
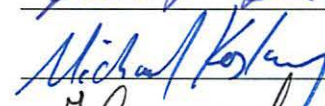

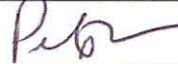


LOCAL TRAPPING AS PREDATOR CONTROL IN RURAL ALASKA: LIMITING
FACTORS IN ALLAKAKET AND ALATNA AND THE POTENTIAL FOR
INCREASED COMMUNITY INVOLVEMENT IN WILDLIFE MANAGEMENT


By

Heidi L. Hatcher

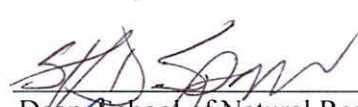
RECOMMENDED:

Advisory Committee Chair


Chair, Department of Humans and the
Environment

APPROVED:


Dean, School of Natural Resources and
Agricultural Sciences


Dean of the Graduate School

8/20/23
Date

LOCAL TRAPPING AS PREDATOR CONTROL IN RURAL ALASKA: LIMITING
FACTORS IN ALLAKAKET AND ALATNA AND THE POTENTIAL FOR
INCREASED COMMUNITY INVOLVEMENT IN WILDLIFE MANAGEMENT

A
THESIS

Presented to the Faculty
of the University of Alaska Fairbanks

in Partial Fulfillment of the Requirements
for the Degree of

MASTER OF SCIENCE

By

Heidi L. Hatcher, B.A., B.S.

Fairbanks, Alaska

August 2013

Abstract

For a community to be involved in natural resources management that community must have the capacity to make management actions. The capacity for a community to be involved in natural resources management or to take management action might be dependent on a wide variety of factors, largely based upon the resource and asset base available to a community. Aerial wolf control as a wildlife management strategy in the state of Alaska is a controversial endeavor. In the rural villages of Allakaket and Alatna wolf trapping was traditionally a commonly practiced subsistence activity but local levels of wolf trapping are currently very low. The State of Alaska began performing aerial wolf control around Allakaket and Alatna in February 2013 per the request of local residents but the program took more than a decade to come to fruition. To investigate the factors that have led to the decline in local wolf trapping in Allakaket and Alatna and to determine if local trapping could be increased as a means of predator control this study adopted a modified analytic induction methodology. Four propositions and hypotheses were developed regarding the decline in local trapping and the potential to increase local wolf trapping. The propositions and hypotheses were based on the ideas that 1) a community must possess the capacity to take action in order to do so, 2) The benefits of action must outweigh the costs, 3) local norms and values must support an action for it to occur, and 4) management roles, responsibilities, and power-dynamics between communities and management agencies can affect the action of a community. Semi-structured interviews were conducted with 16 residents of Allakaket and Alatna to gather data relevant to the propositions and hypotheses. A codebook was developed and

Randolph's Free-Marginal Multirater Kappa was calculated with acceptable levels of inter-coder reliability resulting for each code ($k \geq .80$). Codes were used to organize data from each interview, which were then used to test the hypotheses. Local norms and values do not appear to be limiting local trapping, the community recognizes the benefits of local trapping to outweigh the costs, and the community also recognizes itself to have a responsibility to take management action, so management power dynamics do not appear to be limiting trapping. The community may not have the full capacity to increase local trapping as a form of local wolf control, as the resources or motivation to organize an increase in local trapping are not being realized within the community. Furthermore, a generation gap was identified that appears to be limiting the ability of the community to connect potential trapping students with teachers to revive and perpetuate the local tradition of trapping.

Dedication

This thesis is dedicated to my dad, Michael Hatcher, for his support when it was needed most and for instilling within me an appreciation for our wildlife resources and a passion for conserving those resources for future generations to enjoy and utilize. This thesis is also dedicated in loving memory to my mom, d'Anne Hatcher, for providing me with life skills to succeed, confidence in my abilities, and a drive to fulfill my greatest potential.

Table of Contents

	Page
Signature Page	i
Title Page	iii
Abstract	v
Dedication	vii
Table of Contents	viii
List of Figures	xi
List of Tables	xii
List of Appendices	xiii
Acknowledgements	xiv
Chapter 1: Introduction	1
1.1 Purpose of Study	1
1.2 Study Hypotheses.....	5
Chapter 2: Background	11
2.1 A Brief Sociopolitical History of the Study Area.....	11
Pre-European Contact	11
Post-European Contact.....	12
Present-Day Alatna and Allakaket.....	21
2.2 A Brief History of Ecology and Predator Control in the Study Area	24
2.3 Native Culture and Changing Lifestyles in Allakaket and Alatna.....	34
Changing Lifestyles	34

Wolves in Koyukon Athabaskan Culture	40
2.4 Significance of Traditional Ecological Knowledge and Community-based Management.....	42
Traditional Ecological Knowledge and the Upper Koyukuk Region	42
Lessons from Community-Based Wildlife Management	44
2.5 Significance of Community Capacity and Social Influences	50
Community Capacity	50
Social Barriers to Community Wolf Control	57
Chapter 3: Methods.....	59
3.1 Study Design and Approval	59
3.2 Cooperation, Survey Design, Selection of Respondents, and Data Collection	60
3.3 Analysis.....	62
Chapter 4: Results	69
4.1 Interviews.....	69
4.2 Codebook and Kappa Values.....	70
4.3 Community Capacity	71
Cognition: Understanding the Problem	72
Furbearers and Trapping Knowledge.....	74
Community Support: Human and Social Capital.....	80
Economic Capital.....	82
Capacity-related Deterrents	83
Effects of Changes in Capacity.....	86

4.4 Cost/Benefit Investigation	91
Costs and Risks to be Outweighed.....	91
Benefits Identified by the Community.....	96
Overall Value	97
4.5 Social and Cultural Barriers within the Community.....	98
4.6 Resources Management Roles	101
4.7 Past Efforts to Increase Local Trapping.....	106
4.8 Examination of Hypotheses and Modification of Propositions	107
Chapter 5: Conclusions, Discussion, and Recommendations.....	111
5.1 Conclusions and Discussion	111
5.2 Recommendations for Management Agencies	114
References.....	119
Appendices.....	129

List of Figures

	Page
Figure 2.1.1 Land Status Map of Upper Koyukuk River.....	19
Figure 2.1.2 National Conservation Unit Boundaries near Allakaket and Alatna.....	20
Figure 2.1.3 Game Management Unit 24: Fish and Game Regulation Boundaries	21
Figure 2.2.1 Unit 24 Moose Hunter Success Rates 1997-2010	31
Figure 2.2.2 Wolf Harvest Levels in Unit 24 Since 1988.....	33
Figure 2.3.1 Native Children in Interior Alaska Display Spoils of Hare Hunt between 1913 and 1939.....	35
Figure 2.5.1 Estimates of Asset Availability Relative to Predator Control for Allakaket and Alatna	51
Figure 2.5.2 The Community Capacity Model of Multiple Capacities, Multiple Outcomes	52
Figure 2.5.3 Assets Utilized and Outcomes Expected for Current Action	53
Figure 2.5.4 Potential Outcomes of Local Wolf Hunting and Trapping	55
Figure 3.3.1 Code Agreement Grid for Calculating Kappa	65
Figure 4.3.1 Map of Wolves and Wolf Sign Seen by Respondents in the Year Preceding Interviews.....	75
Figure 4.3.2 Map of Wolf Sightings and Sign in Allakaket and Alatna in 2011-2012	76

List of Tables

	Page
Table 2.4.1 List of CBNRM Design Principles from Cox et al. 2010.....	47
Table 4.1.1 Interview Results and Respondent Demographics	69
Table 4.2.1 Free-Marginal Multirater Kappa Statistic Results.....	70
Table 5.2.1 Possible Components of a Local Wolf Control Program	116

List of Appendices

	Page
Appendix A. Semi-Structured Interview Template	129
Appendix B. Institutional Review Board Approval Letter	134
Appendix C. Final Codebook	135
Appendix D. Interview Results Organized by Analysis Themes	140

Acknowledgements

I would like to thank my committee members for their help and support throughout the creation of this thesis: Knut Kielland, Michael Koskey, Glenn Stout, and Peter Fix. I would especially like to thank Peter Fix for his tremendous amount of help as committee chair and Glenn Stout for the volunteer opportunities and stimulating conversations that led me to the questions that resulted in this thesis. I would also like to thank Seth Wilson for his assistance and support throughout the entire process of this study. Without the volunteer opportunities provided by the Alaska Department of Fish and Game Divisions of Subsistence and Wildlife Conservation this study would not have occurred. Special thanks to the Alaska Trappers Association for the Dean Wilson Memorial Scholarship in support of this study. This thesis was also supported by the Alaska EPSCoR Award, Grant Number EPS-0701898 from the National Science Foundation. The content is solely the responsibility of the author and does not necessarily represent the official views of the National Science Foundation. Most importantly, I would like to thank the residents of Allakaket and Alatna for their tremendous hospitality and the respondents for participating in the study and sharing their background, knowledge, thoughts, and opinions.

Chapter 1: Introduction

1.1 Purpose of Study

This study investigates the possibility and feasibility of increasing community involvement in wildlife management by utilizing local trapping as an alternative to direct agency predator control efforts. In an area where aerial wolf control is to be performed, this study seeks to define obstacles that are preventing local community residents from trapping wolves in hopes of determining possible solutions to predator control dilemmas. The study is guided by the ideas of community capacity, aspects of group action, and causes of group or individual inaction (Baron et al. 1992, Beckley et al. 2008, Gifford 2011).

Throughout Alaska natural resources are utilized at the local level to fuel subsistence lifestyles and cultures to an extent that is unique within the United States. Wild foods are utilized by 95% of rural Alaskan households and are harvested at an average rate of 316 pounds per rural resident per year (Wolfe and Fall 2012). Even urban dwellers utilize subsistence resources, harvesting an average of 23 pounds of wild foods per person per year (Wolfe and Fall 2012). With this unique reliance on natural resources for subsistence also come unique challenges for the management of natural resources. For example, in interior Alaska large ungulates such as moose and caribou are staples in the diets of many residents. These sources of protein are heavily relied upon by rural Alaskans in particular (Wolfe and Fall 2012). Wolves and bears are prevalent in most of Alaska's interior and these predators can create significant competition for humans over

moose and caribou (Bergerud et al. 1983, Ballenberghe and Ballard 1994, National Research Council 1997). In some areas predator control is a management option that can reduce the competition over moose and in turn allow for more moose availability for rural Alaskans (National Research Council 1997, Titus 2007, Alaska Department of Fish and Game 2011*a*). If released from predatory pressures for long enough, moose densities may even increase if other factors such as habitat and nutrition availability will support a greater population (Ballenberghe and Ballard 1994).

Governmental agencies performing predator control measures in Alaska is a controversial political topic with much public debate. This controversy creates a hurdle that is preventative in many situations (such as in communities surrounded by federal lands, where National Environmental Policy Act (NEPA) requirements must be met), and may take a decade or more to develop, approve, and enact in others. Such delayed or nonexistent responses to over-predation on rural moose populations result in conflicts between rural communities and government agencies and may also be linked to subsistence food shortages for rural residents as local moose densities decline (Holen et al. 2012). For these reasons, a less political alternative to direct predator control efforts by government agencies could prove useful for rural Alaska.

Two villages in interior Alaska are facing the predicament caused by low moose densities and high numbers of predators. These villages are Allakaket and Alatna, which are situated near the confluence of the Alatna and Koyukuk Rivers. Allakaket and Alatna residents have requested that the Alaska Department of Fish and Game (ADF&G) undertake aerial wolf control. Legally, those residents have the opportunity to take local

wolf control action through hunting and trapping and in turn benefit in both subsistence and economic terms.

The objectives of this study are to determine the limiting factors that are preventing local residents from trapping wolves around Allakaket and Alatna and to investigate the factors that led the communities to pursue and wait for ADF&G predator control (a process that has taken more than a decade) rather than implement their own through hunting and trapping.

Another goal of this investigation is to provide insights into effective methods of encouraging the community to work towards enacting wildlife management such as predator control locally. Discerning factors that have prevented past efforts from being successful at increasing local involvement in predator control through trapping and hunting will be helpful for resource managers. Identifying what methods or incentives might sway community members to become more involved in local wolf harvest may be useful to prolong the desired effects of the local Intensive Management (IM) program. Creating a greater understanding of local community views on wildlife management and the community's role in predator control and local wildlife management will be useful for future efforts to increase local involvement in wildlife management. Furthermore, although this investigation represents a case study for a very specific location and culture, the results of this investigation may provide clues about how to proceed towards increasing community involvement in predator control for other Alaskan communities for which aerial predator control may not be an option.

It is important to recognize that, in Alaska, unofficial management of wildlife occurs at the local level according to the management views of the local people. This management is informal in leadership, practice, and enforcement and this unofficial management may not always be in accordance with legal management regulations. Management agencies are often not informed of these management actions and harvest and use data gathered by agency employees are sometimes manipulated by resource users to reflect what they would like the agency to think is occurring regardless of what actually occurs. This creates a difficult situation for management officials but reflects differences in local and official management philosophies.

Epistemology teaches us that knowledge is constructed and obtained in different ways, the evidence of which can be seen in the different management philosophies found in Alaska. Agency management philosophy is largely developed through western science in the context of western culture and worldviews while local management philosophy is largely governed by Native worldviews and indigenous culture. The two philosophies strive largely for the same goals of providing for the use of important resources while maintaining those resources in viable and sustainable ways but the methods of achieving these goals are not always agreed upon or understood from one philosophy to the next. For both philosophies, suspending disbelief of why a management action may be chosen often enables us to see the logic behind the action itself.

This study endeavors to suspend disbelief to record and portray the views and ideas of the people of Allakaket and Alatna, but this is a study performed in the context of western science by a researcher with a western worldview. The researcher cannot

fully grasp how the different worldview and epistemology of the respondents affects their views, beliefs, or actions in regards to wildlife management but she hopes to successfully gather and interpret information in a sufficiently representative manner so as to increase agency and academic understanding of local views of wolf management in Allakaket and Alatna.

1.2 Study Hypotheses

To investigate the factors that limit local involvement in wolf trapping and hunting as a means of local predator control four propositions were put forth, with specific hypotheses developed for each.

The first proposition is based on the idea that a community must have the capacity to act in order to do so (Moore et al. 2006, Beckley et al. 2008).

Proposition 1. Communities will not perform local predator control without the capacity to do so, including knowledge and understanding of local predator-prey ecology, of current levels of local predator and prey populations, and of how over-predation can be addressed locally. Capacity also includes access to sufficient physical and economic resources for predator control as well as capable and willing participants and sufficient knowledge for successful predator control efforts such as trapping and hunting.

Hypothesis 1: Residents of Allakaket and Alatna possess the capacity for local predator control.

There is evidence that the effects of predators on the moose population around Allakaket and Alatna are well understood within the community (Simon and Mack 2004,

Holen et al. 2012). This investigation expects to confirm that understanding the ecology of moose-wolf interactions and the results of predator control on moose hunter effort is not an impediment to local predator control in this case. The investigation will focus on identifying the availability of other resources that are necessary for the community to have the capacity to enact local predator control in an effort to determine if lack of capacity is the factor limiting local predator control. Those specific resources will be discussed in more depth in Chapter 2.

Rejecting Hypothesis 1 suggests that the community of Allakaket and Alatna lacks one or more assets that are essential to the community having the capacity to enact local concerted wolf trapping and hunting efforts. Failure to reject Hypothesis 1 will suggest that a lack of local wolf control efforts is due to factors other than capacity. These other factors are investigated in Hypotheses 2 through 4, which will be tested by modified analytic induction.

Proposition 2. A subsistence-based community will not engage in local predator control actions such as concerted hunting and trapping if there are not clear and sufficient benefits that can be utilized in a subsistence economy to balance the cost and effort required for such action.

Hypothesis 2: Community efforts towards local wolf control through hunting and trapping will provide benefits sufficient to outweigh the investment required by individuals and by the community and residents of Allakaket and Alatna understand these benefits.

Rejecting Hypothesis 2 would suggest that the community does not enact local predator control because it is not currently worth the investment of resources. Failure to reject Hypothesis 2 will suggest that lack of local wolf control efforts are not due to a lack of potential benefits. This investigation will seek to identify what costs and risks must be overcome in order for the community to enact local predator control efforts, as well as potential benefits recognized by the community. Benefits will be compared to the costs to estimate if the outcome of local predator control efforts might outweigh the risks and costs.

Proposition 3. Even with the capacity to take action a community will not engage in local predator control without cultural norms and values to support such action.

Hypothesis 3: The local norms and values of Allakaket and Alatna do not prohibit local predator control actions.

Rejecting Hypothesis 3 would suggest that local wolf control efforts go against local norms and values and so local predator control is not feasible. Failure to reject Hypothesis 3 suggests that local norms and values support local wolf control actions and a lack of local wolf control efforts is caused by alternate factors. In a community where local predator control may require individuals to participate in activities such as hunting and trapping norms and values can have significant effects on individual behavior and participation (Sherif 1936, Dowling and Pfeffer 1975, Fishbein and Manfredo 1992, Fulton et al. 1996, Gifford 2011). Wolf hunting and trapping must be a culturally acceptable activity for community members to engage in while incentives and programs must target ages and sexes that are culturally accepted to participate. Predator control

activities such as hunting and trapping and the benefits that arise from them must be valued enough by potential participants to compete with other activities that are prevalent within the community. Hunting and trapping must be in accordance with the values that individuals and the community hold in regards to wolves, the environment, ecology, spiritual and cultural worldviews, tradition, etc. This investigation will seek to identify local norms or values that may be restricting or competing with local participation in predator control efforts such as hunting and trapping.

Proposition 4. When resource management such as predator control requires effort and resources but an outside institution controls resource management and management decisions and enforces management regulations through negative sanctions, a community will be more inclined to seek management action from those with official power than take management action itself.

Hypothesis 4: Residents of Allakaket and Alatna see local predator control as the responsibility of management agencies.

Rejecting Hypothesis 4 would suggest that factors other than top-down management power dynamics contribute to the lack of local wolf control efforts in Allakaket and Alatna. Failure to reject Hypothesis 4 suggests that power dynamics would have to be addressed for local wolf control efforts to occur. The power imbalance through top-down governmental resources management may be one of the most influential factors limiting communities from enacting wildlife management efforts such as local predator control (Child 1996, Hackel 1999, Balint and Mashinya 2006). In a system where the ownership of local wildlife resources, the responsibility of managing

local wildlife resources, the power to make official wildlife management decisions, and the ability to conserve local wildlife for local harvest and use have all been removed from the hands of the local community and placed in the hands of governmental agencies it is difficult to expect local communities to use their own resources and initiative to enact wildlife management efforts such as predator control. When a governmental agency has official control over wildlife management and is funded to enact such management local communities may see programs such as predator control as the role and responsibility of that agency, so requesting that the agency enact such a program may be more logical than the community enacting one itself. When that agency limits local wildlife management decisions and actions through negative sanctions such as fines, seizure of equipment, incarceration, etc., to force compliance with agency management decisions and regulations this may further limit a community's inclination to enact its own local wildlife management. This investigation will seek to identify local views and feelings towards governmental wildlife management in the area, towards the roles and responsibilities of individuals, community groups, and agencies in wildlife management, and if those views might be contributing to the lack of local predator control activities.

