerial gunning². Extremely liberal wolf hunting and trapping conducted in Alaska was mentioned as evidence that wolf populations can more than sustain themselves under such intense pressure. Other interviewees only supported all of the measures currently regulated for, while some participants were willing to accept some hunting but not trapping. General comments on the need for control included statements like:

I like havin' all the critters on the landscape, as long as we can live with 'em and have the tools to control their numbers (Mulder 7-15-13).

and,

Why can't we hunt 'em like any other game (Mulder 10-3-13)?

² While managing agencies currently use aerial shooting to remove problem packs or individuals within the state it is not allowable for the general public.

In only one interview was it specifically stated that the wolf population does not need to be controlled by humans in any way and is in fact biologically capable of managing itself (Mulder 9-17-13). The husband in this couple interview directly stewarded wolves, going to great lengths to feed pups for a season when pack adults were killed, and to keep the story out of the media.. This multi-generational rancher co-owned and operated a large livestock operation with a sibling. When the wolves appeared on their property both brothers were already nearing retirement. They eventually chose protecting the wolves over owning cattle.

A second couple interviewed also indicated that, through careers as agency managers and participation in a local wildlife working group, they took lengths to steward wolves as mandated by the ESA and agency policies. It appears that for them, management of wolves is about managing people. They emphasized a need for greater public outreach and education biological wolf information and ways to co-exist with wildlife:

...there's a lot you can do to live with wildlife. You might have to change your lifestyle a little bit, such as keeping your dog in a kennel at night or inside, like a lot of our neighbors do, because they're afraid a wolf will come down and kill their animal. Things like fladgery, there's a lot of things you can do to minimize conflict. I would like to see more outreach and education on that sort of thing. And...the cost-benefit analysis of wolves in general (Mulder 8-27-13)...

Opinions on wolf trapping were especially divisive. Many of those in favor of wolf hunting were not in favor of wolf trapping. Concerns over trapping of wolves included non-target catch, ethics, and effectiveness of catching wolves or reducing population levels. Dog owners expressed concerns over their pets' safety with the allowance of trapping on public lands. This was attributed to current trap placement regulations providing for limited trail setbacks. Incidents of dogs killed or losing limbs to traps were described. This aspect of the issue extends beyond allowance of trapping on public land to those set by other landowners or Wildlife Services on private property. Dogs left unrestrained may travel to neighbors' properties and get

caught in the traps. This leads to loss or injury of pets, but also to negative feelings between neighbors when disclosure of the traps prior to any incident does not occur. One rancher described just such a situation, with a family dog losing a foot in traps set on a neighbor's property. The rancher expressed concern beyond safety of the pet to distaste for the prolonged death of any animal. For this interviewee, death of animals in traps was paralleled by death from bullet wounds to the intestines, a method used in some wildlife poaching:

We had a friend that stopped by, "Oh, don't you worry; I'll gut-shoot it." I said, "You shoot it, you shoot it. You shoot to kill it. You don't injure it. You can stand over it while they come get you (Mulder 8-17-13)."

Montana Fish, Wildlife, and Parks requires a trapping class as a prerequisite to the use of any wolf trapping permit to ensure proper trapping practices (FWP 2013 Wolf Hunting and Trapping Regulations). Despite this, ethical concerns persist, as expressed by some interviewees. Non-target catch is not entirely avoidable. One rancher-hunter posited that:

...trapping is a whole different ethos from hunting as well, 'cause you get into that, like, having an animal stuck in the frozen cold trying to chew his leg off, whether that's—it's not something I find attractive (Mulder 8-5-13).

Another hunter stated an acceptance for the incidental catch of non-target species:

I think there's always gonna be some secondary damage from whatever type of control used. There are no natural resource solutions that are not without impacts. Everything's got a plus and a minus, and you've just got to weigh that out (Mulder 9-8-13).

Efficacy of and need for trapping impacted willingness to accept trapping practices.

Some interviewees perceived the need of trapping to be great, pointing out the increasing wolf population and decreasing game population and/or a wish to reduce the threat of livestock depredations. Participants in the study were typically aware of the difference in number of animals taken using trapping versus hunting in both Montana and Idaho. One interviewee discussed a need to add wire snares to the compliment of allowable tools in Montana:

...it's almost like they're regulating it to the point that they don't want to harvest as many as could be...if they would let us snare wolves we could do a far better job of controlling their numbers...but right now with trapping the way it is, to me it's like peeing in the ocean. It doesn't make much difference. Yeah it helps...but it's almost like trapping with one arm behind your back, so to speak (Mulder 7-12-13).

A few interviewees stated that they had not seen any change in the wolf population and its presence on the landscape. However, many posited that hunting and trapping have at least been successful in creating a new, sustained psychological predation risk/pressure on wolves, similar to behavioral changes in ungulates caused by increased predation risk from wolf recovery (Ripple & Beschta 2004). They stated that encounters with wolves have been less frequent since enactment of state management regulations. In response to a question on changes of wolf impacts to their livestock operation since hunting and trapping have been allowed, one rancher holding a grazing allotment on public lands stated:

This year we noticed quite a bit of difference. The wolves are there, you just don't see the sign, because they're educated now. Before, you would drive up the roads and the wolves, that's how they travel, is up and down the roads, and now the wolves are still there, but they quit travelin' the roads. They're out of sight and out of mind (Mulder 9-13-13ii).

A fourth generation rancher stated support for the use of hunting and trapping seasons, despite a perceived lack of effectiveness for impacting wolf activity on their land:

...I think it's a good idea, and they're getting 'em, but where they're getting the wolves is in the backcountry. They're not getting the packs that are down here, getting the ones that are getting the calves (Mulder 7-13-13ii)...

The latter rancher resides in the same portion of the valley as the former, but does not use public land grazing allotments. Bureau of Land Management and U.S. Forest Service grazing allotments are located in higher, forested elevations than the privately owned valley bottoms. Livestock set to graze these allotments are at a greater distance from human habitations and are not constantly monitored or protected. These results in any losses going unnoticed for weeks or

months and evidence needed to prove the cause of difficult to attain. The above rancher grazing on public allotments noted the proximity of wolf dens to the summer placement of their cattle:

We got that bunch of cattle that go to the mountains, and there's wolf dens up there. My son has been workin' with the—I guess it's the Fish & Game or the Fish, Wildlife & Parks. That was part of his job, to help the range rider, and we've got pictures of a den with 15 pups, right with the cattle (Mulder 9-13-13ii).

He goes on to describe a frequent need to check on cattle set out on the public allotments and how such visitations translate into costs of time, money, and physical labor. Many interviewees noted that wolf hunting and trapping is conducted primarily on public lands. Interviewees asserted that targeted wolf removals on private land in the valleys mostly occur in response to specific instances of depredation threats.

Support for hunting among study participants was stronger and less controversial than for trapping. Many made statements such as:

So the hunting, I'm for it, 'cause like I said, there's got to be some controls, otherwise things go crazy (Mulder 8-17-13).

The previous sheep rancher statement was echoed by this assertion from a cattle rancher:

From the producers' side, I don't hear anybody saying, "I wish we weren't hunting them." So I assume that most people are in favor of a liberal hunting season (Mulder 9-13-13i).

One hunter posited that trophy hunting is biologically sound, with no room for non-target catch and a focus on selectively taking only the older, larger males. This selectivity lends itself to the idea that target mortality is compensatory and that the ultimate goal is the pursuit rather than take of the animal. This hunter also noted that they alternate target of big game and predatory species each year in order to prevent over-hunting. This individual expressed indecision over a ballot measure proposed for the spring 2014 election that would prohibit all trapping on public lands, having an intense dislike of trapping methods but fearing that it could lead to a similar prohibition of hunting in the future.

When speaking about the effectiveness of wolf hunting at impacting the population, a couple said:

If they killed 200 wolves, you know it made a difference somewhere (Mulder 8-16-13).

Some interviewees stated a belief that wolf numbers are still rapidly increasing or mainly continuing uncontrolled. Some frustration with agency regulations was expressed, particularly with measures perceived as too conservative.

Intent to Participate in Public Wolf Hunting and Trapping

Intent to participate in wolf hunting and trapping was even more variable than opinions regarding regulations. Interviewee intent included a ‘live and let live’ approach, hunting opportunistically, the specific pursuit of wolves through rifle and/or bow hunting, and specifically targeting wolves when trapping, or all of the above. Other than personal distaste for the act, the cost and difficulty of pursuing wolf hunting and trapping is a primary obstacle for participation in it. One interviewee that does hunt and trap wolves described some of this difficulty:

They’re just very intelligent critters, and they’re very challenging to trap. There’s nothing easy, nothing easy about wolf trapping. It’s hard work, it takes a lot of time. It takes a lot of money...You can spend a hundred easy on one trap, and you have to use heavier swivels, heavier chain, and heavier grapple. It’s like having another...trapping wolves is like having to get a whole another set of traps, a whole other set of gear just to trap wolves, so the financial aspect of it is significant once you start trying to buy 2 dozen wolf traps (Mulder 7-12-13).

Some hunters and trappers criticized community members who, prior to ESA delisting talked at length about their intent to actively hunt and trap large numbers of wolves, but have not taken real action to do so. One interviewee mentioned that a large amount of the people who

bought trapping permits and took the required wolf trapping course did not actually end up pursuing it. The causes of this were focused on intelligence of wolves, time intensity, and cost.

Interviewees made statements such as:

...it's not just the case of gettin' a tag and goin' out and shootin' 'em. They're pretty savvy and relatively cunning and I think there's a big curve in terms of learning how to hunt 'em. Hunters have only been huntin' 'em in Montana for two or three years, and there's a steep learning curve in terms of behavior and how you do it and how you go about it if you want to be successful (Mulder 9-8-13)

And:

There's a lot of wolves running around now with PhDs in trapping education (Mulder 7-13-13i).

Many interviewees expressed acceptance of hunting and trapping policies, but little attraction to actively participate themselves. Some hunt wolves opportunistically, particularly while hunting ungulates or when wolves are spotted on private property. One rancher stated intent to purchase a single wolf tag in the 2013-2014 wolf hunting and trapping season:

I'm not gonna go beat the mountains for it. If I cross one of 'em when I'm gatherin' cows, if it's the season, I'll just carry a gun with me and if I see one, I'll shoot it (Mulder 7-23-13)

Ranchers primarily stated intent to protect livestock from depredations but not to actively pursue hunting or trapping on public lands. The constraints of managing a ranch may not allow sufficient time for pursuing wolves around livestock. Many in this stakeholder group hunted big game or trapped furbearers when younger but do not do so currently.

Livelihood and Way of Life

Of perhaps the greatest concern expressed by this sample population were impacts of wolves on their livelihood and way of life. This includes impacts to livestock and agriculture, as well as impacts to hunting and big game populations. When interviews are examined

independently from each other a fractured, contradictory story appears. However, when interviews are compiled, like pieces of a jigsaw puzzle, a fused pattern begins to emerge.

Livestock and Agriculture

More than half of the interviewees self-identified as current or retired ranchers. Most raise or have raised cattle, although two raise sheep. Risks and benefits to these livestock producers are not equally distributed. While some have experienced multiple depredations due to wolves, others have experienced none at all or have experienced more significant losses to other predators, such as coyotes, mountain lions, or bears. The impacts of depredations that do occur on individual ranching operations are unequal in impact. Larger operations may be capable of absorbing a small amount of loss; but those with fewer animals or participating in a specific breeding program have less financial elasticity. A cattle rancher with a smaller operation, who has experienced some depredation threats from wolves but no confirmed losses stated:

They could put us out of business, they really could, because we're small, and we depend on every calf. If we lose one during calving or something, it's kind of a major thing. We have to go for quality, where we don't have quantity (Mulder 8-19-13).

A third generation sheep rancher, currently tolerant of wolves on the landscape, expressed a similar sentiment:

...when you have a problem animal that's eating livestock, they have to go. There's no way that I can let that lie, just 'cause reimbursement or not, I have a specific genetic breeding program. I don't care how much you repay me for the animal (Mulder 8-5-13).

Livestock Impacts as a Compound Problem:

It is important here to note a few things brought up in interviews that increase the complexity of agricultural impacts. Most ranching operations in this study area do not generate any profit and are instead working to pay off a considerable amount of debt. Unlike crops,

livestock are not insurable. One interviewee expressed a desire for their community to create their own insurance program, with all livestock producers paying a specific annual amount, and the general pool available to compensate those individuals that experience wolf depredations:

One idea I threw around a little bit, it's gotten interest but not a whole lot of traction yet, is some kind of insurance program, like crop insurance. If you have crop insurance and the hailstorm comes through and takes out your crop, you're insured. It might not be for the value of what the crop was, but you get your expenses and some out of it. I said, "There's got to be some way you can do that with livestock so that we didn't have to try and prove that it was a depredation (Mulder 7-15-13)."

It is possible that decreasing the impact depredations have on individual livestock producers could lessen the perceived risk associated with wolf re-establishment as a threat. However, this program would still represent an additional cost burden to those participating in it.

Seeking financial compensation for wolf depredation losses is problematic under the regulations of the current state management plan. Depredation payments are disbursed by the environmental group Defenders of Wildlife in cooperation with managing agencies.

Depredations must be verified by an official (i.e. a managing agency biologist or a Blackfoot Challenge range rider). Depredations must be reported within 48 hours. Not all livestock set out to graze distant fields or public grazing allotments are continually or frequently monitored.

Depredations may go unnoticed during this time or producers may be unable to locate carcasses.

Even when carcasses are located tracks may not be visible, remnants may not be sufficient to display hemorrhage patterns indicative of predator kill patterns, or physical signs may be obscured by the presence of multiple predators and scavengers at the carcass. Depredation

payments are set at fair market value; however there is debate over the definition of this term.

Financial impacts may extend beyond the individual animal lost.

Some livestock producers reported negative psychological impacts of wolf presence to their herds or themselves. In the livestock this results in reduced weight gains when set out to pasture, increased nervousness or restlessness, reduced birth rates, and decreased calf survival. The Blackfoot Challenge, together with landowners and managing agencies, has developed programs to prevent depredations from wolves, grizzlies, and other predators. These include hiring range riders to monitor predator activities in high depredation-risk areas, cost-sharing electrified calving areas, and encouraging the use of fladgery. Some interviewees noted unintended secondary effects from such efforts, such as in the following couple interview:

Wife: It's definitely helped, I mean, and it's a huge help, but as we get more cows, you know, it's not big enough to put everything in there. And then every 10 days you move the young ones out, so then they're exposed to you know—
Husband: Just for the ranch you don't want to get all the calves in there because of sickness and stuff (Mulder 7-13-13ii)

Problems with eagles and ravens within calving enclosures may startle mother cows into accidentally killing their offspring. Other interviewees noted that the frequent presence of range riders on summer grazing pastures may signal cattle herds unused to human company at this time of year to return home. This is proverbial double-edged sword. Without the range rider supervision, the risk and stress of wolf predation pressure may instead trigger a return home.

Game Impacts

There is some crossover between impacts to agriculture and impacts to game. Most livestock producers interviewed in this study plant or have planted alfalfa and/or hay. This is intended to be winter feed for livestock herds. Many stated that wolf predation risk/pressure has increased grazing of crops by elk and deer. A few reported a notable shift of ungulate grazing away from their fields. Two contrasting opinions are represented in the following quotes:

I'm happy to have them roaming around and keeping the elk moving. It's completely changed the elks' grazing patterns and actually forced them into the

river bottom considerably more. They don't push on my fences as much, which has been an interesting up or down (Mulder 8-5-13).

And:

They compete with the cattle, especially at certain times when we're calvin' and you've got all them elk comin' into the hay meadows or into the peat [?] grounds, it's hard on 'em. You end up with more broken legs and stuff on the calves. It just seems like it is a little bit at a time, but when you add it all up, it adds up to be a big deal (Mulder 9-13-13ii).

Both opinions were expressed by ranchers; however the interviewees reside in different valleys.