Chapter 2: Background

2.1 A Brief Sociopolitical History of the Study Area

Pre-European Contact

For thousands of years Alaska Natives have inhabited the boreal forest surrounding the Koyukuk River in interior Alaska. Before contact with Europeans humans subsisted in the area by utilizing the natural resources available to them. Through this reliance on the land and waters the Native peoples developed a strong connection with and understanding of the environment and ecology within which they lived. They lived off of land mammals and fish, wore clothing made of animal hides, and created tools such as snowshoes, boats, bows, and spears from the stones, wood, and animal resources that they collected. Groups of people traveled across the land to where they knew resources were abundant, or moved in search of resources when food was scarce. Summers were spent along the river harvesting the salmon as they swam upriver to spawn and the richest pools were visited to gather sheefish. Hunting bears provided important meat and opportunities for young men to prove themselves within their social groups. In the winter caribou would often move through the country and were a welcome addition to local resource availability. When large game was scarce smaller game such as snowshoe hares and ptarmigan often carried the people through the long winter. By moving in a nomadic fashion to utilize resources when they were seasonally available and by discouraging waste and managing the resources available to them the Natives of interior Alaska lived as part of the local ecology, subsisted off the natural resources of the

area for generations, and left virtually no visible impact on the land or environment (Clark 1974, Nelson 1986).

Traditionally the area surrounding the Koyukuk River was predominantly Athabaskan territory, but the area near present-day Allakaket and Alatna was unique in that Koyukon Athabaskans and Iñupiat of Kobuk and Selawik background periodically came in contact in this location on peaceful terms to trade (Huntington 1993, Holen et al. 2012). While Athabaskans and Iñupiat are elsewhere known to be enemies (a sentiment that can still be found in some villages today), the close proximity of their territories on the upper Koyukuk, the benefits of trade, and the interaction required for trade resulted in the Athabaskans and Iñupiat of the area having less animosity toward each other.

Traditionally there was a “no man’s land” between Athabaskan and Iñupiat homelands, but in general within Athabaskan country there were no territorial boundaries (Nelson 1986, Huntington 1993). Different clans or families frequented different areas of the river valley, particularly for summer fish camps, but in general Athabaskans traveled to where they knew resources could be found, took what they needed, and allowed other Athabaskans to do the same. Lifestyle, resource use, and social interaction was far different from today’s Koyukuk valley, which involves land and resource ownership, political boundaries, regulatory agencies, settled villages, and a cash economy, among many other changes.

Post-European Contact

First European contact near the mouth of the Koyukuk River occurred in 1838 when the Russians established a trading post in Nulato. On the Koyukuk River

Lieutenant Zagoskin of the Russian Navy made it as far north as the Kateel River by 1842. Europeans, however, did not reach the upper portions of the Koyukuk River until 1885, nearly 20 years after the Alaska Territory was purchased from Russia by the United States in 1867 (Allen 1887, Clark 1974, Nelson 1986). Long before this time the Natives of the Koyukuk River Valley were introduced to European goods such as beads, firearms, and European staple foods through trade and had since grown accustomed to using them (Allen 1887, Clark 1974). When the first European explorers reached the upper portions of the Koyukuk they found families situated along the riverbanks with no large or permanent settlements, but the people were generally friendly, helpful, and willing to trade or even gift the salmon that they had harvested, despite lower Koyukuk Athabaskan hostility displayed in the 1850s and 1860s (Allen 1887, Clark 1974).

The gold rush of 1898 brought an influx of white prospectors to the Koyukuk River and with them came missionaries, religion, commerce based in a cash economy, and the beginnings of settlements along the upper Koyukuk (Clark 1974, Wyman 1988, Beetus et al. 1993). Koyukon Athabaskans and Kobuk Iñupiat had begun to form small villages on opposite sides of the Koyukuk near the mouth of the Alatna River by the late 1800s but Elders recount Arctic City (about 10 miles downriver from the mouth of the Alatna River) as the first town on the upper Koyukuk, where Bishop Rowe gathered the local Natives and baptized them (Clark 1974, Beetus et al. 1993). When Bishop Rowe asked the Natives where they would like their next town to be the people told him to put it at a trapping camp across from the mouth of the Alatna River, and so Archdeacon Hudson Stuck built an Episcopal mission at present-day Allakaket in 1907 and a

permanent settlement was begun (Stuck 1920, Beetus et al. 1993). St. John-in-the-wilderness served both Athabaskans and Iñupiat (Stuck 1920). A two-story store on the Alatna side of the Koyukuk followed not long after the mission, further exemplifying that western culture and influence had now taken a foothold on the upper Koyukuk (Beetus et al. 1993).

With the influx of prospectors and merchants to provide supplies western amenities such as stores and saloons soon sprang up and small boomtowns grew on the riverbanks as prospectors found themselves seasonally unable to search for gold (Wyman 1988). Bergman was situated north of Arctic City, very near present-day Allakaket, with a saloon and a group of white prospectors calling it home during the winter of 1898-1899. Other small settlements were formed farther north along the Alatna River and the South Fork of the Koyukuk, though none of them remain today (Wyman 1988).

During the gold rush the Athabaskans and Iñupiat of the Koyukuk were introduced to a cash economy firsthand and many quickly realized that their talents for living off the land were valuable when the westerners would exchange cash, gold, or western goods for meat or furs during the harsh Interior winter. The Russian outpost in Nulato spread the fur trade's demand for Interior furs to the Native communities along the Koyukuk (University of Alaska Museum of the North 2013). The influence of the fur trade resulted in more trapping in the region, which led to local territory ownership and protection surfacing as important for the first time within Koyukuk culture (Clark 1974, Nelson 1986). Traditionally families might return to the same part of the river for summer fish camps or winter trapping camps, but other families often joined them and

camp “ownership” was more fluid, whereas now trapping territories and traplines became important property that other trappers were not allowed to infringe upon. These territories were and still are passed down from father to son and represent the first semblance of land delineation, strict ownership, and resource allocation in the area, as trappers could only harvest furs available within their territory (Clark 1974).

After Alaska’s purchase in 1867, the United States government created a series of agencies, laws, and regulations to govern the land, resources, and people of Alaska. The Organic Act of 1884 allowed for the first civil government to be formed in Alaska (Barnhardt 2001). This government also began implementing laws and regulations to manage Alaska, as did the Territory of Alaska after the Second Organic Act of 1912 and the State of Alaska after statehood was established in 1959. Many of these efforts, agencies, and regulations, however, took years to trickle into the upper Koyukuk region.

A post office was built in Allakaket in 1925, which was the same year that the federal government established the Alaska Game Commission to manage the wildlife resources in the state (Huntington 1993, Alaska Humanities Forum 2013, K’oyit’ots’ina, Limited 2013a). Enforcement of game regulations did not reach the Koyukuk region until after 1927, when Sam O. White joined the agency as a wildlife agent (Rearden 2007). Extensive enforcement in the area was not seen until after Sam White became the first wildlife agent pilot and was able to patrol the region more effectively by air. In a region where fish and wildlife were once resources available for anyone to harvest, government agencies were now imposing harvest regulations and license requirements

with negative sanctions such as fines for those who did not comply. Natives were exempt from these early regulations.

The US Fish and Wildlife Service was founded in 1940, which assumed the responsibilities of the Alaska Game Commission (US Fish and Wildlife Service 2013*a*). In 1960 the State of Alaska also began imposing laws and regulations on fish and wildlife with the creation of the Alaska Department of Fish and Game (Alaska Department of Fish and Game 2013*a*). To this day both the Alaska Department of Fish and Game and the US Fish and Wildlife Service officially manage Alaska's fish and wildlife resources.

Congress created the office of Surveyor General for the District of Alaska in 1897, which began surveying properties to record who owned what lands in a territory where land ownership was a foreign concept (Alaska Humanities Forum 2013). Congress continued to impose more control and regulation over Alaska's people and resources with the Civil Code for Alaska in 1900, a wild game protection act in 1902, the creation of road districts in 1904, and the creation of the "Alaska Fund" in 1905 to provide funding for roads and schools (Barnhardt 2001, Alaska Humanities Forum 2013). The Federal Bureau of Education was tasked with providing social welfare and education for the rural Natives of Alaska by 1931 but a public school was not built in Allakaket until 1957, by which time the Bureau of Indian Affairs had overtaken the responsibilities of the Bureau of Education (Barnhardt 2001, K'oyitl'ots'ina, Limited 2013*a*).

When Allakaket received its first public school the only secondary schools available for rural Natives were boarding schools. By the late 1960s there were too many high school students for the boarding schools in Alaska and nearby states so young

Alaska Native students were shipped to schools as far away as Tennessee (Barnhardt 2001, Hensley 2010). After the Molly Hootch case of 1976 high schools were built in rural villages, eliminating the need for young students to leave their communities to achieve a high school diploma (Barnhardt 2001). The federal government operated schools in rural Alaska until 1986, at which point schools were transferred to state management, but the Bureau of Indian Affairs continued (and still continues) to provide health and social services to the tribal members of Allakaket and Alatna (Barnhardt 2001). Although Allakaket currently has a high school, some students still leave Allakaket to live with relatives and attend high school in Fairbanks and others attend boarding schools in Galena or Nenana.

The Civil Code for Alaska of 1900 allowed for towns to incorporate as local governments and the Indian Reorganization Act of 1934 allowed for tribes to incorporate as self-governing units but Allakaket and Alatna did not incorporate until 1975, at which point the community incorporated into a city that included both Allakaket and Alatna (Barnhardt 2001, Alaska Humanities Forum 2013, K'oyitl'ots'ina, Limited 2013a). A clinic and airport were built in Allakaket in 1978 but the community remains off the main Alaska road system. A new school with a high school was built in 1979. After the flood of 1994 much of Allakaket, including the school, required rebuilding (K'oyitl'ots'ina, Limited 2013a). Many Allakaket families rebuilt on the nearby hilltop to escape future floods, which spatially spread the community to a significant degree. The airport was rebuilt and improved in 1997, located halfway between “downtown” Allakaket on the river and “uptown” Allakaket on the hill.

The Alaska Native Claims Settlement Act (ANCSA) of 1971 brought Natives more rights and control over their lands and resources as legal ownership of 43.7 million acres of Alaska's lands as well as \$962.5 million was transferred to twelve newly created Native-owned regional corporations and more than 200 Native village corporations to be used and invested to benefit the Native community (Barnhardt 2001, Doyon, Limited 2013a). As a result, members of the Allakaket Tribe and the Alatna Tribe are shareholders of the regional corporation Doyon, Limited as well as K'oyitl'ots'ina, Limited, which was formed when the village corporations of Alatna, Allakaket, Hughes, and Huslia merged (Doyon, Limited 2013b, K'oyitl'ots'ina, Limited 2013b). Shareholders receive dividends from their corporations on a regular basis and some community residents have received Native allotments of land in the upper Koyukuk region. Since 1982 Allakaket and Alatna residents (along with all residents of the state of Alaska) also receive an annual Permanent Fund Dividend from the State of Alaska (Alaska Department of Revenue 2013).

Much of the lands immediately surrounding Allakaket and Alatna are village or corporation-owned lands, while the State of Alaska and the United States government own the greater portion of lands outside of a ten-mile radius of Allakaket and Alatna (Figure 2.1.1).



Figure 2.1.1 Land Status Map of Upper Koyukuk River (Bureau of Land Management 2013)

The Alaska National Interest Lands Conservation Act of 1980 (ANILCA) established Gates of the Arctic National Park north of Allakaket and Alatna as well as Kanuti National Wildlife Refuge to the east of Allakaket and Alatna, both of which are on traditional hunting and gathering grounds of the upper Koyukuk people (Figure 2.1.2).

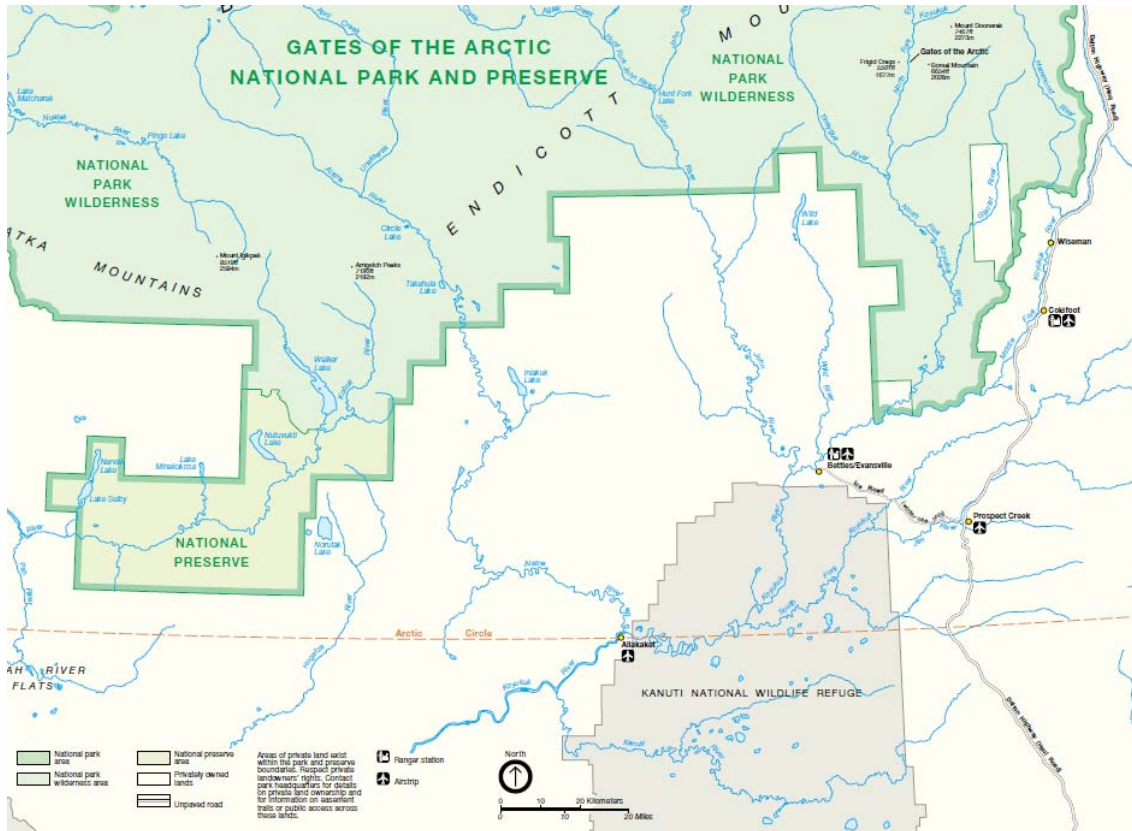


Figure 2.1.2 National Conservation Unit Boundaries near Allakaket and Alatna (National Park Service 2009)

In an area where the people once had the run of the land and its resources, now they must know, understand, and abide by land and resource laws and regulations imposed by the State of Alaska, the US Fish and Wildlife Service, and the National Park Service. These laws and regulations vary according to region and land status and are enforced with negative sanctions for those who do not follow them. In an area where subsisting off the land once directed the lives of the people, now subsistence activities are governed by a complicated array of boundaries and regulations (Figure 2.1.3).

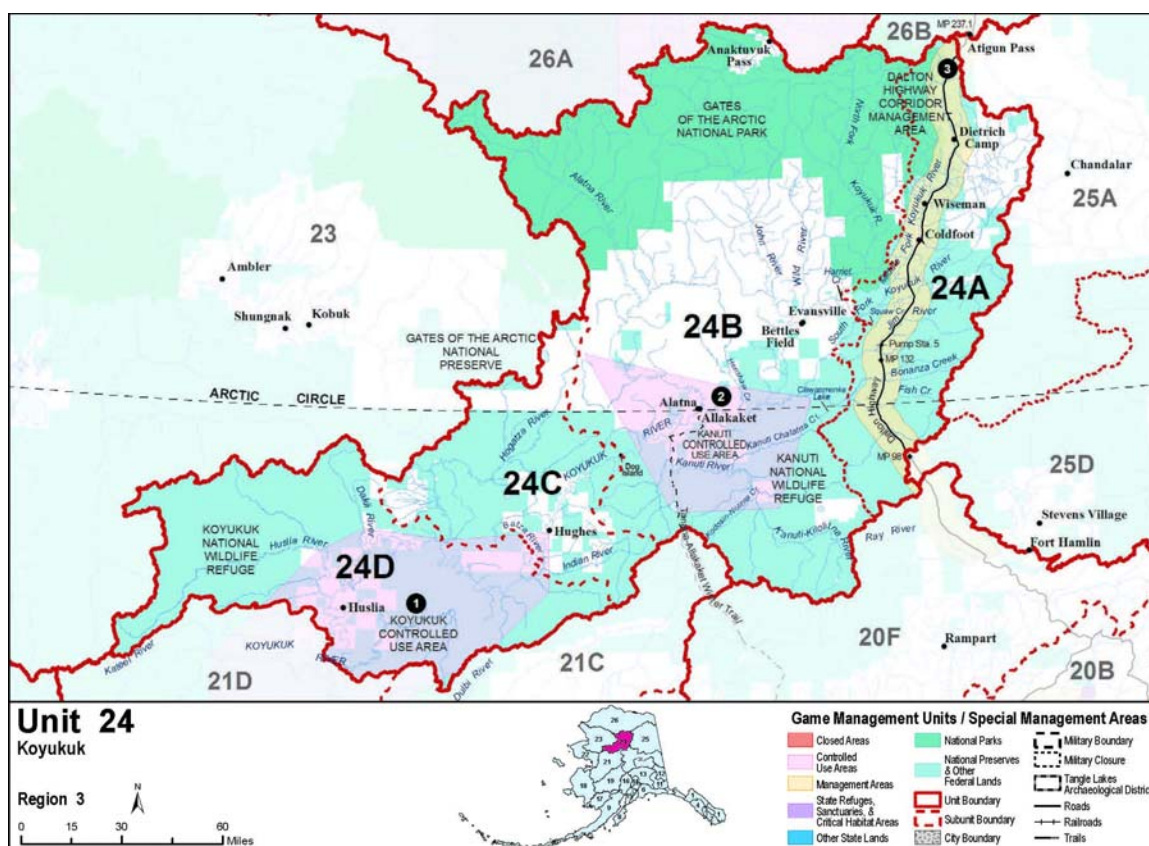


Figure 2.1.3 Game Management Unit 24: Fish and Game Regulation Boundaries (Alaska Department of Fish and Game 2012)

Present-Day Alatna and Allakaket

Today Allakaket and Alatna, separated by less than three miles, are located on opposite sides of the Koyukuk River just downstream from the confluence of the Alatna and Koyukuk Rivers in Game Management Unit (GMU) 24. Winter travel between the communities is unhindered for about seven months out of the year and boats are used to cross the river during the summer. On average the river prevents travel between Allakaket and Alatna for less than one month total each year (Clark 1974). The only

school, clinic, store, and post office in the area are located in Allakaket, resulting in regular visits of Alatna residents to Allakaket.

Although Alatna is traditionally a community of Kobuk Iñupiat and Allakaket is traditionally a Koyukon Athabaskan community, there has been much intermingling since the settlement of the villages and there are now many familial ties between Allakaket and Alatna (Clark 1974). It is not uncommon for community members to switch residence from one village to the other. Subsistence lifestyles are predominant in both villages, which rely on the same moose population and are equally affected by over-predation on that population. Members of both villages often hunt and travel together. For these reasons, the approximately 37 residents of Alatna and the approximately 106 residents of Allakaket are considered to form one community for the purpose of this study (Clark 1974, Department of Commerce, Community, and Economic Development 2012, Holen et al. 2012).

Currently, state game regulations authorize Alaska residents and non-residents to hunt, fish, and trap on private, state, and federal lands surrounding Allakaket and Alatna. Federal limitations in Gates of the Arctic National Park and access on private lands, however, may limit that authority. Additionally, moose hunting on federal lands within the Kanuti Controlled Use Area (Figure 2.1.3) is restricted to federally qualified subsistence users (rural residents of GMU 24 and the villages of Anaktuvuk Pass, Koyukuk, and Galena) and federal subsistence regulations and seasons apply (US Fish and Wildlife Service 2008a). Rural residents of Allakaket, Alatna, Hughes, Huslia, or rural residents of GMU 24 residing north of the Arctic Circle can hunt sheep in Gates of

the Arctic National Park under the authority of federal subsistence regulations (US Fish and Wildlife Service 2013*b*).