Variation existed within the individual valleys as well. The sum pattern shows a possible shift in ungulate herd presence and grazing patterns from one game management area to another. An alternate explanation is that there is indeed a decline in calf and fawn recruitment in some locations, and a separate increase in recruitment in others. Interviewees discussed decreases in the overall ungulate population, particularly in terms of elk calf recruitment; increased time spent in valley bottoms and rivers; increases in group sizes; and increased wariness.

Impacts to Hunting

Impacts of wolves on ungulate game populations may be translated into impacts on game hunters. Effects discussed in interviews include an increased difficulty in locating and killing hunt-able game, a reduction in issuance of elk and moose hunting tags, reductions in photographic opportunities, and concerns that cultural traditions of hunting may slowly be phased out of existence.

Interviewees also discussed impacts on hunting and trapping of other predators. They noted that population trends for foxes and coyotes have changed. Outside of this study researchers have documented a meso-carnivore suppression of coyote population numbers (Berger & Gese 2007, Berger et al. 2008). Coyotes act as a limiting factor to fox populations. Interviewees attributed a release of fox population numbers to the reductions in the coyote

population from wolf presence. Both species may be targets for fur-bearer trapping. Inter-specific competition and predation between wolves, coyotes, and foxes has changed the frequency with which coyotes and foxes are trapped.

The most commonly mentioned impact to non-wolf predator control practices was a threat to dogs used in mountain lion hunting. Interviewees described incidents of wolf attacks during the point in the process where the hunting dogs go unrestrained to scent track. A couple interviewees stated that this has led to a change in hunting practices, with dogs held restrained on leashes over longer periods or to abandonment of the practice. The main reason cited for hunting mountain lions was “working” the dogs along scent trails, with take of the animals occurring only occasionally. Hunting dogs may be considered family pets, increasing the feeling of loss at their injury or death. One mountain lion hunter described the impact by stating:

We used to turn loose on colder tracks, older, older tracks of lions that you know would end up being a little bit longer run for the dogs, but I never turn my dog loose or dogs if I’m with other people [anymore], unless we know that cat is right there... they recognize the canine intrusion, and they go do something about it. They’re just being wolves but [it’s] pretty tough on the dogs (Mulder-7-12-13).

Personal “Affects”, Beliefs, and Attitudes

According to Manfredi et al (2009), affects are “the ‘feeling’ states we experience, including positive or negative moods and/or emotions.” Affects present in these interviews included expressions of fear, admiration, dislike, and respect.

Interviewees frequently described personal affects of awe and respect for the wolf organism, as opposed to wolf re-establishment. Many told of being stunned or impressed in their initial interactions with wolves, such as in the following statement made by a ranch manager:

I get kind of worked up, excited, when I see a wolf, ‘cause they’re cool (Mulder 8-30-13).

The discussion would, at times, quickly skip from a positive description (i.e. size of the animal, beauty, capabilities, or novelty) of a first encounter with a wolf to a negative impact from current wolf populations. Statements, such as displayed in the following mix of affect and beliefs from a trapper, defy stereotypes with one breath then reinforce them with the next:

I think the wolf is an absolutely magnificent animal. They truly are. The social aspects of their lives, and just the way that they hunt, the way that they live to me is very admirable in a lot of ways. It's very disturbing in a lot of ways too, but my biggest problem with the wolf is that they've been allowed to propagate to the numbers that we have now (Mulder 7-13-13i).

Another trapper made a very similar comment in this expression of attitude:

I'm not anti-wolf. I wish there wasn't as many. It's way cool to see wolves and wolf tracks. They're cool (Mulder 10-22-13).

One of the most surprising remarks about belief in the benevolence of wolves was made during an interview with a rancher-hunter and his wife. The idea was expressed that when wolves returned to that particular valley, natural instincts lead them to prey on ungulates rather than cattle. The couple continued on to say that:

...they came back because they knew that they were gonna be taken care of (Mulder 9-17-13).

While this point of view would not be surprising stemming from a number of overtly pro-wolf people in Missoula or out-of-region, it challenges pre-conceived notions about the opinions of ranchers in rural Montana.

Statements of fear and hatred for the actual animals were less pervasive than expected, but did pepper some interviews. One couple recalled taking the action of conducting archival research for information on pioneer accounts of wolves in an attempt to dissuade the 1995-96 reintroductions. Later in the interview an attitude was expressed that wolves will kill for fun:

...there have been reports where they've killed a lot of animals that they didn't eat. It's like they go on killing sprees when they get a chance...I think that is

pretty well established. That's a bad kind of an animal to have on the loose.
(Mulder 8-16-13)

This opinion was echoed by other interviewees through references to the wolf as “a patient killer” or “super-predator” (Mulder 7-13-13ii), and statements like:

Wolves will just kill to kill. They won't even have to eat 'em. They practice; they'll kill 'em and just go on (Mulder 7-23-13).

Interactions with Predators

Willingness to tolerate future interactions with wolves may be tied to past interactions, both with wolves and non-wolf predators. Most interviewees have resided in Montana for a fairly long period of time. Half reported having lived in Montana for at least 40 years. The minimum length of residence in the state for any interviewee has been 8 years, with a maximum length of residence of 88 years. Positive and negative interactions with wildlife and other natural forces were described in interviews as frequent occurrences.

Past interactions with predators in this sample population fall into two categories, wolf and non-wolf. These may be further separated out into direct and indirect interactions (direct wolf, direct non-wolf, indirect wolf, and indirect non-wolf). For some interviewees, wolf presence has only been apparent for the past few years in the portions of the valleys where they reside—such as the community of Potomac. For these individuals indirect experience with wolves, particularly in situations of conflict, seem as influential as limited direct experience. This includes accounts from family, neighbors, media, and publicized research. For example, one couple described a negative incident found in historic documents as well as one recently described media story occurring in northwestern Montana:

I found a Nebraska history at UM at the library when I was working on my master's degree, and it told about piles of human bones that had been left by wolves...some of the articles that I read told about children being attacked in their front yards by wolves (Mulder 8-16-13).

Another interviewee described a concern for human safety as informed by a friend's situation:

He is literally on the edge of town, like, the town stops here and his property basically borders it...He's got three hounds behind his house in dog boxes, chained up right off his porch. Middle of the night he hears his hounds goin' crazy. He goes outside and looks, and there's a wolf attackin' his dog and he shot it...but what if that was—he has kids who are seven, eight years old (Mulder 10-22-13).

The latter interviewee has had direct experiences as well as indirect and described his attitude as a combination of both.

Many interviewees' indirect experiences with wolves have been negative; however direct experiences included a more even mixture of benign and threatening encounters. Many of the positive encounters occurred in the early years of wolf recovery. One retired rancher described an early negative direct experience with wolves in their area, with a threat of depredation on a sick cow one night. They continued to elucidate a matter-of-fact approach to life in a region where predators are abundant:

So we brought her back in and put her in a little shed, and that night we could hear the wolves coming! Tpp! Tpp! Tpp! My son and I were so upset. We went out and we boarded up the shed, we were firing guns off into the air. It's pretty funny in a way, but scary... Those things happen...But we found them interesting in many ways. We can hear them howling occasionally. We occasionally see them, just like we see bears occasionally (Mulder 8-25-13).

In the above incident, the interviewee mentioned that it was preceded by a loss of the wolf breeding pair female that left the male as a sole source of food for their young-of-the-year. The same interviewee also experienced the loss of a pet dog to the same pack after the female's death.

Many of this study's participants have pursued hunting of multiple game or predatory species at one point or another. Most of the ranchers, and some canine owners, have dealt with depredation losses due to predators like wolves, coyotes, grizzly bears, black bears, mountain

lions, eagles, or feral dogs. In explaining opinions of wolves, individuals often related relationships and experiences with other predators, including coyotes, fox, bears, and mountain lions. Like the example above, some interviewees considered wolves to be one more difficult but manageable threat to game and livestock, while others considered them to be pivotal and catastrophic. Some described grizzly bears as a more problematic source of depredations on livestock as well as pets. Others asserted that they have had more losses due to mountain lions or coyotes. Coyote caused depredations seem to be a particularly large threat for the sheep ranching industry. Again print and TV media and discussions with friends and neighbors were typically mentioned sources of indirect information.