Hunting, fishing, and trapping under state and federal game regulations, however, is a complex endeavor, as each species has different limits, regulations, and seasons for different areas within each GMU. Furthermore, hunting regulations, seasons, and limits are different from trapping regulations, seasons, and limits for a given species.

Determining what can be harvested when and in what area can be quite confusing and involves deciphering information in multiple different regulation books. Violating the hunting or trapping regulations can result in substantial fines and/or loss of property such as boats, rifles, traps, ATVs, etc. Fishing regulations are separate and require their own set of regulation books. Additionally, because Alaska's fish and wildlife are "reserved to the people for common use," residents of Allakaket and Alatna can only limit harvest of wildlife resources occurring locally by non-local users by forbidding non-local hunting and trapping access on privately owned land (corporation land and Native allotments) in and around the villages (Alaska Constitution 1956).

Anyone can participate in the process of Alaska's legal management of fish and game by submitting written proposals to the State Board of Fisheries, the State Board of Game, and/or the Federal Subsistence Board (US Fish and Wildlife Service 2008*b*, Alaska Department of Fish and Game 2013*b*). Alaska residents may have the opportunity to serve on an advisory council to provide proposal development, reviews, and recommendations to their respective Boards. There are ten Regional Advisory Councils for the Federal Subsistence Board and 82 Advisory Committees for the State

Boards of Fish and Game. Advisory Committee meetings are open to the public and the public is encouraged to submit relevant information or feedback on proposals. The State Boards are each composed of seven members that are appointed by the governor of Alaska for three-year terms while the Federal Subsistence Board is composed of the regional directors of the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Indian Affairs, the U.S. Forest Service, as well as three public members appointed by the Secretaries of the Interior and Agriculture. Proposals must be approved by their respective Board to be enacted as management regulation.

This is the process by which residents of Allakaket or Alatna can participate in the official management of their local wildlife resources and they are bound by the regulations and management decisions that result from this process. This structured management system is quite different from the informal local management mentioned previously and the process required to include public information or opinion in management regulation limits the ability for agencies and local populations to work together for effective and functional co-management.

2.2 A Brief History of Ecology and Predator Control in the Study Area

Allakaket and Alatna are situated on the Arctic Circle in a boreal forest river valley just south of the foothills that lead into the mountainous region of the Brooks Range. The people of the Koyukuk have persisted for generations but recently they have witnessed some interesting ecological changes in their homeland.

Throughout the history of the Koyukuk people the local environment provided fish in the summer while caribou (*Rangifer tarandus*) generally migrated through the area

in the winter. The seasonal availability of fish and caribou provided a large portion of the annual sustenance for the people of the Koyukuk, but small game such as porcupines (*Erethizon dorsatum*), snowshoe hares (*Lepus americanus*), beavers (*Castor canadensis*) and ptarmigan (genus *Lagopus*) often carried the people through the winters (Clark 1974, Nelson 1986, Beetus et al. 1992, Moses and Arundale 1993, Simon and Arundale 1993). Hunters sometimes traveled to the Brooks Range to harvest Dall sheep (*Ovis dalli*) but moose (*Alces alces*) were not seen in the area until after 1930 (Clark 1974, Nelson 1986, Edwards et al. 1992, Huntington 1993, Moses and Huntington 2003, Stout 2010).

Prior to the arrival of moose, with no resident large prey population in the area, large predators were relatively scarce as well. Oral tradition suggests that black bears (*Ursus americanus*) were relatively abundant and were utilized as an important food source while hunting them provided a tradition by which young men could prove their strength and courage to their people (Clark 1974, Nelson 1986). Brown bears (*Ursus arctos horribilis*), however, were scarce and lived in the highlands where people did not encounter them often (Nelson 1986). Hunting and killing a brown bear provided sustenance and was a culturally significant feat for a Koyukuk man, but brown bears did not pose much of a threat to villages or village food sources, so they were not seen as resource competitors as they are now.

Wolves (*Canis lupus*), too, were scarce and even their tracks were rarely seen (Nelson 1986, Moses and Huntington 2003). Packs of wolves would follow the migrating caribou through the area but these wolves did not have much of an impact on the people. Traditionally wolves were trapped with babiche snares and deadfall traps

because their fur was prized for potlatch gifts and parka ruffs but they did not pose much resource competition, so predator control was not a concept that applied to the ecology of the area prior to moose invasion (Clark 1974, Nelson 1986). As steel traps and snares became available and wolf pelts became more valuable with the influence of the Russian fur trade the Koyukuk people increased their wolf trapping efforts as well as trapping efforts for other furs but before 1930, when moose moved into the Koyukuk country, these efforts were not related to moose management.

In other parts of Alaska, however, predator control was being encouraged by the federal government and the Territory of Alaska. In 1915 a bounty was placed on wolves by the Territorial Legislature, which impacted wolf trapping on the Koyukuk before predator control was even locally relevant (National Research Council 1997). As moose began to trickle northward along the Koyukuk River they did well its favorable habitat and densities began to climb. With the moose came greater numbers of brown bears and wolves but by this time the fur market had resulted in trapping having a strong foothold in the upper Koyukuk. Fur trapping, including wolf trapping, had increased to become a normal winter pastime for Koyukuk men. These high levels of trapping may have aided in the quick establishment and rise of the moose population in the area.

In the 1940s and 1950s, by the time moose had reached the upper Koyukuk, the federal government also offered wolf bounties and federal agents were enacting widespread wolf control throughout Alaska by means of poison and aerial shooting (Regelin 2002). The fur market crashed in the 1930s but trapping was still the major winter activity along the Koyukuk.

By 1960 moose had become abundant in the upper Koyukuk region and now provided a staple food source to the people of Allakaket and Alatna, with the average family harvesting three moose each year (Clark 1974, Moses and Huntington 2003). Around this time the State of Alaska outlawed the use of poison on predators but the state government still offered a bounty on wolves and civilian bush pilots were increasing aerial shooting of wolves from planes throughout Alaska, including the Koyukuk River Valley (Clark 1974, Huntington and Elliott 2002, Regelin 2002). Koyukuk trappers were still seeking-out wolves due to the state's fifty dollar bounty but with fur prices dropping some trappers were shifting their focus to beaver (Clark 1974). It is unclear if the trapping culture along the Koyukuk saw local wolf trapping during this time as a distinct predator control effort or simply a way of capitalizing on the economic incentives that were available while also providing for and continuing cultural traditions.

The introduction of snowmobiles in Allakaket and Alatna in 1964 made it easier and quicker for local trappers to check their traplines but it also added extra costs that were not involved when dog teams were used for trapping. As snowmobiles became more popular dog teams became scarcer, but with dropping fur prices and increasing fuel prices after the oil embargo of 1967 and the oil crisis of 1973 trapping with snowmobiles became less economical as well. While snowmobiles may have been just one of many factors related to changes in trapping levels, by 1974 trapping in Allakaket and Alatna had severely declined (Clark 1974).

The National Environmental Policy Act of 1969 (NEPA) required Environmental Assessments (EAs) and Environmental Impact Statements (EISs) to be completed for any

federal agency action, which eliminated federal predator control efforts and largely prevents federal involvement in predator control to this day. Aerial shooting ceased in 1972 with the federal Airborne Hunting Act (Regelin 2002). A decline in trapping, the cessation of aerial shooting, and unusually severe winters and deep snows in 1970-1972 all combined to contribute to a decline in many moose populations throughout interior Alaska. This decline prompted the State of Alaska to turn back to wolf control for GMU 20 in 1975, but this only began a series of legal and political battles that continues to unfold and that has impacted predator control throughout the state. It was not until 1994, when the Intensive Management Law was passed, that real progress was made toward the State of Alaska being able to legally enact wolf control (Regelin 2002). Implementing a wolf control program is still difficult and takes time, though, as the program must be based on sound science, it must be cost effective, and it must be broadly acceptable to the public before it can be adopted by the Board of Game.

Aside from the research and data required to provide sound science and the various factors that can arguably be included or neglected to determine cost effectiveness, public opinion varies widely on this contentious topic and provides a substantial hurdle to wolf control efforts, as has been demonstrated by the relatively simple same-day-airborne wolf hunting regulation being juggled back and forth, adopted, dropped, re-adopted, and modified up to seven times from 1986-1999. Board of Game movement toward wolf control in 1992 incited an Alaska tourism boycott and footage of ADF&G wolf control efforts through trapping were used by animal rights groups to bring tremendous negative press to wolf control in 1994 (Regelin 2002).

Overcoming the hurdles necessary to enact official wolf control programs through the Board of Game is difficult, at best. If the trapping efforts of local community members could be boosted to harvest a sufficient number of wolves for effective wolf control, some of the hurdles related to highly public and controversial programs such as aerial wolf control might be avoided or more easily overcome. History and research show that controlling wolf densities through local harvest may be a viable option (Peterson et al. 1984, National Research Council 1997).

Under current regulations it would be legal for an Alaskan community to create its own wolf management plan and enact its own wolf control through local hunting and trapping. Moose, on the other hand, are intensively managed by agency authority and moose management actions by the community itself may be against current regulations and therefore illegal. In a system such as this a community may not feel comfortable actively managing or even realize that concerted local management of one species is acceptable when local management of another is not. While local wildlife management exists within Alaskan villages regardless of legality, a concentrated wolf control effort would be a significant endeavor that would not go as easily undetected as other, smaller local wildlife management actions. As such, given the dynamics of the overall wildlife management system and the legal authority and responsibility to manage wildlife within the state, a community may not make a concentrated management effort such as wolf control without input and/or approval from the official management system and management authority.

In the upper Koyukuk region predator control had not traditionally been necessary but people traditionally had control and management of their own local resources. By the time people saw an influx of moose and began to rely on them as a subsistence resource, management agencies and bush pilots from other communities were performing all the predator control that was necessary. After the people of Allakaket and Alatna began to rely on the moose population virtually all forms of predator control in the area ceased. As the people noticed the moose densities beginning to drop they became concerned, but where outside entities had once driven predator control efforts, now no outside action was to be found. By this time, rather than be controlled by the local people, management of local wildlife resources was controlled by regulations developed with public input and administered by government agencies. This sudden shift away from outside predator control and lack of local management authority is the crux of the current dilemma in the upper Koyukuk region.

Today both Allakaket and Alatna still rely heavily upon the local moose population for sustenance, which in general is open to hunting by non-local hunters as well. The density of that population has fallen continuously over the last 15 years despite adequate habitat, resulting in low moose densities with moose concentrated in areas that are difficult to access (Alaska Department of Fish and Game 2011*a*). Despite excellent twinning rates (indicating that cows have good body conditions in the fall) and some of the lowest browsing rates in the state (indicating that the population density is well below levels that local nutritional availability can support), moose densities continue to decline (Stout 2010, Alaska Department of Fish and Game 2011*a*). Declining moose densities

can necessitate more time, effort, and expense for a successful harvest. These extra resources can be difficult to come by in an area such as the upper Koyukuk, which has high fuel prices and few economic opportunities (Holen et al. 2012). Harvest report data portrayed in Figure 2.2.1 shows that moose hunter success in Unit 24 has dropped steadily since 1997, although some of the decline in hunter success rates can be attributed to an increase of local hunters reporting unsuccessful hunting activities as well as a possible decrease in hunting effort or even experience of hunters (Stout 2010).

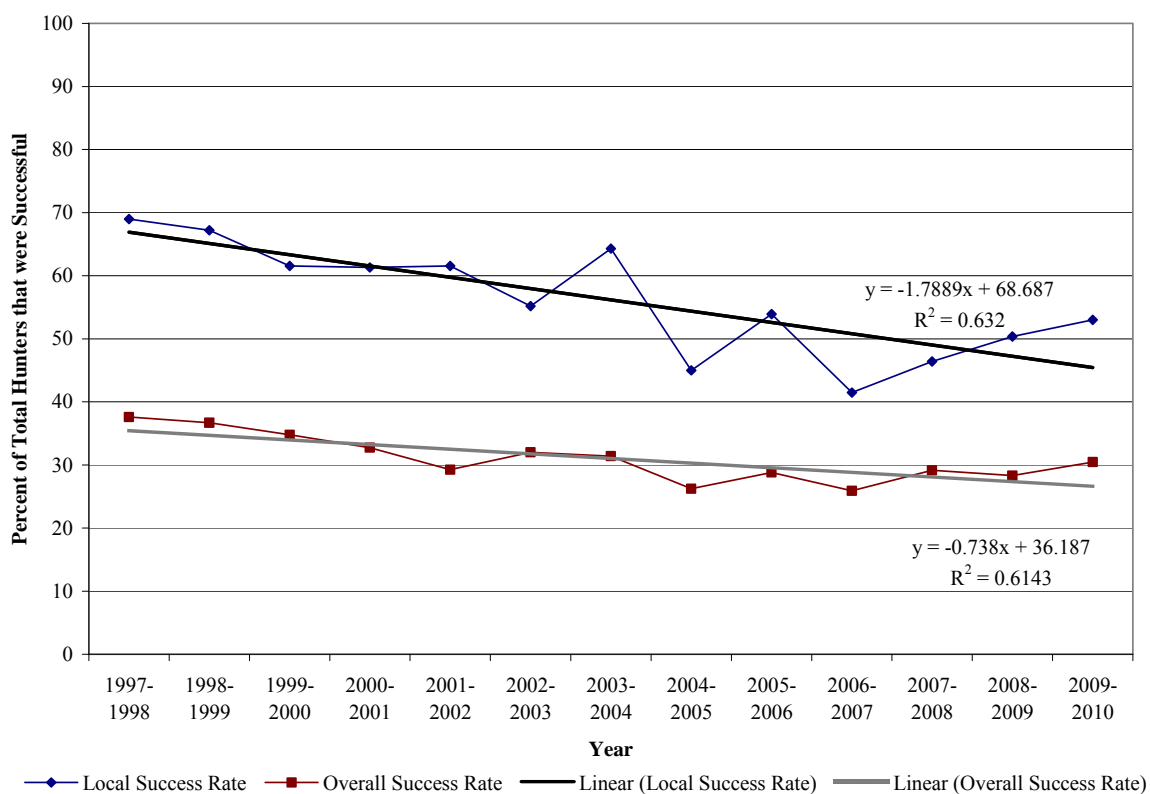


Figure 2.2.1 Unit 24 Moose Hunter Success Rates 1997-2010 (Stout 2010)

To address the issue of declining moose densities and hunter success rates, at the request of local residents, ADF&G developed an Intensive Management (IM) Program in 2011 with the intention of increasing moose availability as well as decreasing the effort required for moose harvest for residents of Allakaket and Alatna. The Unit 24 IM Program was approved by the Board of Game in 2012 and is now being enacted. Due to cultural concerns about the inclusion of bears, the IM program focuses on aerial predator control to reduce wolf numbers. As part of the IM program, ADF&G began aerial wolf control in February 2013 with the intention of killing 20-30 wolves (~66% of the current population) in the Upper Koyukuk Village Management Area (UKVMA) the first winter and of returning annually for four years to maintain the new lower wolf population. The program succeeded in killing 23 wolves in its first winter. The wolf carcasses were given to Allakaket and Alatna to be skinned and disposed of in a culturally appropriate manner. The expectation of the program is to reallocate moose from wolves to humans and in turn decrease the cost and difficulty for village residents to harvest the number of moose necessary for subsistence (Alaska Department of Fish and Game 2011a).

Legally, each resident of Allakaket and Alatna can trap an unlimited number of wolves between November 1st and April 30th of each year (Alaska Department of Fish and Game 2011b). Depending on the current fur market trappers can sell wolf pelts for \$100-\$400 each, which may significantly help to offset the cost of trapping. If Allakaket and Alatna residents trapped an average of 25 wolves annually, they would be actively participating in a wildlife management strategy that they believe will result in more plentiful and local moose while saving the State of Alaska up to \$88,000 on the cost of

aerial wolf control and simultaneously generating \$2,500-\$8,000 each year for the local economy (Alaska Department of Fish and Game 2011a). Currently, a very small number of Allakaket and Alatna residents trap wolves and together they average less than ten wolves per year, reporting only 7 wolves harvested in 2011 (Alaska Department of Fish and Game 2013c). Harvest data portrayed in Figure 2.2.2 shows that overall wolf harvest in Unit 24 has declined since 1988 (Stout 2000, 2009). ADF&G-sponsored trapping and snaring clinics for Allakaket and Alatna residents with the goal of increasing local trapping activities and wolf harvest have yielded no lasting success (Stout 2011).

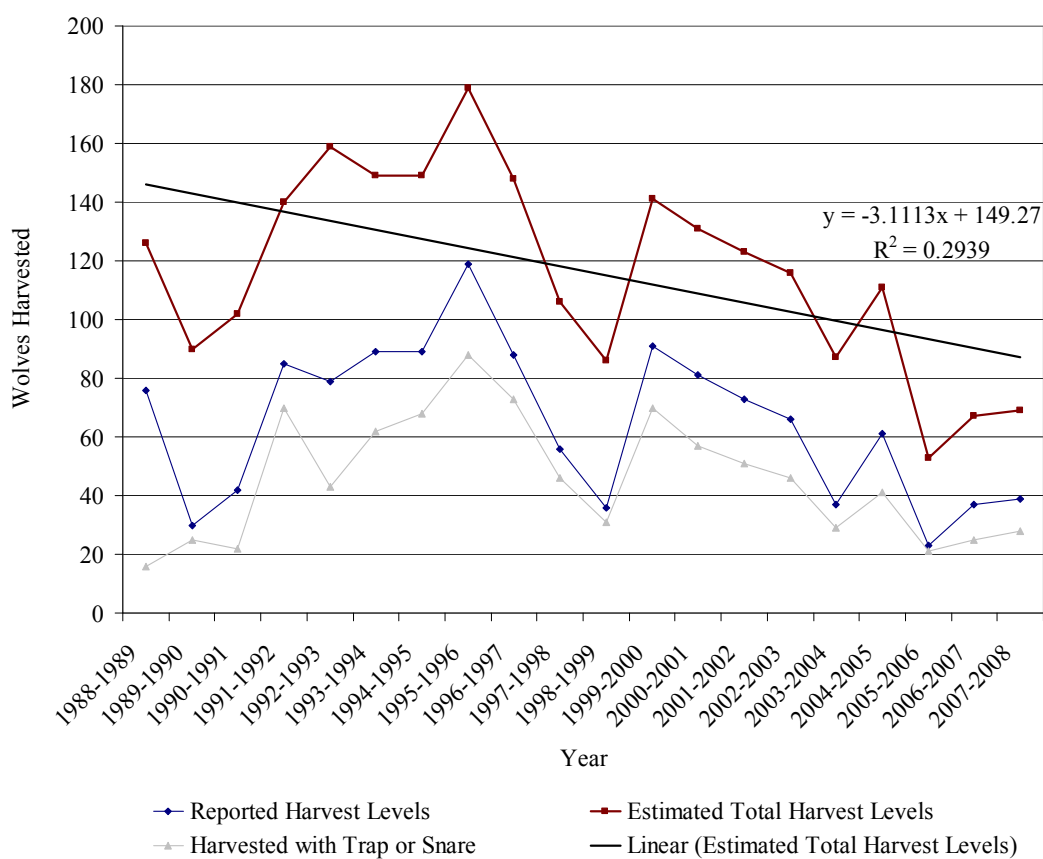


Figure 2.2.2 Wolf Harvest Levels in Unit 24 Since 1988 (Stout 2000, 2009)

2.3 Native Culture and Changing Lifestyles in Allakaket and Alatna

Changing Lifestyles

Subsistence has been a way of life for the people of the upper Koyukuk for generations. That way of life has traditionally been passed down through experiential education: children learned how to survive by watching and helping their parents, grandparents, and relatives perform the tasks that their people have been doing for centuries in order to successfully live in the Koyukuk region (Clark 1974, Nelson 1986, Huntington 1993). As soon as they were able, children began practicing their hunting and trapping skills and contributing to the success of the family (Figure 2.3.1). A boy of four might accompany his father on the trapline, or a child of seven might take a small sled and two dogs mushing by himself or hunt caribou with his family on snowshoes (Bergman et al. 1992, Huntington 1993, David et al. 2004, Simon and Mack 2004). The history and culture of the people were passed down through a rich oral tradition as well. Stories of “how things came to be” taught children how they should interact with their environment, treat other creatures, and manage their resources (Nelson 1986). Subsistence and other cultural activities were the only education, and so the people of the Koyukuk and their traditions persisted. Early Episcopal missionaries in Allakaket recognized that learning the subsistence lifestyle was far more important for the survival of Athabaskan and Iñupiat children than western education, as living off the land was the only way to live along the Koyukuk (Stuck 1988).



Archives, University of Alaska, Fairbanks

Figure 2.3.1 Native Children in Interior Alaska Display Spoils of Hare Hunt between 1913 and 1939 (Alaska's Digital Archives Date Unknown)

As the role of trapping in interior Alaska grew with the availability of steel traps and wire snares and the value placed on furs by the fur trade, the role of trapping in the subsistence lifestyle along the Koyukuk grew as well. By the early 1900s “asking Indians not to trap was like asking fish not to swim” (Huntington 1993). This, too, had become an activity that children began to learn at an early age by accompanying their parents on the trapline and helping when they could (Nelson 1986, Beetus et al. 1992, David et al. 1992, Huntington 1993, Simon and Mack 2004).

Despite the early views of the Episcopal missionaries towards the subsistence lifestyle, according to Barnhardt (2001) the federal government operated, “with the belief that it was important to transform American Indians and Alaska Natives into civilized and Christian Americans and the best mechanism for achieving assimilation into American society was education.” Pressures for children to attend school eventually turned into

compulsory education. Allakaket and Alatna's eldest residents today received varying degrees of formal education: from little or none to perhaps eighth grade (Beetus et al. 1992, Bergman et al. 1992, David et al. 1992). They witnessed the changes that schools have made on their traditional lifestyle.

Where families once moved from summer fish camp to winter trapping camp to spring muskrat camp to gather different subsistence resources, soon families stayed in the village for children to attend school during the time of winter and spring camps (Clark 1974). By 1956 school requirements meant that only home-schooled children were able to go to spring camp. Since then no new generation has been raised with the tradition of spring camp or been taught where to make spring camp or what to gather there, so the spring camp tradition will likely disappear entirely (Bergman et al. 1992).

By 1974 young families were reluctant to join their seniors at fish camp in the summer, waiting later and later to leave the village (Clark 1974). As snowmobiles became more popular and dog teams became more scarce, the need to go to fish camp in the summer to gather dog food for the winter became less, until the tradition of summer fish camps virtually disappeared as well (Nelson 1986, David et al. 1992). The availability of seasonal jobs outside of the village also contributed to the decline of fish camps, as the summer season could be used to make wages working for mining companies, for oil companies, firefighting, etc (Clark 1974, Nelson 1986, Beetus et al. 1992).

During the era when high school students were sent to Mount Edgecombe or even further away to complete school, residents of Allakaket and Alatna began to see

noticeable changes in their younger generations. As children were sent off to boarding schools they were displaced from their community, their homeland, their family, and their culture. As such, they did not learn the traditional skills necessary for survival or for their culture. This resulted in the development of cultural differences between generations. Lindberg Bergman recalls that in the 1950s when high school students returned to the village they were more interested in village dances, ball games, parties, alcohol, and drugs, than learning their Native culture, tradition, or subsistence lifestyle (1992). Although Allakaket has a high school now, some students still leave Allakaket to live with relatives and attend high school in Fairbanks. Often, these children attain jobs after high school and never return to live in the village (Beetus et al. 1992).

Furthermore, for most of the history of formal schooling in Alaska, Native children were generally forbidden to speak their Native language at school, which was enforced with physical punishment (Napoleon 1996, Barnhardt 2001). Alaska Native languages and cultures were not taught in public schools until the 1990s (Barnhardt 2001). Formal western education prevented youth from learning traditions firsthand as they were performed in the field while it also stifled the transfer of language and culture within the village. Today elders are passing away without having the opportunity to impart their knowledge or traditions on the younger generations (Bergman et al. 1992).

Even when families stayed in the village for the winter men often left the village to spend the winter trapping (Clark 1974). Because school dominated the winter for children they were no longer introduced to trapping until after they finished school, which grew later and later as school age requirements grew more strict. In 1961 all

families of Allakaket and Alatna maintained winter trapping camps but by 1974 virtually no families did (Clark 1974). Now, by the time children finish school and can begin learning about trapping or other traditions, they have already spent the majority of their childhood indoors focusing on western education and living western lifestyles centered around radios, TVs, basketball, and the like (Edwards et al. 1992, Ned and Arundale 1992, Simon and Mack 2004). It is difficult to interest people in outdoor lifestyles when they are raised with indoor culture, but formal education also encourages youth to obtain jobs and become productive members of the cash economy-based western society. There is little room for young adults to immerse themselves in learning the tradition, culture, and subsistence lifestyle of their people once they graduate high school at age 18, particularly since the basis of that lifestyle is to spend an entire lifetime (including childhood) learning it and then passing it on (Bergman et al. 1992, David et al. 1992, Simon and Mack 2004). As a result, Allakaket and Alatna residents see that their young generations now do not even know how to trap or make a living off the land (Simon and Mack 2004). Some may not even be able to speak with their grandparents or great grandparents due to language loss.

Trapping in particular has additional cultural and spiritual roadblocks that make it difficult to pass from one generation to the next along the upper Koyukuk. In Koyukon Athabaskan culture luck is a major factor that determines trapping success (Nelson 1986). There are cultural rules that can be followed to help prevent bad luck. Most of these rules are related to showing proper respect for creatures, the environment, and other trappers, but some of the rules make it difficult for new trappers to learn the trade. Traps and

snares can be passed down a family line but can not be shared or given to other people or even touched by other people, as they will not be successful in snaring or trapping furbearers afterward (Nelson 1986). While likely not preventative, this rule may make it harder for new trappers to get started than if they could borrow equipment from other villagers. Giving trapping knowledge to another person can also give them your luck, which is a deterrent for many trappers to pass on their knowledge and may be one reason why older generations of trappers are not teaching younger ones now (Nelson 1986, Simon and Mack 2004). To circumvent this, children and young adults traditionally learned to trap by watching others on the trapline rather than being directly taught how to trap (David et al. 1992, Henzie et al. 1992). As discussed above, this no longer occurs.

Modern cash economy and modern technology have played a large role in the changing lifestyles in Allakaket and Alatna (Bergman et al. 1992, David et al. 1992, Simon and Mack 2004). Grocery stores provide an alternative to hunting and gathering. Modern housing and heating provide shelter from the environment and reduce the need to cut or gather wood. While woodstoves are prevalent, they are often neglected in favor of diesel-powered heaters or wood is bought from enterprising neighbors. Activities such as TV and basketball provide entertainment and pastimes to fill the void that was once consumed by subsistence activities. In 1961 men already spent winter nights playing cards until the lamp oil burned out (Clark 1974). Now electricity has removed that limitation. Jobs, dividends, and government assistance allow people to immerse themselves in this modern lifestyle. Where activities such as hunting and trapping were once required for survival, now they become less and less necessary. Modern equipment

such as snowmobiles are now heavily relied upon for activities such as hunting and trapping, but are costly to buy, run, and maintain, which results in those activities competing financially with the alternatives listed above.

The people of Allakaket and Alatna see the changes that are taking place in their villages and traditions. Efforts such as Native language and culture classes in school and traditional sewing workshops in the community are a relatively recent development to try to preserve traditional ways of life. Nevertheless, the subsistence lifestyle and related traditions are slowly disappearing beneath modern and western influence and will require continued and expanded effort and action if they are to be preserved.

Wolves in Koyukon Athabaskan Culture

Although evidence suggests that historically numbers of wolves or brown bears in the upper Koyukuk region did not pose significant competition or danger to villages or family bands, the need and potential effects of predator control are not lost on the people of Allakaket or Alatna today. In fact, predator control is seen as an important and necessary action by the villagers of Allakaket and Alatna, who believe that, relative to the levels of available prey, there are too many wolves and brown bears in the area, which is causing the decline that they observe in the moose population (Moses and Arundale 1993, Moses and Huntington 2003, Simon and Mack 2004, Koyukuk Advisory Committee 2012). In the Koyukon Athabaskan culture, however, bears and wolves are both highly respected creatures with strong spirits, which has significant relevance to how Koyukon Athabaskans interact with them. Although Koyukon Athabaskan relationships with bears are interesting and relevant to the overall ecology and predatory pressures in the area, the

ADF&G IM Program and this study focus on wolves, so bears will not be explored in this section. More information about bears and their role in Koyukon Athabaskan culture can be found in *Make Prayers to the Raven* (Nelson 1986).

In Koyukon Athabaskan mythology wolves were once human and are still considered to be related in a way to the Koyukon Athabaskans due to their intelligence, social behavior, and shared prey (Nelson 1986). The similarities that the Koyukon see between wolves and humans result in Koyukons having great respect for wolves and some Athabaskans do not care to mess with them because of that. The wolf's speed, intelligence, and keen senses also make it difficult in itself to hunt or trap.

In Koyukon Athabaskan culture wolves are also seen to have great, strong, and dangerous spirits that provide another deterrent to interacting with them. Wolves must be skinned very carefully and away from women or children (Nelson 1986, Moses and Huntington 2003). A wolf carcass must be treated with respect and disposed of in the woods after a piece of fish or fat has been placed in its mouth and its joints have been cut, as these are spiritually powerful places. If the carcass is treated improperly, the wolf spirit will cause arthritis or cripple the children of the wolf hunter/trapper.

Wolves are "hutlaanee" or taboo to women entirely (Nelson 1986). Women can not hunt, trap, or skin wolves, nor can they sew wolf pelts until the pelts have sat for a number of years (for the spirit to be sufficiently departed), unless the sewer is an elder. Wolf pelts, however, are highly prized as they are important gifts at potlatches and the fur of the wolf is particularly warm and resistant to frost, making it excellent for parka ruffs (Nelson 1986, Moses and Huntington 2003). Interestingly, these cultural views did not

seem to deter wolf trapping in Allakaket and Alatna in the past, when trapping was an activity that every family undertook and when men focused on trapping wolves in particular (Clark 1974). It is not clear if these cultural views of wolves are affecting wolf trapping efforts now, nor is it clear if the Alatna Iñupiat share the views of their Athabaskan brethren regarding wolves. This study hopes to shed light on these topics.

2.4 Significance of Traditional Ecological Knowledge and Community-based Management

Traditional Ecological Knowledge and the Upper Koyukuk Region

Alaskan Natives survived and thrived for thousands of years by utilizing wildlife resources (as well as other natural resources) to fulfill basic needs such as food, tools, clothing, and shelter. Having sufficient wildlife resources and knowing when, where, and how to harvest wildlife of diverse species was essential to maintaining a healthy lifestyle and ensuring human survival. With life so heavily dependent upon natural resources, nature and culture intertwined to create beliefs and values that maintained the sustainable use of natural resources (Berkes et al. 2000, Kassam 2009). As a result of life being intertwined with nature, Alaska Native peoples also gathered extensive traditional ecological knowledge (TEK) through generations of experience and connection with the ecological systems in which they lived, and this TEK was an essential aspect of subsistence life in Alaska. Today, the TEK that Native communities hold can be a valuable asset for resource management.

The importance and value of complimenting TEK with scientific data analysis to aid in management decision-making is largely acknowledged, but acknowledgement does not always coincide with understanding, as management groups are sometimes unclear on what TEK is, how it can be incorporated into contemporary western bureaucratic decision-making processes, and what actual advantages it can provide over scientific data collection alone (Berkes et al. 2000, Usher 2000).

For management purposes, TEK represents “all types of knowledge about the environment derived from the experience and traditions of a particular group of people,” and as such it should be noted that, despite the word “traditional,” TEK within a given community is ever-changing and always up-to-date with current conditions as new environmental observations are continually factored into it (Usher 2000). Berkes et al. (2000) expand upon this definition of TEK by noting that the understanding of relationships (between living organisms as well as between them and their environments) in an integral aspect of TEK, and that TEK is passed culturally through generations of Native peoples.

The upper Koyukuk region is no exception, and the wealth of TEK available in Allakaket and Alatna is what clued the local residents into the initial moose decline and triggered them to seek predator control from ADF&G. In present-day Alaska, however, villages can only utilize TEK to make official management decisions about wildlife resources by submitting their knowledge and recommendations through the Board of Game process. This process and the economic and political difficulties involved with agency predator control caused more than a decade to pass between the time that villagers

requested action and the time that predator control was enacted. It is clear that TEK can provide timely identification of changes in local resources, which can be a major asset if it is properly incorporated in resource management, but currently in Alaska the connection between TEK and resource management is very minimal.

Lessons from Community-Based Wildlife Management

In some areas of Africa, programs utilizing principles of community-based wildlife management (CBWM) have had great success achieving goals such as increasing elephant populations by decreasing poaching through community involvement (Child 1996, Getz et al. 1999, Mapaire and Campbell 2002, Foggin 2003). In Alaska, reducing predatory pressures on moose by increasing community involvement in wolf trapping can be seen as a similar goal, and so some lessons regarding that goal might be learned by evaluating the principles of CBWM.

In the late 1980s and early 1990s, community-based natural resources management (CBNRM) sprang up in southern Africa in response to the many conservation issues that were spreading due to failures in the colonial “fortress” strategy of conservation and preservation. Lands in impoverished areas were experiencing a “free-for-all” of resource degradation and unsustainable utilization that was not effectively controlled by laws or enforcement (Gibson and Marks 1995, Child 1996, Mutandwa and Gadzirayi 2007). Furthermore, the control of resource management decisions laid in the hands of central government with no connection to the resource users. Both conservation and development goals were failing and social injustice was prevailing (Balint 2006). The colonialist command and control system was failing at a time when a

paradigm shift was occurring in the realm of resources management (Berkes 2004). Rather than follow old reductionist and detail-focused approaches, management authorities as well as the scientific community were beginning to think on the level of whole systems. They began to recognize humans as being a part of the ecosystems in question, rather than separate from them. Ideas for effective conservation and management shifted from expert-based towards participatory approaches. As a result, rather than view humans as just “managers” or “stressors,” authorities sought to develop management that recognized and utilized the interactions between people and ecosystems. Thus, CBNRM emerged.

As Brosius et al. (1998) point out,

Community-based natural resource management programs are based on the premises that local populations have greater interest in the sustainable use of resources than does the state or distant corporate managers; that local communities are more cognizant of the intricacies of local ecological processes and practices; and that they are more able to effectively manage those resources through local or "traditional" forms of access.

In addition, by giving local communities rights to and responsibility over local resources and ways of benefiting from those resources in a sustainable economical manner, local communities have greater incentive in the sustainable use and protection of resources while also enjoying improved economic development and social empowerment (Child 1996, Hackel 1999, Balint 2006). With less need for guns and

guards to enforce ineffective resource laws (or in Alaska's case helicopters to enact aerial wolf control), an economic burden is also lifted from central government (Mutandwa and Gadzirayi 2007).

A CBNRM program aims to provide local communities with legal rights to benefit from natural resources. To do this it must devolve the authority and management of said resources to the community level. This necessitates the facilitation and development of community institutions through which communities can successfully manage their new responsibilities. The program must also provide the technical knowledge and assistance needed for successful management. Finally, the community must be given access to methods by which it can benefit from its natural resources in a sustainable manner. As laid out by Cox et al. (2010), a list of the necessary design principles for CBNRM can be found in Table 1. The focus or importance of each goal and the attempts to achieve them vary with each program design.

Given these principles that have contributed to successful community-based management in some cases, clues arise as to what might encourage successful community initiatives in Alaska, and what might discourage them as well, shedding light on possible reasons why Allakaket and Alatna turned to ADF&G for predator control rather than turning to trapping. First, previously mentioned management authority and power dynamics arise as possible issues. Also, any hunter can harvest moose near Allakaket and Alatna, so the resource does not belong to the locals to use or protect. This may be a deterrent to local communities enacting predator control on principle itself, as they would be working to protect a resource non-locals can take from them. This deterrent might be

overpowered, however, by the need and value that the community places on the local moose population.

Table 2.4.1 List of CBNRM Design Principles from Cox et al. 2010

Principle	Description
• User boundaries	Clear boundaries between legitimate users and nonusers must be clearly defined.
• Resource boundaries	Clear boundaries are present that define a resource system and separate it from the larger biophysical environment.
• Congruence with local conditions	Appropriation and provision rules are congruent with local social and environmental conditions.
• Appropriation and provision	The benefits obtained by users from a common-pool resource (CPR), as determined by appropriation rules, are proportional to the amount of inputs required in the form of labor, material, or money, as determined by provision rules.
• Collective-choice arrangements	Most individuals affected by the operational rules can participate in modifying the operational rules.
• Monitoring users	Monitors who are accountable to the users monitor the appropriation and provision levels of the users.
• Monitoring the resource	Monitors who are accountable to the users monitor the condition of the resource.
• Graduated sanctions	Users who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and the context of the offense) by other users, by officials accountable to the users, or by both.
• Conflict-resolution mechanisms	Users and their officials have rapid access to low-cost local arenas to resolve conflicts among users or between users and officials.
• Minimal recognition of rights to organize	The rights of users to devise their own institutions are not challenged by external governmental authorities.
• Nested enterprises	Use, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

The majority of wildlife management authority has been removed from the local level, so a community-initiated local trapping effort may not be expected, as it is not the

official responsibility of the community to perform wolf control. Responsibility of management and funding for management officially lies in the hands of government agencies, so seeking agency action may be a way of utilizing resources represented by government agencies. Through fees such as license or tag costs resource users pay management agencies with the expectation that the public resources will be properly managed. Accessing the resources and services of management agencies funded by the public may be away of utilizing and justifying the existence of those management agencies (Gifford 2011). Making an effort to hunt and trap wolves locally might be seen as performing the job of the agency.

The idea of nested enterprise, however, might offer a way to help bridge this dilemma to increase local wolf harvest. There are no permanent nested enterprises within the community that provide for the community and agencies to work together toward management goals. While agency snaring clinics help spread knowledge with the intention of increasing local wolf harvest, they are not a permanent presence to ensure lasting influence. Community efforts to harvest wolves through hunting and trapping are not a part of the official wolf control program that was developed and enacted by the management agency. A nested enterprise within the community could be created with the cooperation of management agencies and the local community that can provide organization, an official sense of purpose, and a means to an end that might be effective and long-lasting. A community wolf control program, for example, formed by cooperation between government agencies and the villages of Allakaket and Alatna and charged with the goals of maintaining a low wolf population while passing on the

tradition of wolf trapping might encourage participation of village members in wolf management, increase trapping focus on wolves, raise funds to provide snaring materials or traps, and nurture the development of new trappers over a period of generations. Such an enterprise might provide the approval and encouragement needed for a community to enact concerted local management efforts within the current management system.