Cultural and Social Influences

Two social influences clearly stand out in this study as important: the influence of cultural norms, as well as family and personal history. Less than half of interviewees were born within the state of Montana, with one person originating as far away as the Czech Republic. The shortest length of residence in the state was eight years and shortest length of residence within the study area was five.

Family History

Of those born within Montana, family histories of residence stretched back for as many as five generations. For some of them, familial memories of wolf encounters have been consistent in documenting ongoing presence of the species within the state. This coincides with possible occasional migrations of transient wolves from Canada past estimated extirpation in the lower U.S. (FWP 2003). The impacts of wolf encounters experienced by parents and grandparents appear to contribute to an increased tolerance of the species in this sample

population; or rather contributed to an increased willingness to manage game and livestock in consideration of the presence of wolves. A fourth generation rancher who expressed a “live and let live” attitude towards wolves stated:

They’ve always been here. I used to see them. My dad used to see them... before they introduced them (Mulder 7-13-13ii).

In slight contrast, some interviewees with a family history extending back multiple generations in Montana seemed to hold on to memories of pioneer ancestors’ role in the transformation of the landscape from wilderness to productive ranch land:

Husband: ...my grandfather came to the valley in 1883. Things were very different when they came. They were part of the development in the area from the primitive area to a place with a university... from our point of view, when you’re raising livestock, why would you want the worst predator around that would cause you lots of trouble and financial problems (Mulder 8-16-13)?

This sentiment was present to some degree in many interviews: wolves were removed with great effort by settlers for the “wild” threat they represented to human interests, and given the difficulty of managing for wolf presence, restoration has been counterintuitive.

Cultural Norms and Values

A frequently expressed sentiment regarding concerns over hunting and trapping of any predator in these interviews can be tied to utilitarian principles of sustainability present throughout the ranching, hunting, and trapping communities. With tag limits raised from three to five wolves per person in the most recent seasons, some interviewees seemed mystified by a perceived waste of so many removals. This thread was repeated in several interviews, such as this married couple’s response to being asked if they would consider pursuing wolf hunting or trapping:

Husband: No, I would not.

Wife: No. If I’m not gonna eat it, I’m not gonna—somehow I can’t imagine eating a wolf.

Husband: [laughs] And I don't want a wolf rug or anything (Mulder 8-27-13).

Most interviewees that supported use of public trapping seasons for wolves clearly outlined expectations that it should be conducted ethically and with the least amount of suffering for the animals possible with each method. Both unethical wolf hunting and unethical trapping practices were considered as an unfavorable reflection presented to in the general public eye.

One hunter/trapper asserted:

There're a lot of people out there calling themselves trappers that in my opinion they don't have any business being out there trapping because they're slobs, and they don't have any morals or ethics or respect for the animal or other people (Mulder 7-12-13).

Some of this study's interviewees state participation in conducting hunter or trapper education and outreach courses, including those required by FWP when purchasing a permit to trap wolves.

Another trend that emerged in some interviews was an idea that it is preferable in social situations to avoid any and all discussion of wolves and wolf recovery. The subject of wolves was equated to politics and religion, too divisive and value-laden to not trigger conflict between friends and neighbors. Individuals that expressed this opinion tended to be reluctant at first to be interviewed due to concerns of anonymity and confidentiality. It is unclear if this need to keep the peace was a function of increased age of interviewees or the small size of the area's community.

Place in the Landscape and Ecosystem

Many of the participants in this study recognized wolves as a component of the landscape that will be present throughout the foreseeable future. A wish to fully eradicate wolves was infrequently mentioned, with most interviewees instead wishing for a minimization of population levels. The amount that interviewees believed wolf numbers should be decreased by fluctuated.

Some desired wolf population numbers more in line with the original Wolf Recovery Plan goals of 100 individuals and 10 breeding pairs in the state of Montana or at least a reduction to the 150 individual, 15 breeding pair target outlined in the Montana Gray Wolf Management and Conservation Plan (2003). The threat of reductions below the legal 100-10 level would reinitiate federal management, something which many interviewees identified as undesirable due to the relative inflexibility of control measures it allows for. One sheep rancher simply stated:

I believe they're necessary for the web of life. I believe they should be around here, and we need 'em for our ecosystems (Mulder 8-5-13).

A retired hunter echoed this sentiment in a Leopoldian statement:

I think it's great that we have wolves in the ecosystem. They should be there. They were here for a long, long time. They do keep things somewhat in balance, and we want to keep all the parts, as they say (Mulder 8-27-13).

A cattle rancher interviewed considered wolves to now be an integral part of the landscape that the industry cannot change and must now learn to cope with:

...if I was a dictator in the world and I only had my own little place to live on, I would hope there wouldn't be a wolf, because it makes my management easier, just like it makes my management easier if there were no hurricanes or tornadoes or floods. I love the rain, but I don't need a flood. I like the tool of fire, but I don't want a wildfire. Nonetheless, that's not the world we live in. We have to accept what Mother Nature gives us, and one of the things she gives us is wolves. They are a key component in this ecosystem. I need to recognize that and my management needs to reflect that (Mulder 9-13-13i).

This line of thinking was repeated by another rancher:

...probably 70% of the population in the U.S. think wolves on the landscape is a good thing. We're fightin' a losin' battle sayin' they shouldn't be on the landscape. They're gonna be on the landscape, whether we like it or not, so let's figure out ways to deal with that fact (Mulder 7-15-13).

In other interviews, individuals described a trophic cascade effect caused by the return of the wolf, with changes evidenced in many other components of the ecosystem. Some stated that the extent of change has been all-encompassing with wolves "shaking up" everything they know.

Impacts most frequently mentioned, elucidated on in above sections, were to game populations as well as to other furbearer species like fox and coyotes. Some individuals with long-standing family histories in Montana, or who have worked in managing agencies, described mesocarnivore release seen throughout the generations following wolf extirpation and later the mesocarnivore suppressions seen with wolf recovery. Others described reductions in over-grazing by ungulates.

Noted Changes in Tolerance

Explicitly stated changes in tolerance of wolves were limited in frequency. Interviewees who did note changes spoke of both alterations in their own opinions and differences seen throughout the study communities. Several made comments focused on public hunting and trapping of wolves as a positive change, and a step to address the threats wolves can create. One rancher spoke of a dampening of inflamed opinions on the topic, which may represent the beginnings of a move towards inactive rather than active intolerance:

Three years ago is when it got hot, when everybody was up in arms about the wolves. That's when they trapped behind us, that's when people were going out, "I'll shoot 'em," and stuff. And like I said, in the last year it's gone away again, at least as far as we're concerned. We just aren't hearing the big radicalization, "Kill all the wolves." (Mulder 8-17-13)

Changes in actual experiences with wolves in Montana began evolving through the years following intentional reintroductions. Some interviewees mentioned a sharp increase in the frequency of sightings since 2001-2003; however there was variance in how frequently wolves may have been encountered following the first hunting and trapping seasons. Many people mentioned belief that hunting and trapping of wolves has made the species more cautious or wary of humans.

When asked to speculate on the potential for any future attitude changes most participants appeared hesitant. A range of views were expressed here. Some stated that a change in tolerance of wolves, whether positively or negatively, would happen only if a dramatic event were to occur. Potential causes of reductions in tolerance or acceptance could be drastic reductions in game numbers, re-listing the species as federally endangered or threatened, or increases in first-hand livestock or pet depredations. An increase in acceptance of protection for the NRM wolves (i.e. cessation of public wolf hunting and trapping in Montana) could be caused by a reduction in wolf numbers, as was mentioned in the following statement from a rancher:

Only if it got down to the point to where they were making them extinct again, then I might think differently about it (Mulder 8-30-13).

Another interviewee, this time a lifelong trapper, brought up benefits stemming from biological research on wolves and their prey species:

I get my opinion changed a lot, particularly as relates to wildlife management...the science has got some pretty d--- good things, and it has some abilities to increase our knowledge. And so my opinions could most definitely be changed (Mulder 7-13-13i).