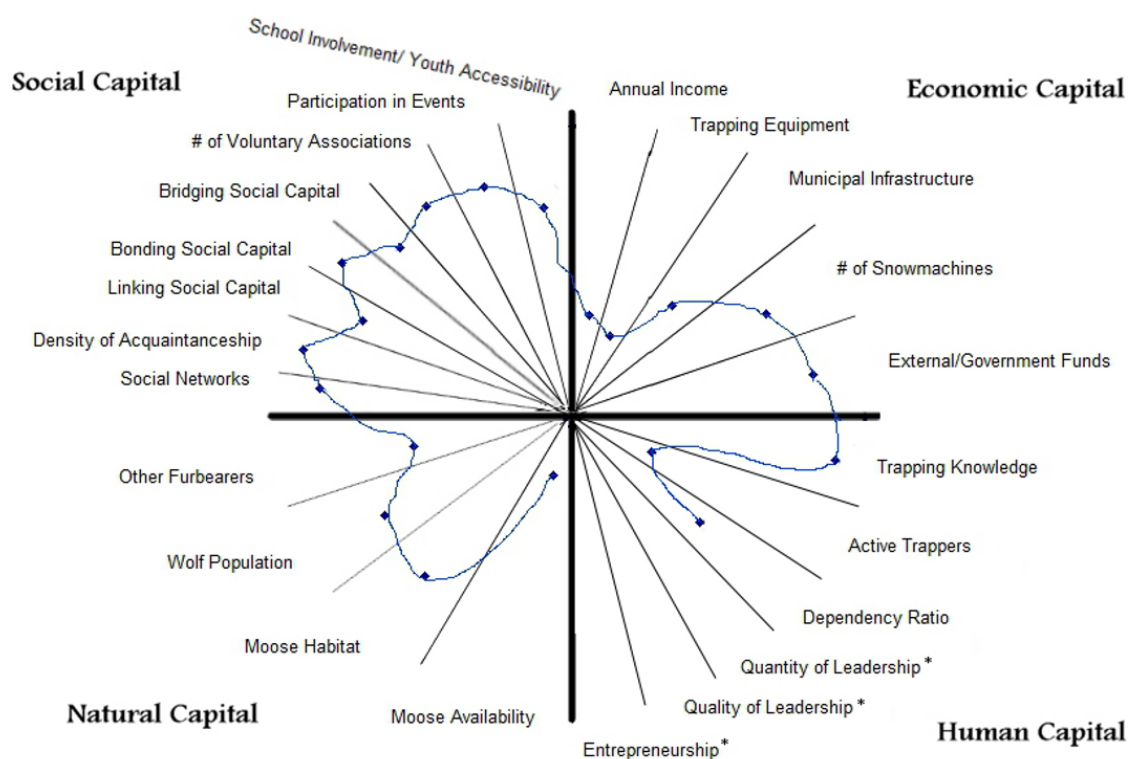
Appropriation and provision is another important principle that may have contributed to Allakaket and Alatna pursuing agency predator control over community-based predator control. Even when a program takes a decade to come to fruition, less community resources are spent seeking agency action than are needed to increase wolf hunting and trapping locally. Seeking agency action requires the time and effort of one or more community members, but compared to trapping an extensive amount of time is not involved, public meetings do not occur frequently, flight fares are often covered, and no physical effort is necessary. Once agency action occurs, public funds are utilized to reduce the wolf population with the expected benefit of greater moose availability. Local wolf hunting and trapping for that same benefit requires extensive time, hard physical work, and money to pay for equipment, snowmobiles, fuel, and oil. The benefits to such an endeavor are many (wolf pelts, potential income from the sale of wolf pelts, a sense of accomplishment, recreation, enjoyment, continuing tradition, etc), but those benefits must be sufficient in the lives and cultures of Allakaket and Alatna to outweigh the investment required. It is not clear what potential benefits the communities of Allakaket and Alatna currently perceives to arise from wolf hunting and trapping (aside from more moose) or if

a lack of relevant benefits is a factor that is preventing community members from investing more in these endeavors.

2.5 Significance of Community Capacity and Social Influences

Community Capacity

For a community to make a concerted effort toward a goal such as predator control, the community must have the capacity to take action, which begins with having the assets necessary for action (Beckley et al. 2008). Those assets include social capital, economic capital, human capital, and natural capital. Allakaket and Alatna have many assets that can be used to pursue predator control. Relevant assets and a visual estimation of the relative level of those assets are portrayed in Figure 2.5.1. Estimates were made based on knowledge and observations of the community prior to this study's interviews, as well as demographic and economic data that is publically available (Department of Commerce, Community, and Economic Development 2012, US Census Bureau 2012*a, b, c, d*).



- ◆ Each dot represents the estimated relative availability of the resource within Allakaket and Alatna. Estimates standardized differing metrics to a qualitative scale with ranges from no availability (center of the circle) to very high availability (outside edge of the circle). Availability is defined as the level necessary for trapping; i.e., absolute quantities of the resources are not comparable, but the adequacy of the resource base as needed for trapping is comparable. Estimates were made from empirical sources when available (e.g., State of Alaska Department of Community and Economic Development, Alaska Department of Fish and Game) and observations made within the community before interviews were conducted. The diagram does not represent information obtained from the interviews conducted for this study.

— The line connecting dots gives shape to the asset amoeba to provide a visual representation of the amount of each resource available to support trapping relative to the other resources needed for trapping within Allakaket and Alatna.

- * An estimate of these resources was not possible during the timeframe of the observations.

Figure 2.5.1 Estimated Asset Amoeba for Allakaket and Alatna

The capacity that a community has to address an issue, the issue that arises to be addressed, and the methods by which the community chooses to address that issue all combine to create different potential outcomes (Figure 2.5.2). Declining moose densities in the upper Koyukuk region have initiated a response from the local community. By utilizing human and social capital through bureaucratic relations Allakaket and Alatna are currently addressing the issue of high wolf numbers by pursuing agency action and as such have accessed state resources to enact predator control (Figure 2.5.3). The expected outcomes are to decrease wolf numbers and increase moose availability, but no other outcomes are explicitly expected.

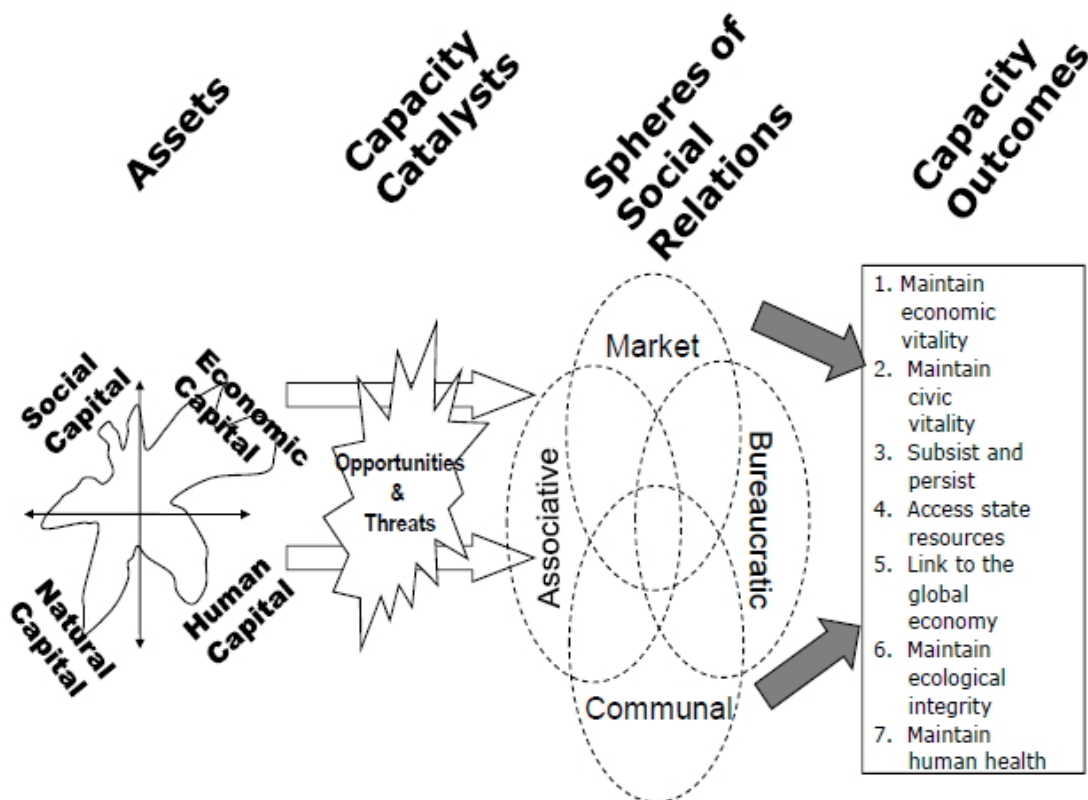
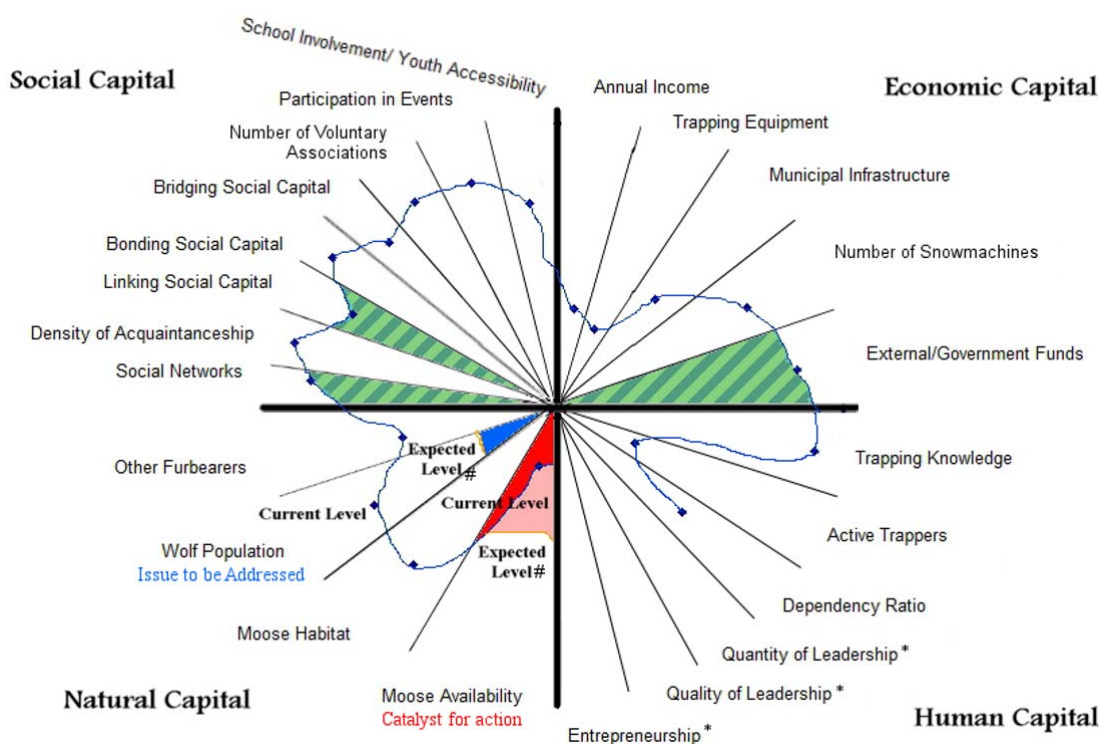


Figure 2.5.2 The Community Capacity Model of Multiple Capacities, Multiple Outcomes (Beckley et al. 2008)



- ◆ Each dot represents the estimated relative availability of the resource within Allakaket and Alatna. Estimates standardized differing metrics to a qualitative scale with ranges from no availability (center of the circle) to very high availability (outside edge of the circle). Availability is defined as the level necessary for trapping; i.e., absolute quantities of the resources are not comparable, but the adequacy of the resource base as needed for trapping is comparable. Estimates were made from empirical sources when available (e.g., State of Alaska Department of Community and Economic Development, Alaska Department of Fish and Game) and observations made within the community before interviews were conducted. The diagram does not represent information obtained from the interviews conducted for this study.

— The line connecting dots gives shape to the asset amoeba to provide a visual representation of the amount of each resource available to support trapping relative to the other resources needed for trapping within Allakaket and Alatna.

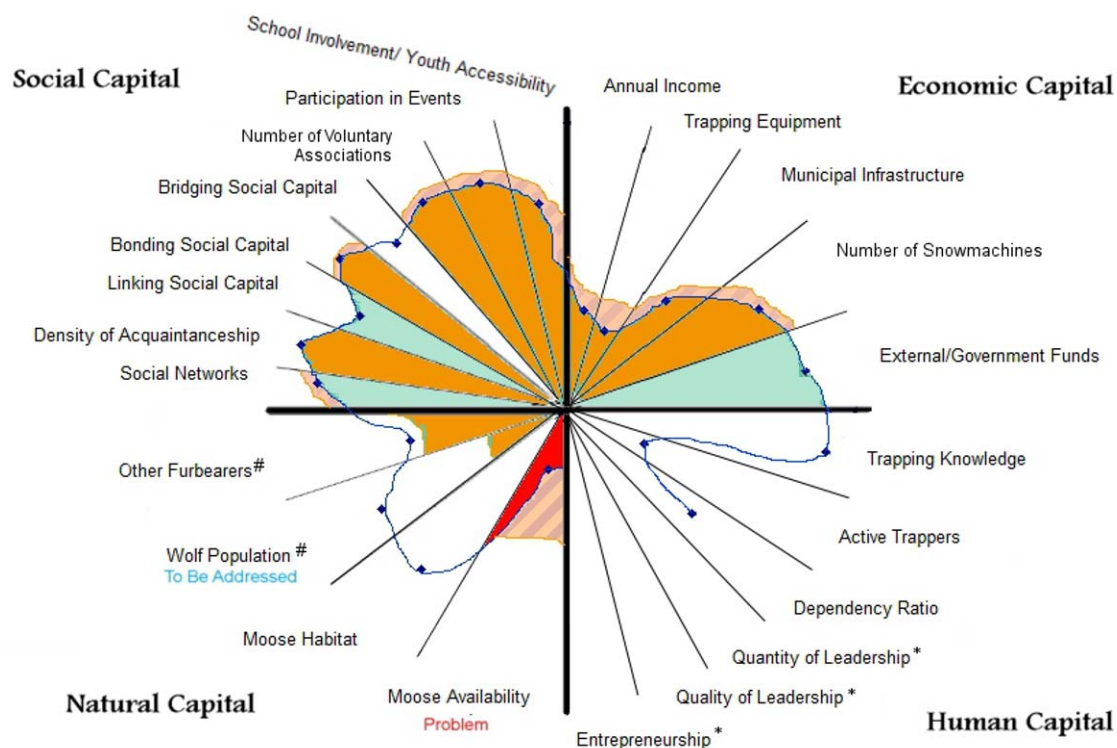
- * An estimate of these resources was not possible during the timeframe of the observations.
- # Expected levels do not represent a specific expected level of change but rather a relative expectation of "more" or "less."



Assets currently being utilized to achieve wolf control.

Figure 2.5.3 Assets Utilized and Outcomes Expected for Current Action

Pursuing wolf control by increasing the hunting and trapping efforts of community members is an alternative action for Allakaket and Alatna that has the potential to result in positive outcomes that include the goals of decreased wolf numbers and increased moose availability as well as several other potential benefits (Figure 2.5.4). This alternative action would require the use of different assets, but could possibly result in benefits such as increased local income, increased community involvement, increased youth involvement, increased participation in tradition, and/or cultural enrichment. Without sufficient assets to provide the community with the capacity to pursue this alternative, however, this option is not possible.



- ◆ Each dot represents the estimated relative availability of the resource within Allakaket and Alatna. Estimates standardized differing metrics to a qualitative scale with ranges from no availability (center of the circle) to very high availability (outside edge of the circle). Availability is defined as the level necessary for trapping; i.e., absolute quantities of the resources are not comparable, but the adequacy of the resource base as needed for trapping is comparable. Estimates were made from empirical sources when available (e.g., State of Alaska Department of Community and Economic Development, Alaska Department of Fish and Game) and observations made within the community before interviews were conducted. The diagram does not represent information obtained from the interviews conducted for this study.

— The line connecting dots gives shape to the asset amoeba to provide a visual representation of the amount of each resource available to support trapping relative to the other resources needed for trapping within Allakaket and Alatna.

- * An estimate of these resources was not possible during the timeframe of the observations.

Assets that can be utilized to achieve wolf control. Assets currently being utilized to achieve wolf control.

Potential increase in assets: these do not represent a specific proportional amount of increase, only a general change of "more."

- # These resources may decrease in availability, indicated by the levels represented below the current levels. No specific proportional amount of decrease is represented, although wolves may show a greater decline in availability as they will be targeted for wolf control.

Figure 2.5.4 Potential Outcomes of Local Wolf Hunting and Trapping

Specific assets required for local wolf hunting and trapping to be effective include availability of wolves and knowledge of where to find them, knowledge of how to trap wolves or individuals with wolf trapping knowledge that are willing to share that knowledge with others, snowmobiles or dog teams to access the greater countryside, fuel or dog food, traps, snares, rifles, ammunition, and enough individuals that are willing, capable, and interested in hunting and trapping wolves to ensure that enough wolves are harvested annually.

Furthermore, such an endeavor requires human and social capital such as individuals that are willing to initiate and organize a program to monitor and ensure that goals are met, recruit and manage participants, and access outside economic capital or gather funds from within the village if such funds are available. Ultimately, cognition of the issue is also necessary. If individuals within the community do not understand the role of trapping in the situation, the effect the community can have, or even the complicated rules and regulations surrounding hunting and trapping, they may not be inclined to make an effort to hunt or trap wolves.

This study seeks to determine if the capacity to pursue and enact local wolf control efforts through community-based hunting and trapping exists within the community of Allakaket and Alatna. If the community does not have the capacity required this may be a factor preventing current involvement in wolf control efforts but would most certainly rule out the feasibility of local hunting and trapping efforts as an alternative to aerial wolf control.

Social Barriers to Community Wolf Control

Other internal barriers may be at work that have prevented the community of Allakaket and Alatna from organizing local wolf control efforts or that are preventing individuals from hunting and trapping in an effort to combat wolf numbers. Group dynamics, for example, sometimes prevent groups from taking action when action would require only some group members to contribute effort or resources because not all members are able to do so (Baron et al. 1992). For local wolf hunting and trapping to be effective men would be required to make the effort while women would not be able to participate, and only the men with sufficient interest, motivation, time, equipment, and fuel would be able to participate. In essence, the weight of the program would be placed on a certain section of the community and the community may be reluctant to make a group decision that requires that section to take action while the rest of the community can do little to help.

Gifford (2011) outlined the “dragons of inaction” that often prevent communities or individuals from taking action. In this case, these dragons may be relevant as to why Allakaket and Alatna sought agency wolf control over increasing hunting and trapping locally to decrease wolf numbers.

Comparisons with other people certainly plays a role for some community members, as it is the norm that women can not hunt or trap wolves, so it is unlikely that women will go against that norm to combat wolf numbers. If young community members feel pressured to join their peers in activities such as basketball over-trapping this dragon may be affecting more than just women.

Distrust of ideas, those who propose them, or even the potential for a program to meet its goals may be a dilemma for individual or community involvement (Gifford 2011). If local hunting and trapping efforts are perceived by local residents to be an inadequate action and no one believes that enough wolves can be taken in such a way then local residents will not participate in such an effort. Individual perception of the potential effectiveness of wolf local hunting and trapping efforts are investigated in this study to determine if distrust is a current factor.

Finally, limited behavior is a dragon that may also apply in this situation. Limited behavior is related to the idea that an individual may adopt the easiest action available, but that action may not necessarily be the most helpful overall (Gifford 2011). If the community has the capacity to enact its own wolf control through hunting and trapping, this might be the most beneficial action overall, but it certainly is not the easiest. Limited behavior may very well be a contributor to the current situation in Allakaket and Alatna and why the community sought agency action over local wolf control efforts.

Chapter 3: Methods

3.1 Study Design and Approval

Due to the qualitative nature of the study pertaining to a specialized topic in two rural Native communities, several steps were required before data could be gathered. Semi-structured interviews with open-ended questions were selected as the method for data collection to target key topics while allowing respondents to elaborate on subjects of interest and share knowledge, views, and personal experiences (Huntington 2000, Huntington et al. 2006, Perecman and Curran 2006). The data gathered by the semi-structured interviews would then be used to test the study propositions and hypotheses through modified analytic induction.

To introduce the project to the Allakaket and Alatna Traditional Councils they were contacted first by phone and a follow-up email was sent to each office with more details about the project (Norton and Manson 1996). The Allakaket and Alatna Traditional Councils reviewed the project and verbal permission to proceed with the research by visiting Allakaket and Alatna to conduct interviews was granted by each Traditional Council.

The research protocol and instrument were then approved under expedited review by the University of Alaska Fairbanks (UAF) Institutional Review Board (IRB) (Appendix B). A goal of 10-20 interviews was set with the intention of sampling the community spectrum in relation to trapping: a broad age range of males, females,

trappers, wolf trappers, and non-trappers. Due to IRB constraints it was necessary to target respondents 18 years of age or older.

3.2 Cooperation, Survey Design, Selection of Respondents, and Data Collection

To make connections, gain rapport, and develop a better understanding and firsthand knowledge of lifestyles and culture within Allakaket and Alatna the researcher volunteered with the Subsistence Division at ADF&G to spend one week in November 2011 and one week in October 2012 working with local residents in Allakaket to conduct door-to-door household surveys on large land mammal harvest and use.

For the researcher to better understand the topic, glean more insightful results from the research, and connect more effectively with respondents, she attended the Alaska Trappers Association (ATA) Trapping School in October 2011 and maintained a three mile walking trapline outside of Fairbanks, Alaska for the winters of 2011 and 2012 (Dilley 2000, DeWalt and DeWalt 2010). While wolves were not present in the area of the trapline the researcher gained experience trapping in interior Alaska for fox, lynx, mink, marten, and ermine using snares, foothold traps, and conibear traps, which gave her experience and knowledge relevant to understanding respondent conversations about trapping.

With review and suggestions by research professors at the University of Alaska Fairbanks and subsistence research specialists at the Alaska Department of Fish and Game a semi-structured interview template was developed with 52 questions for non-trappers, 67 questions for trappers, and an additional 8 questions for Elders (Appendix A). The questions focused on revealing information related to the hypotheses, such as

identifying wolf trapping resources available in the community, investigating opinions on resources management in the area, and exploring what keeps residents from trapping more than they do. Two maps (one of the village area and one showing the larger surrounding area from Bettles to Hughes) were included with each interview template to mark where each respondent had seen wolves or significant wolf sign within the past year. The maps would create a visual record of knowledge within the community of wolf whereabouts, which would be necessary knowledge for successful wolf trapping or hunting.

A visit to the community was planned and approved for mid-April 2012 and accommodations were arranged for a six-day stay at Allakaket School. In an effort to lessen the burden of researcher visits on the community this visit was coordinated to coincide with the visit of an ADF&G Division of Subsistence researcher whose goal was to conduct ethnographic interviews about moose hunting. The ADF&G researcher hired a local resident to arrange interviews with key respondents that had been identified during previous visits. For this study interviews were arranged and conducted with elder trappers and elder wolf trappers after they were interviewed by ADF&G about moose hunting. As respondents that fit other demographics were encountered randomly at the Allakaket School, the Allakaket Tribal Office, and along Allakaket roads, they were asked informally to participate. An announcement was also made over local CB radio inviting residents to participate and those that agreed were interviewed on a first-come-first-serve basis if they fit a demographic that had not yet been sampled. Each respondent was remunerated \$50 for their time.

Interviews were conducted at the Allakaket School, the Allakaket Tribal Office, or in the respondent's personal residence. Interviews were recorded on a digital voice recorder and were later transcribed verbatim. The introduction to each interview, read by the interviewer, was not transcribed, as it was the same for each interview. Basic demographic information about each respondent was recorded but each respondent remained anonymous during the interview and in interview notes. Interviews were assigned a number chronologically as they were conducted.

3.3 Analysis

The unit of analysis for the qualitative data used in this study was a "code." A code is a word or phrase, defined by the researcher, which is used to label a text segment in the interview transcriptions as containing information relevant to a particular theme or question pertinent to the study. The codes provide a common label for similar ideas described in dissimilar language by different respondents, allowing identification of themes that are present in the data. Coding the data was the first process of this analysis and involved the following steps:

1. Reading the transcripts to gain a general idea of the content.
2. Developing code names and definitions for themes identified as relevant to study questions.
3. Testing that different researchers came to the same conclusion that specific text segments should or should not receive specific codes. This test was conducted with the kappa statistic which quantitatively assesses agreement in the use of codes among several coders.

4. Refining the codebook and coding the data.

More detail on these steps is provided below. After the codes have been assigned the content and frequency of the codes are used to assess study hypotheses.

Interview transcriptions were read to provide a refresher on interview content prior to code development. A second examination of the transcripts was used to identify important themes and trends, which contributed to the formulation of initial codes. Important topics or themes necessary to address the hypotheses were also included as initial codes. For example, to test Hypothesis One available resources would need to be identified to determine the capacity of the community to enact local predator control. Required resources include (but are not limited to) community support for such a program, wolf trapping knowledge, and wolf trapping equipment. A code was developed for each resource to note if and when that resource was identified in an interview. A third examination of the transcripts was used to refine and organize the codes into a preliminary codebook.

A summary of each interview was constructed, which included basic demographic data as well as a general description of how the respondent views the situation, how he or she seems to fit into the overall theme of local predator control, anything that seemed particularly important or unusual about the interview, etc. Each summary served as a more holistic overview of the interview to complement the specific data that was being gleaned from the interview through the coding process.

To test the validity of the codebook an interview of moderate length that included an array of topics and themes was chosen to be coded by three researchers independently.

Coders were not required to utilize any given code a set amount of times, so Randolph's Free-Marginal Multirater Kappa (2005) for inter-coder reliability was calculated for the codes applied to the interview transcript by the researchers:

$$K_{free} = \frac{\left[\frac{1}{Nn(n-1)} \left(\sum_{i=1}^N \sum_{j=1}^k n_{ij}^2 - Nn \right) \right] - \left[\frac{1}{k} \right]}{1 - \left[\frac{1}{k} \right]}$$

For the Free-Marginal Multirater Kappa, N is the number of cases in question, n is the number of raters, and k is the number of rating categories. The Free-Marginal Multirater Kappa compares the agreement of the three researchers (n) in the use of the codebook for the selected interview. Kappa statistics were calculated using Randolph's Online Kappa Calculator (Randolph 2008). To produce meaningful kappa values the kappa statistic was calculated only for codes that were utilized three or more times in an interview.

The three coded versions of each interview were examined to compare how each researcher used a given code. For a given interview transcript the number of separate text segments that represented meaningful responses or contributions from the respondent were considered the total number of segments that could receive any code (N). This total number of text segments that could receive any code was used to compare when all three researchers applied the code in question to the same segments, when all three researchers agreed that the code did not apply to particular segments, and when one or two researchers applied the code to a segment but the other researchers did not. For each

code, this data was compiled in a grid (Figure 3.3.1) to record researcher agreement for each text segment in a transcript (Harrington 2011). Two categories (k) were possible for each text segment: the code in question was applied, or the code in question was not applied. This data was entered into Randolph's Online Kappa Calculator to calculate the Kappa statistic (Randolph 2008).

	# of researchers that applied code	# of researchers that did not apply code
Text Segment One		
Text Segment Two		
Text Segment Three, etc		

Figure 3.3.1 Code Agreement Grid for Calculating Kappa

Any given code was used relatively infrequently throughout the entire interview, signifying that the researchers agreed the code did not apply to the majority of the interview. The Free-Marginal Multirater Kappa is not influenced by bias or prevalence, so this agreement in not using the code for the majority of the interview did not inflate the kappa.

Results for kappa statistics can range from -1 (perfect disagreement) to +1 (perfect agreement) with 0 representing agreement by chance. The range of acceptable kappa values varies, with some researchers accepting 0.61 or greater, others accepting

only 0.70 or greater, and still others considering anything below 0.90 to be problematic (Brennan and Prediger 1981, Carey et al. 1996, Randolph 2005). Given the exploratory nature of this study, a kappa value of 0.80 or greater was determined to be acceptable while anything below 0.80 was considered problematic and necessitated code revision (Lombard et al. 2002, Randolph 2005).

If an unacceptable kappa value was calculated for a code the use of that code by each researcher was examined and the codebook was refined for better clarification. The test was repeated with a different interview and the kappa statistic was again calculated for each code. Codes were revised and the test was repeated until acceptable kappa values were attained for each code. With each round of coding representing a different interview it was expected that kappa statistics would fluctuate with each new calculation, even if codes had not been modified. Inter-coder reliability was considered to be satisfactory if final kappa values were above 0.80 but acceptable kappa values throughout subsequent interview coding would further validate the strength of inter-coder reliability.

In cases where only one kappa was calculated for a code (i.e., the theme was only present in one of the interviews tested), that value was considered the final kappa for that code. If kappa was calculated only twice for a code, the last value was used for the final kappa for that code, regardless of which value was higher due to the fact that the code was modified after the first calculation, implying that the last calculation is more representative of the final code.

Once a codebook was developed for which codes achieved acceptable kappa statistics that codebook was used by one researcher to perform the final coding of all

transcripts. ATLAS.ti (Version 6) was then used to organize and review the data to compare types and frequencies of responses for each code and determine how the data related to the hypotheses. In this process of using codes to organize interview segments according to common themes or topics, a grid was created with the various pertinent themes and ideas that arose in interviews to determine the total number or percent of respondents that agreed about a given idea, expressed a given view, identified a particular resource, etc. Modified analytic induction was then used to determine if each hypothesis and proposition was supported or contradicted by the qualitative data as organized in the process outlined above (Gilgun 1993, Bernard 2000, Bogdan and Biklen 2002).

Propositions were modified to reflect the data if necessary.

Wolf sightings and wolf sign noted on each map were transferred to one digital map to visually display respondent knowledge of where wolves have been found and in what numbers within the past year.

Chapter 4: Results

4.1 Interviews

Interviews were conducted with sixteen Allakaket/Alatna residents, which resulted in a total of nine hours and thirty-five minutes of recorded interviews with an average of thirty-five minutes per interview (Table 4.1.1). Respondent ages ranged from twenty years to seventy years with an average age of forty-four and a median age of forty-six and a half. After the fourth female was interviewed respondent selection shifted to males, as it was clear that cultural taboos still forbid women from dealing with wolves and no new information was arising with subsequent female interviews. Respondents had varying degrees of trapping experience.

Table 4.1.1 Interview Results and Respondent Demographics

Respondent ID	Gender	Age	Interview Length (min:sec)	Actively Traps	Former Trapper	Focuses or Focused on Wolves	Has Trapping Experience
1	Male	26	37:40	x		x	x
2	Male	70	26:06		x		x
3	Male	62	44:13	x			x
4	Female	50	32:49				
5	Female	55	11:56	x			x
6	Male	59	28:15	x			x
7	Female	21	19:59				x
8	Male	70	20:38		x		x
9	Male	29	18:05		x	x	x
10	Female	29	21:12				
11	Male	62	57:07	x		x	x
12	Male	55	58:50		x		x
13	Male	22	18:31				
14	Male	20	59:21	x		x	x
15	Male	43	45:10		x		x
16	Male	33	82:39				x

4.2 Codebook and Kappa Values

Three rounds of kappa values were calculated to determine inter-coder reliability using one interview for each round. Interviews 9, 8, and 4, respectively, were used for the kappa calculations. The final codebook contained twenty codes (Appendix C).

While kappa values for each code fluctuated with each interview, the final kappa calculation for each code was above the acceptable value of 0.80 (Table 4.2.1). Of the codes that received more than one kappa calculation, 91% showed an increase in kappa value overall or from the second kappa to the third kappa, indicating that the iterative process of code development strengthened the codebook and resulted in greater inter-coder reliability.

Table 4.2.1 Free-Marginal Multirater Kappa Statistic Results

Code	Interview 9 Kappa Value	Interview 8 Kappa Value	Interview 4 Kappa Value	Final Kappa
Capacity: Changes	*	0.943	*	0.943
Capacity: Deterrent	0.959	*	*	0.959
Furbearers	0.905	0.733	0.826	0.826
Support	0.797	0.943	0.855	0.855
Trapper	0.891	0.924	1.000	1.000
Willing to Participate	0.878	*	0.971	0.971
Wolf Trapping Knowledge	0.755	0.619	0.826	0.826
Equipment	0.946	*	*	0.946
Understand Problem	0.878	0.676	0.870	0.870
Incentive: Deterrent	0.755	0.962	0.884	0.884
Incentive: Positive	0.864	0.962	0.942	0.942
Involved	#	#	0.957	0.957
Norms and Values: Changes	0.946	0.829	0.913	0.913
Norms and Values: Deterrent	*	*	0.930	0.930
Resource Management	0.891	0.943	0.826	0.826
Overall Kappa Average	0.872	0.853	0.900	0.910

* Kappa was not calculated because code was used less than 3 times by any given coder

“Involved” code was added to the codebook after the second interview was coded

Capacity: Changes, Capacity: Deterrent, Willing to Participate, Equipment, and *Norms and Values: Deterrent* were only used enough to receive a kappa value in one or two interviews. The code *Involved* was added to the codebook after the second kappa calculation, so it only received one kappa value.

The overall kappa average was at an acceptable level for each kappa calculation, but it increased with the third kappa calculation and it increased once again when the final kappa for each code was included in the final average, resulting in a high overall kappa average of 0.910. Once again, this suggests that the codebook development process resulted in a more reliable codebook.

The codes *Capacity: Resource: Doesn't Support, Past Efforts, Historical Disconnect, Not Involved,* and *Resource Management: No Role/Responsibility* were not utilized enough in the selected interviews to warrant a kappa calculation but each represents an important topic of the study and so these codes remained in the final codebook. Due to the fairly straight-forward intended use for these codes and the high overall average kappa shown from the codebook development process, there was no evidence to suggest that the inter-coder reliability of these codes would be significantly less than the codes that received kappa values.

Appendix D portrays the grid that was created to organize the interview data by the hypotheses. A detailed discussion of these data and findings follows.

4.3 Community Capacity

Interviews identified the availability of resources necessary for local wolf control efforts to determine if the community has the capacity to enact such efforts.

Cognition: Understanding the Problem

For local wolf control efforts through hunting and trapping to occur community members must understand the effects that wolves have on the local moose population and the village, as well as the role that local hunting and trapping can have in addressing that issue.

All but one respondent felt that the local moose population is lower than it should be. Every respondent stated that the wolves in the area have a negative effect on the local moose population and when asked about the local wolf population nine respondents stated that there are too many wolves. Of the respondents that felt that the moose population is too low, one respondent felt that wolves were a factor but that bears were the primary culprits, whereas all others named wolves as the primary factor. Bears were mentioned second to wolves by four respondents. Of all respondents, twelve specifically expressed their belief that fewer wolves will help the local moose population rebound and/or result in more food (moose) available to the village. As expected, it appears the community recognizes low moose numbers in the area and the effect that wolves are having on the moose population.

Respondents identified other ways in which the local wolf population affects the community as well. Eight respondents mentioned that wolves come into the villages and eat local dogs while seven of respondents expressed concern or fear for personal safety along village roads. These issues were attributed to there being too many wolves in the area and as a result community members carry firearms for wolf protection or stay inside

when wolves have been spotted in the village. One respondent described a wolf encounter on the village roads:

Actually when I was sixteen I got chased by a wolf. Yeah it was a scary moment...I was walking along this road (pointing on map). I got chased from right here all the way...up to this road and I climbed the Washeteria and I waited for about an hour and then I, finally it couldn't get me so it just walked off and I, I had luck that time so I ran all the way uptown, I was scared, I was, yeah that's a really scary moment for me cause I was a lot smaller [than now].

(Interview 14)

The community also recognizes that local hunting and trapping can address the wolf-moose balance and contribute towards the goal of greater moose availability. Five respondents attributed the high wolf population to a lack of hunting and trapping, explaining that, compared to the days of active trappers and predator control, "wolf has clean [moose] out because they're not, nobody hardly trap wolf, hunt wolfs" (Interview 2) and "[people] used to trap a lot you know they trap them (wolves), now there's just hardly any trappers. That's why they're getting more and more" (Interview 8).

When asked if hunting and trapping from community members could bring the wolf population down if aerial control was not an option ten respondents believed that local hunting and trapping could indeed be effective if a concerted effort was made. One respondent believed that low wolf numbers could be maintained through local hunting and trapping, but that the local wolf population is currently too large for local harvest

alone and aerial wolf control would be necessary to make the first dent in wolf numbers. Only one respondent felt that local community efforts would not be effective, and this was because he did not believe that enough community members would be willing to get involved. Overall, the community recognizes the effects that hunting and trapping can have on the issue at hand.

One respondent mentioned that reading and understanding hunting and trapping regulations might impede some people from hunting or trapping, but he explained that this was not an issue for himself. No other respondent mentioned knowing or understanding regulations to be an issue that prevented them from trapping.

The cognition necessary for the community to have the capacity to enact local wolf control appears to be present within the sample group.

Furbearers and Trapping Knowledge

For the community to effectively control the local wolf population through hunting and trapping community members must know where to find wolves and how to hunt or trap them effectively. All but two of the respondents could and did name areas outside of the villages where they knew to be heavy wolf sign and/or where they had seen wolves within the past year (Figure 4.3.1). The two respondents that did not encounter wolves or wolf sign outside of the village in the past year do not leave the village to travel the countryside.

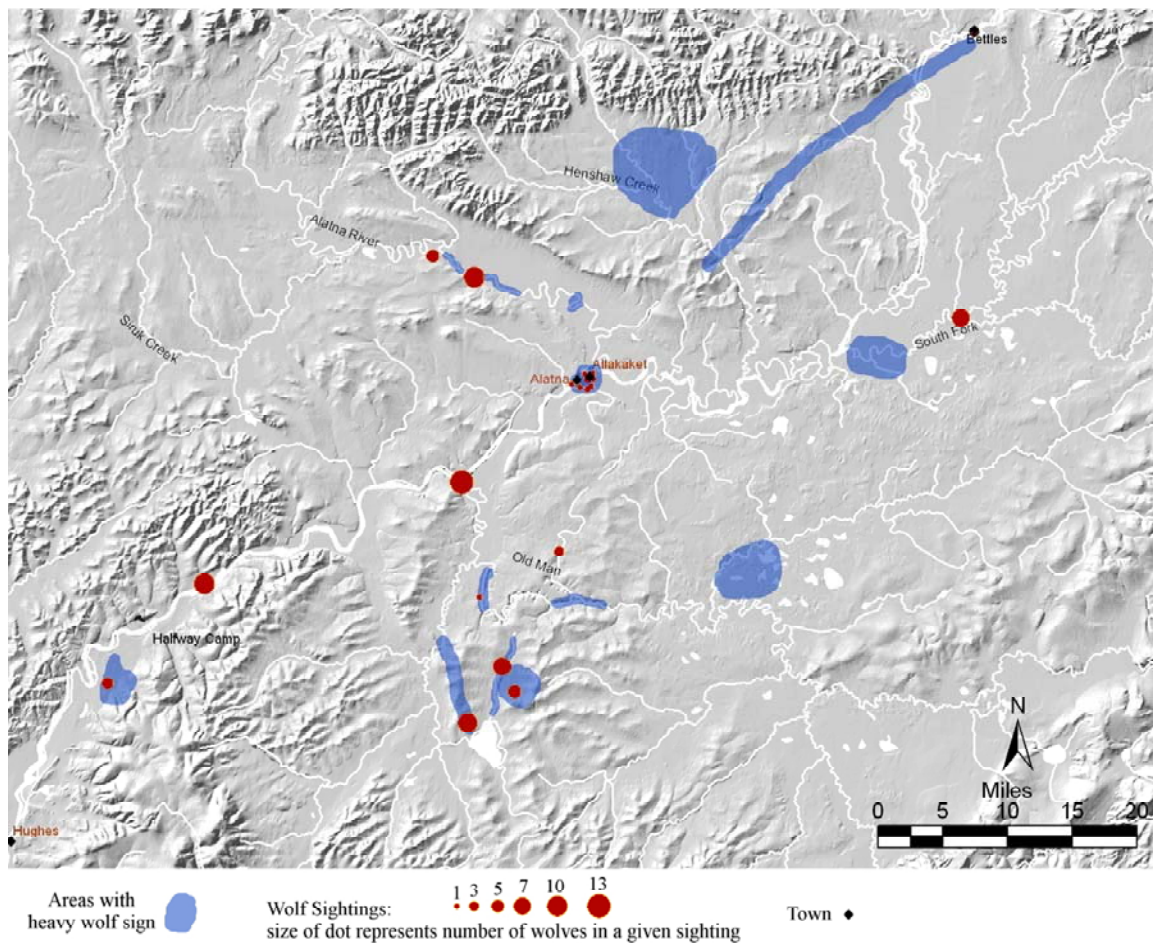


Figure 4.3.1 Map of Wolves and Wolf Sign Seen by Respondents in 2011-2012

Both of the respondents that did not leave the village and all but one other respondent reported seeing wolves or heavy wolf signs at certain locations within or near the village (Figure 4.3.2). As such, every respondent could and did identify areas where they knew that wolves traveled or visited, showing that there is sufficient local knowledge of wolf abundance and of locations where wolf hunting or trapping is likely to be successful.