A third interviewee, this time a hunter, jokingly responded:

I guess if they ate my children, I'd probably be a little more negative, but I don't think that's a possibility. My kids are pretty big (Mulder 9-8-13)!

Many interviewees seemed aware of wolf and game research studies conducted by Montana Fish, Wildlife, and Parks and the University of Montana. Typically mentioned were aerial elk population count surveys; a recent study conducted by UM biologist Hebblewhite showing that mountain lions are a greater source of mortality for elk than wolves in the Bitterroot Mountains; and studies on wolf-caused trophic cascades conducted in Yellowstone National Park. Reading newspapers like the *Missoulian* and having conversations with agency officials were two common sources for obtaining scientific information.

While allowance of public wolf hunting and trapping has thus far shown only the beginning of changes in tolerance in this sample population, removal of them would potentially polarize opinions further. Some interviewees believed that change in tolerance is something that will occur gradually over time. A hunter asserted that human nature would eventually temper wolf intolerance:

...eventually everybody will get used to wolves and before you know it, everybody's gonna say, "Oh, yeah, we've got wolves. It's cool." The guys who 10, 15 years ago were totally upset about having wolves here (Mulder 10-3-13)...

However, a number of interviewees thought communal changes in tolerance of wolves were unlikely to occur. One noted the polarized nature of the wolf debate and a belief that it has led to intransigence in attitudes and skepticism that tolerance or acceptance might increase in their communities in the future:

I don't know how many people were kind of on the fence about wolves. It seems to be a fairly polarized issue or critter, maybe, so I don't know that hunting or trapping, the taking of wolves, the management of wolf populations, I don't know that it's changed people's opinions. It's changed the population of the wolves, especially around here. I don't know anybody who's really changed their opinion on it (Mulder 8-27-13).

This study has sought to examine how public wolf hunting and trapping seasons, recently created under state controlled management, have impacted rural rancher, trapper, and big game hunter acceptance of Northern Rocky Mountain (NRM) gray wolves within Western Montana. Included in this research has also been an examination of other factors at play in determining wolf tolerance and acceptance levels in this sample population. This was explored through 20 interviews with ranchers, trappers, and big game hunters in the Blackfoot, Bitterroot, and Ninemile Valleys.

Some overlap exists between the three user groups (ranchers, trappers and big game hunters). Most ranchers interviewed hunt or have hunted in the past, but have not participated in

trapping. As seen in interviews, owning and managing operations of a ranch can be physically demanding and time consuming, leaving little time for outside activities like hunting and trapping. Two of the three interviewees who trap also actively pursue hunting, and all three are dependent on trapping and/or hunting for a substantial portion of their income.

Impacts to tolerance and acceptance levels stemming specifically from allowance of public hunting and trapping of wolves in Montana do not appear to be unique to any of the three groups. When examined through the Wildlife Acceptance Capacity model, strictly defined as the maximum level of wildlife that can exist in an area as limited by human tolerance, it is questionable whether or not public hunting and trapping might increase the number of wolves the sample population will tolerate and accept (Bruskotter et al. 2009, Carpenter et al. 2000). However, willingness to tolerate and accept the current population appears to show a slight increase among ranchers, trappers, and big game numbers.

When the interview data is looked at in terms of social psychological models, risk perception from some ranchers, and perhaps to a lesser degree among trappers and hunters, decreases the longer they operate without any direct negative experiences with wolves. Hazard acceptance shows a similar trend, and seems to show a slight increase over time with the realization that wolves will be a permanent fixture on the landscape. This may also be due to the perception of an increased ability for all individuals to assert direct control over the situation.

When the normative behavior model is used, acceptance and tolerance at the community level has also shown a slight improvement: inflammatory beliefs, attitudes, and behaviors have been tempered as the political legal fury has begun to fade. As values and norms change in the future in rural Montanan cultures there may be a corresponding change in acceptance and tolerance of wolves.

Study Limitations

There is need for subsequent research to further discern the impact of holding public wolf hunting and trapping seasons on the tolerance of wolves within Montana stakeholder groups. This study was intended to be exploratory and aimed at gaining some initial insight on the social impacts of a policy that is only a few seasons old. Interviewee responses indicated that further changes within this sample population may be yet to come. One limitation with qualitative research is that it cannot be considered as representative of a general population or entirely replicable by other researchers with a different group of subjects (Warren and Karner 2009). Responses given by participants are to some degree subjective, and are dependent on the chemistry between interviewee and interviewer. Such problems can be minimized through careful planning and consideration in the design and data collection phases and are, in my opinion, outweighed by the value that can be added through interviews with the same sample population at a later date. To achieve a more extensive understanding, this study should be conducted over a larger geographic scale with a larger sample population. Future studies should strive to increase the number of female participants, as well as trappers and individuals under the age of fifty.

In comparison to this study Montag et al. (2003) noted a similar gender response bias in mail surveys for the general public and rancher mail surveys in their study on the social validity of establishing a predator depredation compensation program in Idaho, Montana, and Wyoming. Despite census data suggesting the sample population to be split evenly as far as gender, 82 percent of respondents in the general public survey and 78 percent of respondents in the rancher survey were male. Montag et al. also experienced an age bias. Census data showed that more

than half of the sample population in the region to be under the age of 45. In the general public survey only 24 percent of respondents were under age 45 and only 13 percent of ranchers fell in this range. Following analyses of discriminating values, the authors conclude that the gender and age biases do not “appreciably impact” results of either survey from a policy setting standpoint

Research needs include subsequent studies approached both quantitatively and qualitatively. The specific focus on impacts of public wolf hunting and trapping on acceptance levels has much left to be explored. Indeed there are substantial needs for research on social impacts of hunting and trapping of any wildlife species. Quantitative research designed by independent researchers may be crucial for garnering information at a broad level with a potentially greater sample size and increased representativeness of a general population. However, the benefits of further approaching research on this topic qualitatively extend beyond adding to the scientific body of knowledge. It can provide managing agencies and researchers with guidance and feedback on specific reactions to policy and wolf management actions. It can also help facilitate positive working relationships, and can increase trust between different stakeholder groups. Qualitative studies would allow residents opportunities to express concerns and interests outside of the confrontational public meeting and written comment formats typical of NEPA. Given statements made prior to and within study interviews, I believe that acknowledging public comments is not enough to make this sample population feel valued by managing agencies. Regardless of how much they accept or tolerate wolves, interviewees expressed a desire to see their interests and concerns fully incorporated into management and policy. Interviews, answering surveys, attending public meetings for setting hunting and trapping regulations each season, and submitting written public comments require a time commitment from participants. In fact, mail surveys conducted by Montana Fish, Wildlife, and

Parks in 2011 regarding attitudes towards hunting and trapping of wolves in Montana showed very low reported participation rates in the public process of hunting and trapping regulations for upcoming seasons (FWP 2012). Participation rates were 5 percent for the general public, 9 percent for elk and deer tag holders, 17 percent for wolf hunters and trappers, and 5 percent for private landowners (FWP 2013). Given these results and the results of this thesis study, it may be that in order for rural Montana residents to be willing to be so greatly diverted from conducting essential business-related activities there needs to be a perception that real change will result from it.

When designing the interview guide the aim was to create a soft lead-in to asking some potentially contentious questions. When given the opportunity, feedback on the interview process was garnered after they were concluded and the digital recorder turned off. Responses were generally positive, however many did suggest that a more direct approach to questions could have been taken. Additionally, richer information might have been gained by separately interviewing individuals from some of the couples. In two of the couple interviews in particular, participants seemed deferent to each other and especially conscious of leaving time for the other to speak after each of the main questions. These interviewees did not greatly elaborate on their own responses despite multiple follow-up probes. As a novice researcher unfamiliar to nearly all of the interviewees and a guest in their homes, I was perhaps overly concerned with the possibility of giving offense by requesting individual interviews or with cornering too much time out of their busy schedules. In one instance I might have made an incorrect assumption that individual opinions would not vary greatly regardless of the interview format. Greater differences in attitudes may have in fact become more apparent if interviews were conducted individually. One benefit of interviewing these couples together is that it allowed them to

double check specific details of responses with each other, such as the timeline of how incidents may have occurred.