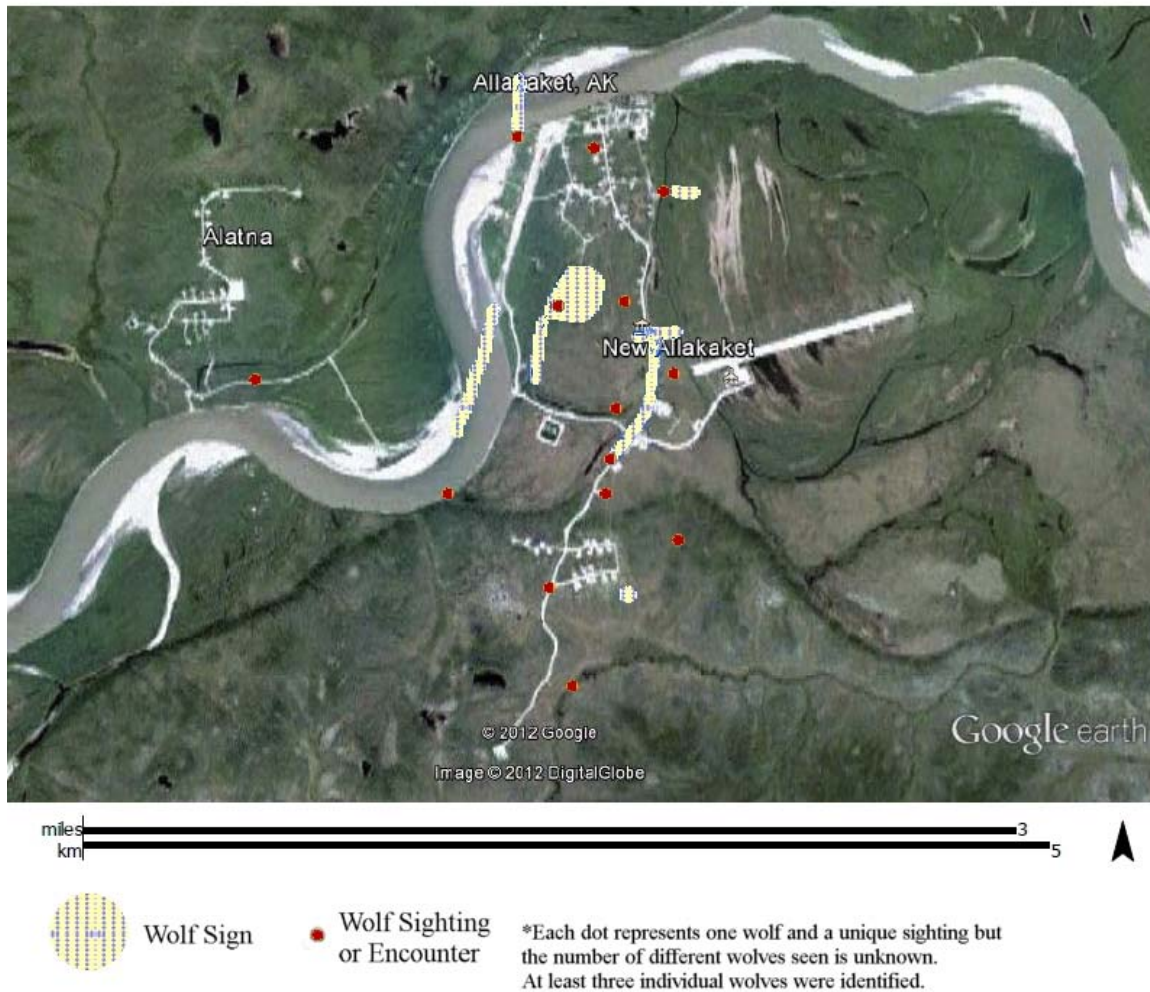


Figure 4.3.2 Map of Wolf Sightings and Sign in Allakaket and Alatna in 2011-2012

As mentioned previously, all respondents agreed that there are more than enough wolves to sustain an increase in local trapping. Furthermore, eight of the trapper respondents were asked if they believed there were enough other furbearers in the area to sustain an increase in general trapping. All eight respondents agreed that there is a surplus of furbearers in the area because not enough trappers are taking advantage of the resource. This is important, as a local wolf trapping effort will most likely include a

general trapping element to obtain the most benefit and ensure the longevity of the program.

Only six of the respondents were active trappers at the time of the interview while three respondents were formerly active trappers. Four additional respondents had some trapping experience or made small trapping efforts on occasion, leaving only three respondents with no trapping experience. Nine additional trappers or former trappers that reside in Allakaket or Alatna were identified in respondent interviews. This evidence suggests that there is sufficient general trapping knowledge in the community for a trapping program to be viable.

Four of the respondents actively focus on and have success hunting or trapping wolves and five additional respondents have had success hunting or trapping wolves but do not focus their efforts on wolves. Of all respondents (including trappers and non-trappers), twelve named general methods used for trapping wolves with snares being the most commonly used method in the area. Five respondents described specific sets used for wolves. All trapper respondents stated that winter (usually after December) was the best time to trap for wolves because their fur is the best quality in the winter. One respondent added that they are also most vulnerable at that time because food is more difficult for them to obtain. Four additional members of the community were identified as being wolf trappers that had passed wolf trapping knowledge to respondents. This data suggests that there is sufficient wolf trapping knowledge available and accessible within the community for wolf trapping and hunting efforts to be successful if this knowledge is utilized.

Additionally, for wolf trapping or hunting to occur there must be sufficient knowledge of how to handle the wolf carcasses in a cultural context so as to avoid repercussions from the wolf spirit. Five wolf trappers as well as two non-trappers stated that, to avoid injury or bad luck, wolves must be handled carefully to appease their strong spirits. One respondent explained:

Wolf used to be man in our culture...he was the toughest man around here, that's why most people scared to trap it. He used to be a man before. In our ways, you know, in our culture. When we kill them we can't just leave it we gotta skin 'em, cut all the joints, cut the head, open the belly, cut every joint so you don't get arthritis. Not getting arthritis, you know, but I burn fat right away, you know, when I get them. I shoot it then I make fire and burn some fat and goddamn marten he'll talk with it, you know, he tell if you feed it, you know, you're not bothering it and, "don't think bad about me or my family" you know, that's what you tell him. I don't know if different people do that...but us, that's what they tell me so I do that. (Interview 11)

One Alutna Iñupiaq described similar rules regarding wolves, saying:

You have to be really careful because they have strong spirits in our tradition. If you don't cut the joints, you gotta cut all the joints. If you don't you're going to have problems from that part. Arthritis, I mean, some kind of ailment...It takes a certain amount

of luck [to catch on]> and it depends on how you take care of the last one you got, like if you didn't cut a joint or did something wrong, didn't burn it maybe, they know that, you know, maybe from like a fox seen it and then, you know, they communicate and said "yeah that person didn't take care of the last wolf he caught," so [it makes it harder to get another]. (Interview 1)

This evidence suggests that the Iñupiat are indeed concerned with the same or similar beliefs as the Koyukon Athabaskans regarding the spirit of the wolves and the need to treat wolf carcasses properly. Only three trappers specifically stated that they know the proper way to treat wolf carcasses in order to meet customary obligations attributed to avoiding injury from the wolf spirit. One other trapper implied that he know how to care for a wolf carcass properly while two respondents that have harvested wolves in the past stated that they do not know the proper way to care for the carcasses, and so they gave the wolves to someone else in the village to skin and dispose of in the customary way. Three additional community members were identified as knowing how to care for wolf carcasses, having taught that process to others within the village.

While there appears to be sufficient knowledge available within the community of how to properly skin and dispose of wolf carcasses so as to meet customary obligations and therefore avoid injury, two respondents (one possessing that knowledge and one without) remain reluctant to harvest wolves due to the power of the animals in general rather than just the repercussions that might come from treating their carcasses improperly. This extends the issue of the wolf spirit from a capacity issue to one of risk

assessment and risk/benefit comparison, which will be discussed in further detail in section 4.4.

Community Support: Human and Social Capital

Every respondent supported the idea of a local wolf trapping program, saying that such a program would be beneficial for the community, and every respondent declared that they would be willing to contribute financially to fund such a program just as they currently contribute financially to fund other community programs. The four female respondents and two male elders were the only respondents that were not willing to participate in wolf trapping efforts if a program were initiated. Only one respondent was not willing to participate in a trapping program by sharing his knowledge of general trapping, wolf trapping, or fur handling with community members. As mentioned previously, additional community members were identified as already willing to teach others about trapping. In October 2012 (after these interviews were conducted) one community member organized and taught a community trapping and snaring workshop with an emphasis on targeting wolves. Around thirty community members participated. All of this evidence suggests that there exists sufficient support for a local wolf control program within the community, as well as sufficient individuals that would be willing to participate in trapping and in teaching others, to populate a successful program, if one were to be organized and initiated.

On a visit to the community after interviews were conducted, one community member expressed concern that a local wolf control program should not include

“handouts.” Due to this concern, this individual was the only community resident that did not express support for such a program.

Levels of community involvement and development of community programs indicate that the community has the capacity to maintain a program such as would be needed for local wolf control efforts, but the capacity to organize and initiate one may be lacking.

Eight of the respondents involve themselves in community-related endeavors through activities such as serving on one of the Tribal Councils, serving on the local ADF&G Advisory Committee, or volunteering with local fundraisers, or being involved with the local Dog Musers Association. One respondent specifically expressed a willingness to organize fundraisers and events for a trapping program were a program to be created. Through other endeavors, another respondent demonstrates the capacity to develop and initiate such a program, but he is already over-busy with other responsibilities.

The capacity for the community to run a local wolf trapping program appears to exist, but the capacity to initiate one appears to be lacking, as there so far has not been an individual willing or interested in undertaking such an endeavor. One respondent noted that, to get a program going, the community only needs, “communication, and I don’t even think it’s actually that hard, cause people, I see those younger people want to do things but nobody’s teaching them or they don’t have a snowmachine or something and all of it is just small things, I think” (Interview 15). Evidence suggests that the person to open communication about increasing local trapping and begin to organize assets to make

them more accessible for local trapping is a key resource that may be lacking in this situation.

Economic Capital

Many assets in terms of economic capital related to wolf hunting and trapping are available within the community. Interviews identified ten snowmobiles that are available to respondents for trapping and several more snowmobiles can be witnessed zooming around the community, many of which are likely available for use by potential trappers. Five respondents, however, stated that better snowmobiles (wider track, more fuel efficient, newer, better for deep snow) would be needed for an effective wolf trapping effort. Ten respondents own or have access to traps and/or wolf snares, but these resources were limited and two respondents confirmed that sharing traps and snares is not culturally appropriate within the community. Six respondents named a lack of traps and snares as limiting their current trapping activities. This evidence suggests that more traps and snares would likely be needed in order for local wolf trapping to be effective.

Funds for extra equipment, ammunition, motor oil, and fuel would be necessary for the community to have the capacity to enact local wolf hunting and trapping. Seven respondents mentioned that their personal finances limit their trapping activities due to the initial cost of equipment, fuel, and/or oil. Without its own fund, the community has turned to agency donations to provide materials to increase availability of trapping equipment (specifically snares) for the local trapping and snaring workshop previously mentioned. Prior to the community trapping and snaring workshop of 2012, residents relied on agency snaring clinics as a source of new equipment. While the clinics were

intended to provide knowledge of snare-making techniques with the hope that participants would then invest in materials and continue to make more snares after the clinic, participants who were interviewed simply utilized the snares they received at workshops and did not make more, although some did express interest in attending another workshop to receive more snares.

Each respondent, however, expressed that they would contribute to a community trapping program just as they contribute now to the local dog musher program. Through fundraisers such as bingo, cake walks, and raffles, Allakaket and Alatna as one community raise \$5,000 every year and \$10,000 every third year to support the local dog mushers and contribute to the Koyukuk Spring Carnival (Interview 4). This indicates that there could be significant financial support within the community to fund a local wolf trapping program that might be utilized to provide snare-making materials, traps, fuel, or even snowmobiles. Furthermore, Village and Tribal Council funds can be appropriated such programs and external funding is also available to the community, including grants from the Tanana Chiefs Conference (Interview 6). Given the overall economic assets available to the community, economic capital does not seem to limit the capacity of the community to enact local wolf control if the human capital is available to organize and consolidate these assets through fundraisers and the like.

Capacity-related Deterrents

Some respondents mentioned deterrents that can not be addressed by the community, which may affect the capacity of the community to trap or hunt wolves effectively. Five respondents explained that the terrain around Allakaket and Alatna puts

its people at a disadvantage when it comes to hunting wolves in the winter. Other communities are surrounded by relatively flat, open terrain where residents can chase wolves on snowmobiles shoot them in the open, or perhaps even run them over with their machine, although this method of harvest is not legal. Around Allakaket and Alatna, however, the hills, forests, and gullies limit the mobility of snowmobiles while providing wolves with cover into which they can quickly disappear. This virtually eliminates one method of hunting wolves that other communities enjoy. Two respondents added that the snow is especially deep in the Allakaket/Alatna region, which makes hunting and trapping that much more difficult. One respondent explained:

The good trappers, some of them got old now, you know. I don't really blame them; it's too hard going like that. Way harder than other places. I read stories about long ago that really make me mad sometimes. They say our people here didn't break trail. I know why. I break trail steady and it just cover up and just, deep you know. And hills and everything. Then you get out about 25 miles or halfway to Hughes and from there you can just go anyplace, you know. It's really not fair. (Interview 11)

Thus, the terrain and the climate pose difficulties that can not be altered. Past trapping efforts and wolf harvests by the community show that the terrain and deep snow can be overcome by using different harvest methods and by working hard, even using snowshoes instead of snowmobiles to access the country. One respondent felt that even the difficult terrain could be overcome with the proper equipment, explaining:

It usually takes two, or...I heard it's hard to get wolves with one snowgo cause they can run through timber or cricks or somewhere where you can't go and you have to have somebody else go around the other way and then you just keep going until you they get real tired and you could track them down. But you have to be persistent to get them. You can't just think you're going to get it you have to chase them and chase them and then they're, after they get tired it's easier, but then you have to have gas and everything a good machine and just keep going. (Interview 15)

Four respondents noted that the intense cold of December 2011 and January 2012 limited the ability of residents (including themselves) to spend time outside or even away from their own houses for extended periods, as heating fuel and propane do not act normally at such temperatures and it is possible for houses to freeze if not attended. While the extreme cold can not be overcome, periods of -40 and below (a typical cut-off for outdoor activities and the point at which heating fuel and propane start to cause problems) do not last the entire winter and temperatures are generally warm enough for three months or more of the trapping season to allow for regular trapping.

Ten respondents pointed out that the speed, acute senses, and high intelligence of wolves make them a particularly difficult animal to harvest. Wolves themselves, then, pose a challenge that can not be lessened, although there are measures that can be taken to try to outsmart wolves or avoid triggering their senses. As respondents noted, traps and snares can be cleaned and properly handled so that wolves can not smell them, traps

can be hidden under the snow on trails, or traps can be used to intentionally divert wolves off of trails and into the snares awaiting them in the brush. Even taking precautions such as these, however, does not guarantee success, as one respondent explained:

They're really smart. Walk up to your snares and then walk in the same tracks backwards, looked like. I was pretty sure, you know, I'd have a wolf in my snare and I went over and I looked at the tracks, man, same steps backward. It was smart. (Interview 1)

Wolves themselves pose a deterrent that can not be removed, but past success in local wolf trapping shows that wolves themselves do not prevent the community from having the capacity to harvest them.

Luck is another deterrent that four respondents mentioned as playing a major role in the success or failure of wolf hunting and trapping efforts. Luck is not something that can be controlled, although abiding by cultural rules (such as caring for a wolf carcass appropriately or not touching someone else's traps) can help to prevent bad luck. As with the previous deterrents, past successes with wolf harvests indicate that luck does not prevent the community from having the capacity to successfully harvest wolves locally.

Effects of Changes in Capacity

Changes in assets and technology within the community have had interesting effects on local trapping levels. As mentioned previously, Clark (1974) noted that in 1961 men in Allakaket and Alatna enjoyed playing cards until the lamp oil burned out. Present-day visits to Allakaket reveal that playing cards is no less popular, but now electricity allows for gaming into the morning hours. Young men may not start their day

until the afternoon, when most of the short winter daylight has already passed. While it is not suggested that electricity is by any means a major factor in the decline of local trapping, it is interesting to note how the improvement in technology is correlated with this change of behavior.

Respondents identified other changes in technology as culprits contributing to a decline in local trapping. Three respondents linked modern comforts and luxuries (naming secure housing, diesel-fueled heaters, and grocery stores) to the decline in local wolf trapping, citing that people in the area used to have to trap wolves to keep their villages safe and to provide for their families. Now, while community residents seem to recognize the issue of too many wolves and not enough moose, they are not forced to take action because they have modern resources to turn to. One respondent explained:

People used to trap a lot of different directions years ago and now there's nobody out right now, I think, with a trapline: an actual trapline. There's trails but there's not traps and snares all over like a trapline would be. But they went in all directions though. Years ago. Yeah cause there's nothing, that, that's what they had to do. Now you can sit around and don't have to worry about wood if you have diesel oil. Yeah, but they used to go everywhere...start out in the fall everybody make trail in the fall out towards their country. That's how it was, like go up to South Fork or go back Old Man or go up Alatna, down the Koyukuk, towards halfway to Hughes so

there was always trails. Not anymore. Lots of them probably grew over a little bit. (Interview 15)

A lack of warm winter clothing and trail gear was cited by three additional respondents as limiting local trapping activities, as one respondent stated that now people just have “town clothes” (Interview 11). This change can also be linked to the availability of warm and secure houses, as well as access to different (less practical) fashions.