The schedule for interviewing ranchers was impacted by the summer hay harvest. Rancher interviews were difficult to obtain in the month of July and in early August. Haying occupies large and small livestock productions alike. Individual ranches differ in timing and duration of the harvest. For the larger operations friends and family members seem to be recruited to aid each other in harvesting. When initially contacted in late June and early July, several ranchers requested phoning or e-mailing them at the end of July or the first two weeks of August to set up and interview. Despite this unexpected limitation, interviews were obtained from ranchers with a variety of production sizes.

Comparison of Findings to Previous Research

When looking at the wolf population trends in Montana following the delisting there appears to be corroborating information to support a claim that the public wolf hunting and trapping seasons have somewhat improved general social tolerance and may further do so in the future. Sources of mortality, pup survival, overall minimum population levels, and number of breeding pairs and dispersals have been tracked since natural re-establishment in Northwestern Montana in the early 1980s (FWP 2003-2013). Annual agency reports of gray wolf information are available online through the U.S. Fish and Wildlife Service for the year 1999 and onward. In 2009, the year in which wolves were first removed from the Endangered Species List and subsequently relisted, spikes were seen in the number of wolf-related complaints to Wildlife Services and wolves legally removed by them, as well as a near doubling in the number of confirmed illegal mortalities (FWP 2003-2012). There was also an increase in the amount of

confirmed cattle and sheep losses (FWP 2003-2012). Confirmed depredations have shown a steady decrease since then, and the number of complaints declined by more than between 2009 and 2013 (FWP 2013).

The Montana Livestock Loss Board, an independent entity created under state management to handle finances of depredation payments, paid out \$86,740 in reimbursements for fiscal year 2013 (FWP 2013). For Powell, Missoula, and Ravalli Counties, those encompassed within the study area, nine payments for confirmed or probable depredations were made totaling \$8,687 (MT Livestock Loss Board 2014). As of April 2014 one payment has been made in both Ravalli and Missoula Counties, equaling about \$2,442. The amount of illegal take did not show much fluctuation between 2011 and 2013 and the rate is similar to that seen prior to 2009 (Montana Livestock Loss Board 2014). As mentioned in Bruskotter et al. (2009), poaching of wolves can be considered one of the most extreme acts of intolerance given the high risk, high effort, and low perceived benefits it entails. Lack of fluctuation in illegal take may reflect a lack of changes in tolerance of wolves, or it may simply be due to a low detection rate of such incidents. Overall mortalities decreased between 2012 and 2013 but increased by roughly 80 wolves from 2009 levels (FWP 2013). The increase from the number of mortalities in 2009 is not wholly unexpected as the hunting season is much longer and legal public trapping added. It is fairly safe to assume that livestock losses are suffered primarily in rural areas and Wildlife Services control actions also typically resultant from actual or threatened depredations. Without examining Montana Fish, Wildlife, and Parks permit and game check station records it is not possible to know the percentage of the legal wolf harvest that is due to rural versus urban hunters and trappers. Some interviewees perceived the wolf population as out of control and many times larger than promised by managing agencies in the 1980s and 1990s. The 2013 annual wolf

report from FWP states that in Western Montana alone there are enough wolves and nearly enough breeding pairs to keep the Montana subpopulation from being federally relisted, with a minimum of 123 wolves in 23 packs and 7 breeding pairs (FWP 2013). Statewide the population is 627 wolves in 152 verified packs (FWP 2013).

Lewis et al. (2012) conducted four mail-back surveys for FWP to measure resident attitudes towards public wolf hunting following the initial 2011 season. Surveys were sent to the general public, holders of ungulate hunting tags, holders of wolf hunting tags, and private landowners. Participants were asked to rate, on a scale from one to five, their tolerance for wolves on the landscape, tolerance for wolf hunting in Montana before and after the 2011 season, satisfaction with wolf management before and after 2011, and satisfaction with 2011 hunting regulations. Survey results showed that the singular season did not change tolerance of wolves or tolerance for wolf hunting in any sample population. Tolerance for wolf hunting after the 2011 season ranged from 60 to 83 percent, while intolerance for the hunt ranged from only 4.3 to 10.5 percent. In all four surveys roughly a third of respondents choose the neutral middle value regarding satisfaction with wolf hunting regulations. All surveys also showed that more a majority of participants reported they were “very dissatisfied” with overall wolf management before 2011. After the hunt, satisfaction rates are split fairly evenly along the scale except for low levels of respondents indicating they are “very satisfied.” With only recent hunting season and no legal allowance for public trapping having occurred at the time of the survey does at least help provide a baseline for comparison. However, bias may have resulted from participant being asked to retrospectively evaluate their opinions, and the quantitative survey format does not allow for explanation of motivations for any changes or lack of changes. Interestingly, only 7 percent of landowners, 17 percent of elk and deer tag holders, and 6 percent of the general public

reported that they had actively participated in the hunt, while 87 percent of current wolf tag holders expressed intention to purchase tags in the future. All of the explanations provided for participation and nonparticipation in the hunt mirror results in thesis interviews. Reasons for participation in the hunt include a perception that the Montana wolf population is too high, intention to assist in management and control, desire to shoot a wolf and to obtain a trophy, wish to have a novel experience, and to reduce future livestock depredations. Reasons indicated for nonparticipation include lack of time or money, desire to only kill animals for food, general lack of interest, and physical inability to take part related to age or illness. (Lewis et al. 2012)

Wolf literature consistently focuses on the politics surrounding the species. Specifically, the focus has been on anti-federalist and anti-environmental attitudes present in residents of the Northern Rocky Mountains and anti-rancher or hunter attitudes expressed by nonresidents, pre-existing distrust between stakeholder groups, aggravation of distrust and increased polarization of views due to the turbulent process of intentional reintroductions to Central Idaho and Yellowstone National Park and the process of removing the population from the federal Endangered Species List, and perceptions that impacts of wolf re-establishment are inequitable or that individuals' voices have gone unheard. As mentioned in the background section, USFWS has documented all official documents and legal proceedings. Courtroom motions, decisions, and appeals trace the highly contentious delisting process. The pattern of process-related changes culminating, in passage of the 2011 wolf rider circumventing administrative and judicial authority and legislatively delisting the NRM population in Montana and Idaho, is echoed by the evolution of opinions expressed in thesis interview. Nie (2003) noted an array of stakeholder groups cooperated in the original extirpation of wolves throughout the conterminous U.S. but anticipated that the delisting process would likely divide them. Interviewees reported

dissatisfaction with outside groups being allowed to influence management within the state of Montana and several hunter-trappers asserted that out-of-state environmental groups have only decreased support for wolf re-establishment by continually challenging the switch to state management. Nie (2003) also indicates that anti-federalist attitudes towards wolf management originate from frontier history and perceived threats to private property rights. Montag et al. (2003) agree with this claim. Majic and Bath (2010) found a similar pattern in re-establishment of wolves in Croatia to that described in literature and to a certain extent in thesis interviews. In one of the areas examined, political furor over wolf conservation policies led to polarization of opinions and only when media attention quieted was an increase in tolerance from ranchers evidenced. Articles by Bruskotter and his co-authors (2007, 2009, 2012, and 2013) assert that trust in managing agencies is critical in determining acceptance of predators. Interviewees that expressed such trust (particularly those in support of the Blackfoot Challenge and with past positive experiences with wolf biologists and managers) indeed appear to have an increased tolerance for problem wolves.

Nearly all thesis study interviewees indicated a desire for management and control consistent with dominionistic and utilitarian attitudes towards wildlife described by Kellert (1976, 1980, 1982, and 1985) and Bjerke et al. (1988). Interviewee expressions of desire for active public and agency control and management were consistent with the assertion by Bruskotter and Wilson (2013) that an individual's perception that their own actions, and those of others, can realistically impact wolf populations impacts risk perception. They are also consistent with ideas from the 1987 NRM Gray Wolf Recovery Plan and 1994 NRM Gray Wolf Reintroduction Final Environmental Impact Statement that direct control via public hunting and trapping and allowance of defense of livestock are critical to allowing increases in tolerance and

acceptance of wolves among those rural stakeholder groups that are most impacted by wolf re-establishment.

As mentioned, concern over impacts to livelihood and way of life was very frequently expressed in interviews. Many recent examinations of the impacts to livestock production have focused on financial valuations of losses, such as studies by Kallenberg et al. (2014) and Montag et al. (2003). Kallenberg et al. followed livestock sales, confirmed depredations due to wolves, and climate change data. Findings scientifically corroborate and quantify experiences described by ranchers in thesis interviews. However, interviewees took the argument beyond financial impacts, describing psychological predation stress-related pressure on their cattle but also on their own state of mind. Impacts to game populations mentioned by interviewees included predation pressure on herds in study areas shifting grazing patterns towards “safe” private lands and riparian areas, and in a few instances wolves causing a positive shift away from hay and alfalfa fields. Some feared that reductions in ungulate populations will destroy Montana cultural traditions of hunting and trapping. William et al. (2002), Karlsson, and Sjöström (2007), Andersone and Ozolinš (2004), Decker et al. (2006), and Ericsson et al. (2004) demonstrate that individuals’ negative attitudes towards wolves increase with perceived direct impacts to game populations, ranching, and way of life. This study did not seek to compare rural versus urban acceptance of wolves, although interviewees asserted that urban residents in Montana are typically associated with environmental radicalism. This contrasts with claims from Heberlein and Ericsson (2005) that urbanization increases indifference of wolf management.

Personal affects, beliefs, and attitudes towards wolves have been trickier to examine than other themes in this study, although they are sprinkled throughout interview transcripts. Hunter and Brehm (2004) assert that residence in rural areas and environmental concern are not

mutually exclusive as other studies would seem to suggest. Interviewees expressed emotional responses to wolf interaction that are fearful but also respectful. At times interview transcripts echo past beliefs about history of wolves in the NRM like the tendency of wolves to “kill for fun” (McIntyre 1995).

Lack of knowledge and experience with predators, both wolf and non-wolf, seem to impact acceptance levels. Findings from this study support those from Montag et al. (2004) that rural ranchers and hunters in the NRM region to some degree accept the threat of wolf presence as just one more thing they must cope with. Heberlein and Ericsson (2005) found that residents new to rural areas and coexisting with predators expressed the lowest tolerance levels and that as interactions with predators increase fear decreases. This also feeds into the conception of family history as an influential factor in determining acceptance of wolves. In this thesis, however, generational experiences work both ways. Some fourth and fifth generation interviewees indicated that ancestors’ participation in extirpation and the threat wolves posed in both the past and present are evidence that return of the wolf is negative. However, others indicated that awareness of continued wolf sightings over the years, despite official claims that they were extirpated from Montana in the early twentieth century, increased their willingness to accept the hazard because it is not new to the area.

Nie et al. (2003) and Lewis et al. (2010) both noted that societal norms and values shape perception of predator harvest. This is also acknowledged in case studies of the Blackfoot Challenge (Weber 2009). In a review of Kellert’s work, Vale et al. (2005) claim that culture has its greatest influence on shaping attitudes during upbringing. This did not emerge clearly in interviews. Interviewees have held residence in Montana for an extent of 8 to 88 years. With many residents having resided in Montana for lengthy amount of time most expressed attitudes

expected of any rural Montana resident, such as the anti-federalism mentioned above. The one interviewee who was most likely to have been influenced by a different cultural upbringing, originating from Eastern Europe where wolves were present, might also have been greatly impacted by training as a wildlife biologist. While studies mentioned in the lit review section suggest that higher education levels are associated with increased tolerance, this did not hold true in thesis interviews. Some that had little formal education expressed acceptance and admiration for wolves, while others with education up through Masters Degrees appeared to be very intolerant and at times fearful for human safety. The difference may truly be generational, with less recent education having been trained in a completely different management paradigm. This would seem to agree with studies by Andersone and Ozolinš (2004), Majic and Bath (2010), and Williams et al. (2002) that report age as a determining factor in levels of acceptance, with younger generations more willing to tolerate or steward predators.

Belief that wolves have a critical place on the landscape was often tied by interviewees to much publicized research by Ripple and coauthors (2007, 2008, 2009, 2012, and 2012) on the far-reaching ecological benefits of restoration in Yellowstone National Park. Hunters and trappers who spend large amounts of time in the outdoors similarly described noticing changes in landscape condition and population levels of other wildlife. Berger et al. (2008) document a reduction in population levels of coyotes, direct competitors for resources, and a subsequent increase in pronghorn from the decrease in coyote predation on newborns. Acceptance that wolves will now be a long-term presence on the landscape seems to improve overall tolerance of the species among the thesis sample population. The notion seems to be that acknowledgement of this point is a critical precursor to capability of managing the land, other wildlife, and private livestock production well.

Implications and Conclusions

We as a society, and as individuals, are frequently guilty of dismissing ideas and attitudes countercurrent to our own as being invalid. In wildlife research and management there is a temptation to dismiss approaches that are not firmly rooted in quantitative physical and biological sciences. Social considerations are tricky, imprecise, and complex, particularly when policy and management actions generate long-standing conflicts. Manfredo (2008) writes that over the years he has studied stakeholder attitudes and values in human-wildlife conflict, managers have typically been surprised by research results. Biologists and managers generally are drawn to the wildlife profession out of desire to conserve natural resources rather than work with the public (Manfredo 2008). Training for the field focuses on biological rather than sociological concepts, which can lead to a perception among professional practitioners that there is a right or wrong answer and that their job is to convince the public of these points of view (Manfredo 2008). Considering that wildlife conservation in the U.S. is predicated on the Public Trust Doctrine—through which wildlife was placed in trust for the public through state control and regulation—this gap in understanding of public views and acceptance levels is concerning and may have real consequences for human-predator conflict management (Schwartz 2003).

Traditional avenues for resolving the mixed social and biological issues that may arise in wildlife management—such as legislative, administrative, or judicial processes—can lead to degradation of trust and relationships between stakeholder groups, physical and psychological harm, waste of both human and natural resources, and erosion of communities involved (MacDonnell 1988, McKinney 2010 and 2011). Conflict in resource management need not always result in negative outcomes. Resolutions focused on reconciling interests, rather than

determination of right or power, can increase communication and trust and lead to positive social changes and a lasting solution of problems (McKinney 2010 and 2011).

The frequency with which interviewees in this study focused on the political process of wolf delisting and management as well as their frustration and distrust of opposing stakeholder groups should give reason enough to reflect on the drawbacks of traditional approaches to conflict resolution in Western Montana. Indeed the Northern Rocky Mountain gray wolf case would seem to demonstrate the danger of the increasing polarization of attitudes that litigation and other traditional conflict resolution approaches may carry. In a case study of the Blackfoot Challenge, Weber (2009) asserts that by focusing on interest based solutions, participants of the landowner-agency collaborative effort have redefined social norms based on shared values and sense of place for “understanding public problems, the community itself, interests, actors, and sectors of society.” From this study’s interviews and prior knowledge, I gather that wolves in the Blackfoot present a novel test of the goodwill and redefined norms created by the Challenge.

Positive working relationships between managing agencies and landowners will be of key import in moving forward with wolf conservation. Those ranchers who expressed trust for the U.S. Fish and Wildlife Service, Montana Fish, Wildlife, and Parks, or the Blackfoot Challenge showed a slight increase in wolf tolerance. These individuals were more likely to invest in preventative measures to protect livestock and were more willing to use non-lethal methods to address conflicts when they occur. This was one of many unexpected findings. Shusler et al. (2008) note that the nature of social relations wildlife management agencies have with communities can be considered a form of capital that is equally as important as money and infrastructure. The authors go on to state that through fostering a sense of trust, increasing

stakeholder involvement, and developing social capital, managing agencies can increase communities' wildlife acceptance capacity, and proactively deal with any conflict.

Delisting of grizzly bears from ESA protection is likely to be the next great debate in predator management in Montana and throughout the Northern Rocky Mountain region. The social dynamics of grizzly conservation and management are similar to those seen for wolves (Serhveen 2012). In certain areas depredation of livestock is greater from bears than wolves. Grizzlies are less biologically resilient to hunting pressure. Historic grizzly removal efforts have been nearly as violent and exhaustive as that of wolves, and the risk to human safety of grizzly presence higher. Recovery efforts have been attributed to an intense public education and outreach effort in the Greater Yellowstone Ecosystem and willingness of managing agencies to remove problem animals (Greater Yellowstone Coalition 2011). Like the in the wolf case, grizzly management is really people management (Serhveen 2012, Rachel 2012). Social consequences of delisting and transfer to state management of grizzlies—as well as the consequences of maintaining the species' status as a Threatened and Endangered Species—must be considered with equal weight as the biological and ecological considerations.

The broad extent of the social repercussions of wolf reintroductions and recovery in the Northern Rocky Mountains is as yet unknown and warrants further research. Consequences of the wolf debate have already been felt in the grizzly case. Despite federal approval, efforts to intentionally reintroduce five female grizzlies into the Selway Bitterroot Wilderness along the Idaho-Montana border were quashed at the Idaho state government level in 2009 in a political backlash to the contentious wolf delisting process (Rachel 2012, Serhveen 2012). In 2008 Idaho revised their wolf management plan, which stated that the Idaho subpopulation should be

maintained at about 500 to 600 individuals. However, as part of the 2009 backlash, Idaho Fish and Game reverted to their original 2002 wolf plan, which calls for the wolf population to be maintained above 150. The negative social consequences of wolf reintroductions, natural re-establishment, and the litigious delisting process should provide guidance for agencies, NGOs, and the general public of how not to handle grizzly management and policy.

For this sample population, the factors that lead to where interviewees fall on a scale of wolf acceptance since the advent of public hunting and trapping seasons over are incredibly complex. Influential factors that emerged in these interviews include the ramifications of political maneuvering; the place and impact of wolves in the ecosystem; personal beliefs, affects, and attitudes; the need for management and control of the wolf population; impacts to interviewee's livelihood or way of life; past interactions with predators; cultural influences like norms and family history; and noted changes in opinions towards wolves. Interview data reveal complex relationships between stakeholders, interest groups, and impacts from wolf re-establishment, as well as complex attitudes towards wolves that often incorporate some level of awe and admiration. It is not possible to state that public hunting and trapping seasons have been a sole cause, or lack of cause, of any changes in acceptance of wolves, nor can the multiple components be fully enumerated. What is certain is that all of the factors mentioned above create a web of influences specific to each individual. One interviewee has actively acted as a steward to wolves, several have committed possible acts of intolerance, while most lie somewhere in the grey dimensions in between the ends of the scale. While the impacts of the seasons have not yet been great or entirely consistent across the sample population, statements made by interviewees suggest that removal of public wolf hunting and trapping liberties would

greatly reduce tolerance and acceptance in these interest groups and increase an overall polarization of public opinions.

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Appendix A: Interview Guide Questions

- 1) Do you or your family own a ranch (*adapt to interview location*)? Tell me a little bit about it, such as what you grow or raise.
 - Prompt: is livestock main source of income?
- 2) What has been your experience with wolves (i.e.: when you think about your interactions with wolves what stands out to you)?
 - Probe responses: i.e. I heard you say that wolves have a detriment to cattle and/or game herds; can you tell me more about that? *OR* Can you tell me a story about your experiences with this?
- 3) How has this changed since hunting and trapping of wolves have been allowed (2009 and 2012 respectively)? Please explain.
- 4) Can you tell me about any hunting or trapping you do generally, i.e. what sort of game you hunt or trap?
 - Follow-up: Tell me about any wolf hunting or trapping you yourself do.
 - If you haven't been wolf hunting/trapping: Tell me about any plans you might have to hunt or trap wolves *OR* How come you don't hunt/trap wolves and/or other animals?

Clarify attitude if not clearly stated by this point

- 5) Do you think you would change your opinion of wolves in the future?
 - Cause/circumstances?
- 6) Is there anything that you think I'm missing, that I haven't asked you, or that you think I should be aware of?

Appendix B: Northern Rocky Mountain Gray Wolf Timeline

Early 1900s: Wolves extirpated from contiguous U.S.

1973: NRM gray wolf subspecies designated as endangered under the ESA

1978: Gray wolves listed as endangered throughout entirety of historic range

1980: NRM Wolf Recovery Plan created

1986: First NRM pack documented outside of Glacier National Park

1987: Revision of the NRM Wolf Recovery Plan

1994: Wolves in Idaho, Wyoming, and a portion of Montana designated as an Experimental Nonessential Population

NRM Wolf Reintroduction Final Environmental Impact Statement released

1995-96: 66 wolves from Canada released in central Idaho and Yellowstone National Park

2003: NRM reaches recovery population numbers (exceeded the minimum needing for delisting for 10 consecutive years)

2004: Idaho and Montana State Management Plans approved by USFWS

2008: USFWS delists NRM wolves from ESA

Judicial injunction prevents delisting until genetic connectivity between subpopulations is proven

2009: Wolves delisted in Montana and Idaho

2009-2010: Montana and Idaho hold public hunting seasons

2010: District Court rules that wolves in Montana and Idaho cannot be delisted until wolves in Wyoming can be delisted.

USFWS challenge a portion of the Wyoming Management Plan in court but are denied

Early termination of the hunts in Idaho and Montana as wolves are relisted

2011: Congressional rider attached to budget legislation delists wolves in Idaho and Montana

Litigation challenging constitutionality of rider is overruled

2012: USFWS approves delisting in Wyoming

2013-14: USFWS proposes delisting gray wolves throughout the entirety of their historic range

Appendix C: Terminology

Additive mortality: takes place when the additional risk of death does not cause reductions in other forms of mortality, but rather increases overall mortality rate (Ballard et al. 2001). 1994 FEIS assumes that additive mortality is not a significant factor in livestock losses, but rather that livestock wolves might kill would die anyways.

Affect: a psychosomatic response to a stimulus based on past direct and indirect experiences with the stimulus (Damasio 1996)

Belief: ideas that do not require support from actual proof

Closed Cow: cow with a calf to raise

Compensatory mortality: additional risk of death causes a reduction in other forms of mortality so that overall mortality either does not change or is less than it would be if additive, ex. a dispersing wolf yearling that is killed in a trap may have otherwise died from conflict with an established wolf pack (Ballard et al. 2001)

Cow-calf Operation: A method of raising beef cattle in which a permanent herd of cows is kept by a farmer or rancher to produce calves for later sale.

Cultural Norm: culturally shared attitudes regarding the acceptability of certain behaviors (Bruskotter 2009, Zinn et al. 2000, Zinn et al. 2008, and Decker et al. 2006)

Depredation: predation on domestic livestock

Existence Value: Defines the value people attach nationally to simply knowing that wolves exist in the recovery areas as measured through public surveys.

Open Cow: cow that is not pregnant and is without a calf to raise

Predation Risk/Stress/Pressure: sustained and acute effects of predation risk on prey demography, cognition, and behavior (Clinchy et al. 2013)

Public Trust Doctrine: the principle that wildlife resources are owned by no one, to be held in trust by government for the benefit of present and future generations, established in 1842 by a U.S. Supreme Court ruling in the case of *Martin v. Waddell* and reaffirmed in the U.S. Supreme court ruling in the 1896 case *Geer v. Connecticut*

Wolf Recovery: legally defined measure of success of reintroduced NRM gray wolf subpopulations that standardizes delisting from the federal Endangered Species List. It is set at a metapopulation of 30 breeding pairs and 300 individuals, with 10 breeding pairs and 100 individuals each in Montana, Wyoming, and Idaho and proof of genetic connectivity between these subpopulations.

Wildlife Reintroduction: the deliberate release of a species into the wild, from captivity or relocated from other areas where the species survives. For wolves, it is the intentional capture, relocation, and release of 66 wild Canadian gray wolves into Central Idaho and Yellowstone National Park

Wildlife Acceptance Capacity: a maximum level of wildlife that can exist in an area as limited by human tolerance (Decker & Purdy 1988, Bruskotter 2009, Carpenter et al. 2000).