Three respondents mentioned that they used to trap with dog teams, which were cheaper and more reliable than snowmobiles. While the new technology of snowmobiles has replaced dog teams in the village, respondents note that the cost of that new technology is now limiting trapping efforts. Two of those respondents also noted that no one uses snowshoes to walk traplines anymore, implying that snowmobiles are to blame for the loss of this practice. One respondent went further to say that the new technologies are no help anymore because the younger generation has lost a fearlessness that was once present in the community. He explains:

My mom was born in 1914, her grandpa was born in 1840- something...them days, when they'd see a big animal (brown bear) track they'd track it till they kill it...they would track it: one man and one his grandsons...but them days they could walk, you know. Now these guys don't even know what end of the snowshoes goes in front, you know. Or what kind of lunch to take. They didn't even have thermos bottle them days, you know. They killed it too,

and then they'd haul it back, you know. That was their predator control back in them days...They had no fear them days. They didn't even have gun really, you know, they just had spear and they used that. Then they'd start with single shot, you know, and they worked their way up from there. Now they got big fancy guns and just, useless, you know. (Interview 11)

This excerpt mentions a generational change in knowledge within the community, which six additional respondents noted to be connected to the decline in local trapping. Respondents mentioned that people in the area used to have greater skill and knowledge than is available now, and they also mentioned that the community is losing its teachers before their knowledge is being passed on. One respondent said that this decline in knowledge could be traced back to the Mount Edgecombe days and another respondent, explaining the current trapping dilemma said:

[We need to] get some of these younger guys to get on the ball. Some of them say they got trapline or they inherited from their father or grandpa but they never go out there. They just talk for nothing, you know. Just full of words, that's all. Me, I go out there. Got to learn all my dad's trail, but that's where I raised up, you know, out in camp. Me and my brothers and sisters were raised in camp, you know. Out there, you see, that's where I'm going right now, this camp here. That old Chalatna, you see, we just stayed in camp year-round, till I went to school we stayed in

camp, you know...I haven't really stayed in that camp where I was yesterday, that's Chalatna camp. So a part of it is gone, you know. Then we went to school and they sent us to boarding school and all that stuff, you know. We just lost our learning right there, you know. By the time we come back all the grandmas, all the good teachers were gone, you know. (Interview 11)

While technology and a loss of knowledge are linked to the decline in trapping, one respondent believes that technology might be used to help pass trapping and survival knowledge on to the youngest generation in school, saying, "that's how I learned, by going out and seeing my parents. We have shows, video tapes and stuff like that they can see how it is" (Interview 6). The community's capacity for local wolf hunting and trapping has certainly changed over time, but assets are still available to overcome the hurdles that have formed, if the resources to connect those assets with the younger generation can be found.

The change in the amount of trappers in the area and the amount of people that are passing on their knowledge was noted by seven respondents as a major contributor to the decline in trapping and a major barrier to trapping today. One respondent was discouraged by this phenomenon, saying, "I never really had an interest in [trapping] and, yeah I, when I was younger I didn't care about all of that or nothing and now I do but nobody to really show me how to do it all" (Interview 10). The interviews, however, identified several individuals that have the knowledge and are willing to share it with others, indicating that identifying, organizing, and improving access to trapping resources

may be an important element that is lacking in the community. Another respondent emphasized this need by saying:

[To start a trapping program it would take] a workshop, you know somebody would talk about it and people would exchange words and, you know, cause everybody got their own section of area that they go to so uh nobody have no, uh, bad feelings about sharing, you know, their knowledge and whatnot and then that would be really good cause it would really boost, um, how people go about catching [wolf] and stuff cause there's a lot of things that some people don't know and that's just a hold-up. (Interview 12)

4.4 Cost/Benefit Investigation

Costs and Risks to be Outweighed

Respondents identified many costs and risks that currently prevent individuals from trapping or limit their trapping activities. Many of these were mentioned previously, as on an individual basis twelve respondents listed the cost of gas as limiting their trapping activities, twelve respondents noted that owning and maintaining a snowmobile limits them or others in participating in trapping, and seven respondents named the cost of trapping equipment (including traps, snares, sleds, and winter clothing) as limiting current trapping levels. Financially, one respondent stated that he stopped trapping because the extra income he would make trapping would cost him the financial assistance he receives now.

Seven respondents mentioned the risk of personal injury or bad luck that comes from improperly treating a wolf carcass but only two of those respondents refrained from harvesting wolves because of that risk. Five respondents noted that some people of Allakaket and Alatna do not like to bother wolves because of the great respect that they have for the animals, but that when there are too many wolves they feel they are forced to do something about it regardless of their respect. Two respondents noted that wolf hunting and trapping also involves risk of being injured or attacked by a live wolf, but only one of those respondents showed real concern of this happening. That respondent explained of both the spiritual and physical nature of wolves:

Some people, you know, are: you can't mess around with some animals, I guess. Yeah, like the mafia, you can't mess around with them. Even those guys from, those Columbians. Those drug dealers. No, you can't mess around with them. Yeah. [With wolves] it's almost something like that. (Interview 3)

Wolf trapping or involvement in a trapping program also requires an investment of time, which four respondents named as a major limiting factor for them. Two of the female respondents and one non-trapper stated that their jobs and/or taking care of their children and parents take up much of their time in the winter, while one wolf trapper also mentioned that his children limit the amount of time he can spend on the trapline. The non-trapper that spends much of his time taking care of his parents also spends a considerable amount of time traveling the countryside on snowmobile, which is an activity that could lend itself to trapping. Other activities that were mentioned that might

interfere with trapping were hauling wood, hauling water for elders, caribou hunting, and volunteering at the Tribal Office. There is not evidence, however, that these activities can not coincide with a trapping program if a sufficient number of people are involved to cover the various tasks that would be required in such a program. One respondent, stated that, with few jobs in the community, time should not be an issue for most people.

Obligations and/or responsibilities, however, are not the only time constraints that must be considered. Participation in a trapping program would take time from other recreational activities that community members currently choose to pursue. Of all respondents, eleven named TV and/or video games as the main factor that keeps much of the community from trapping currently, while three of those respondents added basketball to that list, four more added drugs and alcohol, and one respondent mentioned that after-school activities occupy the remaining time of the youth as well. Of all of these activities, as well as many of the ones listed previously, one respondent said:

[Trapping] is a part of how we grew up and how, uh, people live around here so it, it's not taking away from anything. It's doing what we should be doing. We should actually be doing that. But there's something else that's taking away from that, so it's like, backwards or something. (Interview 15)

Eight respondents pointed-out that trapping requires a lot of hard work and may involve traveling great distances in sub-zero temperatures. Not only does the work require physical investment, but the traveling and harsh conditions can pose significant risk of injury, hypothermia, frostbite, or even death in some cases. Most of these

respondents trap despite these deterrents and two even stated that they trap because they enjoy the challenge. Some community members, however, might find the hard work and risk involved in trapping to be a significant deterrent, as “it’s much easier to sit around TV” (Interview 6).

Nine respondents stated that a lack of knowledge in trapping-related topics currently limits their trapping efforts or the efforts of other community members. These topics include wolf-handling, wolf snaring, survival skills, and trapping in general. Gaining the knowledge needed to increase their own trapping would require an investment from the individual as well as an investment from the community to provide opportunities for individuals to learn the skills they need.

Two respondents mentioned that some community members may not trap because they fear the negative sanctions that will be imposed if they do things incorrectly in the eyes of the law. One respondent brought up a pertinent issue regarding past offenders, laws against firearm possession, and the subsequent risks involved in trapping if those community members were to trap with a firearm or without one. He speculated:

Maybe lot of them (community residents) get in trouble with the law and the law says you can’t have a gun so, nothing, and they, they’re stuck. You know, that’s another thing I don’t like about the law, you know, once they finish probation and all that stuff and they don’t drink or nothing they should, you know, maybe they’re worried somebody might, law will find them out there. Find out they got records, something, maybe that’s another problem. They

can't even hunt moose. You know, that's another thing that's bugging us up. That could be one good reason right there, cause half our boys here even girls I think been in trouble and then they can't even get licenses and stuff like that. That's another thing...and they're better people, I see around, they work hard and everything, maybe that's how come they don't go out, you know. Aught to look into it sometime, you know. You know, get some of these legals around here check into it. Change the rule, you know, cause they come out here they gotta have gun before they go out there. Cause the wolf might be, a wolf knows he don't have a gun too, it's like animal (brown bear), if you've got a gun he won't come around. So it's like when I check my net down here and it's blowing hard they just run right up to me cause they know I got no gun. (Interview 11)

Aside from costs to individuals, a wolf trapping program would require investments from the community to be successful. Three respondents believed that the community needs someone to get a program started and get communication rolling, while two respondents added that someone would need to organize fundraising and begin applying for grants. Nine respondents expressed a need for more people to share knowledge and teach skills related to trapping and three respondents specifically noted that someone needs to start taking children out to teach them as well. All of these needs

require volunteer efforts or program funds. Additionally, one respondent mentioned that a successful program should include trapping huts, explaining:

Long ago they called these set places roadhouses, like there was one right where this X is (on the map), maybe a little this way. People used to build these little houses here and there all over, uh, just so they wouldn't freeze. But they save a lot of lives these days with those, that's what we need is those tents and, uh, stoves set up or even just a small house here and there. (Interview 12)

Benefits Identified by the Community

Respondents identified several benefits to local wolf trapping, both for individuals and the community as a whole. Thirteen respondents noted that a local trapping initiative would result in more moose for the community while four of those respondents spelled-out the connection that more moose would mean more food available to the community. Six respondents pointed-out that more trapping in general in the area would result also result in an increase of food for the community, as more beaver and hares would be caught as well. Two respondents added that, with more trapping and less wolves, the streets of the village would also be safer.

Having wolf pelts for traditional potlatches was a benefit of local wolf trapping that was identified by eight respondents while thirteen respondents noted that warm clothing such as parka ruffs, mittens, and moccasins are another important benefit. Extra income was named as a potential benefit of local wolf trapping by ten respondents, but it was generally listed secondarily to utilizing the pelts for garments or potlatches.

Aside from material gain, eight respondents noted that individuals gain a sense of accomplishment, of being capable, and of contributing to their family or community when they successfully engage in trapping. The recreational value of trapping was expressed by seven respondents, who enjoyed trapping because it provides an escape from the village, a chance to appreciate nature, time to relax, a challenge, and/or enjoyment in the activity itself. Four respondents added that the opportunity to learn new skills or learn the countryside was another benefit to their trapping endeavors.

For the community as a whole, ten respondents declared that a local trapping initiative would be beneficial in perpetuating the tradition and culture of their people, the recent decline of which was a major concern for these respondents. Of all respondents, eleven felt that a local trapping program would allow the youth of the community to learn important subsistence and survival skills, while three respondents added that such a program would provide youth with alternatives to watching TV or using drugs. One additional respondent noted that the sense of accomplishment that arises from successful trapping would result in the community having more confident and capable children. Two respondents recognized that a program would be beneficial for bringing community members together to work together towards a common positive goal.

Overall Value

With the investment of volunteer efforts to organize a program and appropriate outside funds as well as with donations from the community, many of the financial costs of local wolf trapping may be covered. Respondents suggest that the benefits that would arise from such volunteer efforts appear to outweigh the time and effort that would be

required. For the community as a whole, respondents perceive the idea of a local trapping initiative to have sufficient economic, cultural, and subsistence value to validate the investment that would be required for such a program to occur.

As individuals, trappers recognize the risk involved in trapping and particularly wolf trapping, but the fact that several respondents still engage in such activities suggests that some individuals perceive sufficient benefits to outweigh those risks. Trapper respondents feel that trapping is a worthwhile activity regardless of the resources they spend to engage in it. Four respondents mentioned that other community members may not realize the benefits (particularly the financial benefits) that can be gained from trapping, which may be addressed with communication and outreach. While financial costs and opportunity costs represent a significant hurdle, overall responses from respondents suggest that there is sufficient understanding within the community of the value of a local trapping initiative and that its overall value outweighs its cost.

4.5 Social and Cultural Barriers within the Community

For local wolf hunting and trapping efforts to occur, local norms and values must support such efforts. Local norms dictate that women cannot hunt, trap, skin, touch, or be around wolves, as was noted by six respondents. Local culture and tradition, however, encourages men to trap. What age boys may begin to trap wolves, however, is uncertain. Three respondents were discouraged from wolf trapping until they grew older. The appropriate age for children to become involved in trapping is not universally agreed upon within the community. Five respondents believed that youth should be sixteen or older when they begin trapping, with one of those respondents stating that boys should

not trap wolves until they are around twenty years old. Three respondents stated ages between ten and fourteen as appropriate for the children to become involved in trapping. Four respondents said that youth should begin learning to trap at any age, as long as they are old enough to stand and learn. This latter opinion appears to be more similar to the traditional way of living and learning in the area. The apparent change in the appropriate age for children to start learning to trap could be linked to the generational decline in trapping.

No other cultural rules were identified to be limiting local trapping efforts. The rules regarding gender and age do not appear to explain the greater lack of local wolf trapping efforts. Changes within the descriptive norms of the community were noted by many respondents, however. Overall, trapping was once a norm that has recently been replaced by other activities, to the dismay of the older generations. One respondent observed:

Old time, then, there's like us: there's four houses of us on the other side (Alatna) and 15 houses this side (Allakaket) they all trap like this over Old Man and up South Fork River, Alatna. There's not much trapping now. It's basketball or, for them boys and girls, try for basketball. They're not making nothing out of it...They just, they like to watch basketball, football, baseball. They just don't go trapping. These people really change. Around '80s. Before that some guys go trapping back in '50s and '60s. No more now. That

basketball just ruin everything and monitor change too. (Interview 2)

Five respondents speculated that the recent changes in norms and values within the community may be linked to how younger generations were raised and ten respondents mentioned that no one (including young parents) is taking the youngest generation out to teach them or instill an appreciation for activities such as trapping. The “problem” generation seems to encompass the young parents of today and respondents suggest that the age-range of the TV and video game generation includes those community residents from the age of forty-five down to around the age of twenty. When describing his peers, one young adult described what makes them different from himself:

The way they’re raised. Some were raised without fathers and, you know, really man figures. There weren’t no man figures for them and ever since the past couple of years people have been getting lazy, real lazy. Except...there’s only a couple families that are willing to do things around here and that’s, we’re one of them. Me and my brother and my dad, we go out every year do, everything we can before it, before winter hits, and even in seventy-below we go out and haul wood and we don’t see nobody out there: everybody’s in their homes. Me and my brother and my dad are the only ones working, having fun out in the woodyard...things would actually be a lot different in this town if [others] were raised the same way I was raised. (Interview 14)

Several respondents noted that the children of the community are willing and eager to learn, implying that the youngest generation is not to blame for their lack of involvement. This evidence further supports that capacity (to organize and initiate a program in order to bridge the gap caused by the “problem” generation) may be lacking rather than local norms preventing trapping efforts. Two respondents further supported this evidence by saying that they should be or would rather be trapping and living a subsistence lifestyle than either working a desk job or watching TV, respectively. No one has organized the opportunity for them to become involved in trapping.

The issue of group dynamics discussed previously only arose from one respondent. She would not say that the community should initiate a wolf trapping effort because, as a woman she could not participate, so it was up to the men to make that decision and she would support them either way. This view was a result of the local norms that restrict women from being involved with wolves and was not shared by the other women interviewed, so it does not seem to be a major factor limiting wolf trapping.

Only one respondent expressed the feeling that he was just one person and could not make a difference in the grand ecological scheme in question. This feeling contributed to his lack of trapping efforts but did not seem to affect any other respondents. Another respondent, in fact, insisted that every wolf he was able to harvest was one more moose for the area.

4.6 Resources Management Roles

Only three respondents felt that the state is the only entity with the responsibility to enact predator control and two of those respondents felt that the technological

advantages available to the state (helicopters) are the reason for this responsibility, as they felt that local trapping would not be enough to keep the wolf population low.

Ten respondents believe that community members should be putting a greater effort into hunting and trapping local wolves to combat wolf numbers, indicating that the majority of respondents do not see local wolf control as the responsibility of the state alone. One respondent specifically said that she thinks the community has the responsibility to become more involved in local wildlife management, while another respondent felt that the community should put an effort into local wolf control because the community should be responsible for its own resources. One other respondent felt that resources would be better managed by the community than by an outside agency, but this respondent also felt that aerial wolf control from the state would be needed to make an initial dent in wolf numbers, as there are too many wolves for community hunting and trapping efforts to reduce their numbers effectively. No other respondents suggested the need to eliminate agency management and one respondent stated that if the community were in control of resources the local people would not manage resources wisely and soon there would be nothing left. This respondent did, however, feel that management agencies should simplify regulations.

Six respondents felt that resources management agencies were doing a good job of managing resources in the area and these respondents had no issues to voice. Only one respondent was disgruntled about trapping regulations, as he felt that season closures for some furbearers were not appropriate for the long winter of the area. He did not feel that the wolf trapping season needed to be altered, however. No other respondent felt that

they were adversely affected by trapping laws or regulations. Two trapper respondents stated that they do not know the laws regarding trapping, but that does not affect their trapping activities. One of these respondents explained:

They give you this thick book but I don't think anybody reads it.

They just, just hard enough getting out there, I think. It's just, uh, the traveling's hard, making the trail, cutting out brush, and stuff like that is just hard enough to deal with instead of reading the books. (Interview 12)

Two respondents noted that, even with local wolf control through hunting and trapping, the state management agency would still have the responsibility to survey local moose and wolf numbers to determine if wolf control efforts are being effective.

Six respondents did express issues with local wildlife management, but all of these issues were related to moose hunting. Two respondents felt that moose seasons needed to be altered while four respondents felt harassed by US Fish and Wildlife planes during moose season, which negatively affected their hunt success rates. Two respondents noted that conflicts arise with non-local moose hunters; these respondents expressed a desire to have priority over local moose resources. The same respondent that was not concerned about the legal specifics of trapping noted that the possibility of negative sanctions adversely affected his moose hunting, saying:

Long ago when we were hungry we'd go out and get something and you pretty much knew where it was at and then, uh, this time of year it was always a cow moose cause they're the only ones fat.

Sometimes a big bull. Now you can't do it, yeah, I'd lose my snowgo, everything. So it's a struggle, too, cause I don't...we get five hundred dollars (a month) in food stamps and it lasted like four days. (Interview 12)

This and two additional respondents noted that current laws and regulations prevent Allakaket and Alatna residents from using and managing local wildlife resources as their people traditionally did. While the other two respondents were previously mentioned to believe that resource management would be better in community hands, this respondent felt that it is necessary for the community and management agencies to work closely together to adequately manage resources while also addressing the concerns of local users.

Other issues with local moose management included state regulations governing moose hunting on private land, the complicated nature of local hunting laws and regulations, compounded by the regulations varying for state and federal lands, the effects of opinions from outside of Alaska and outside of the interior of Alaska on local regulations, and the way that local regulations can prevent the use of common sense to maximize available resources, as in the following situation:

I see moose with the hocks gone back here too, like, just standing in the water, you know. It's wolves back there, chase it out and they run back when we're coming, I guess, you know. They see a cow moose like that in fall time...when trying to get sheefish and it's, they told me too, they asked the, they're scared of the Fish and

Wildlife guy, you know, flying around all the time so they ask him,

“What should we do with that moose up there, it’s not gonna live.”

You know, that guy tell them, “Well let mother nature take its course.” They coulda just killed it and made use out of it, you know, but it probably died somewhere and wasted, you know.

That’s not really good sound rational methods, you know.

(Interview11)

While some issues were expressed regarding the management of moose, it is interesting that these same issues did not apply towards the management of wolves, nor did local opinions on moose management seem to affect local trapping efforts or contribute to the lack of local wolf control efforts.

Ten respondents felt that they had an active role in local resources management. Roles that respondents identified include teaching others how to live the subsistence lifestyle, sharing with others information on what game can be found where, attending meetings held by management agencies, encouraging community members to express their concerns about local resource management, sharing moose meat with elders, and abiding by laws and regulations.

Every respondent felt that the villages have a role in local resources management in the area but not every respondent was specific about what that role entailed. Some roles of the village that were named include providing bounties or gas money to harvest wolves that come into the village, providing gas for community members to hunt for elders, and sequestering grants for local workshops, projects, and programs.

Thirteen respondents felt that their regional corporation has a role in local resources management. The major role that was identified was closing corporation lands to non-local hunters.

4.7 Past Efforts to Increase Local Trapping

When asked about previous snaring or trapping clinics within the community, four respondents had not heard of clinics being held or did not know that there had been any available in Allakaket as opposed to Fairbanks. Three respondents had heard of clinics being held but were out of the village when they were held. Five respondents had participated in clinics or workshops but only two of those respondents had since used the snares that they received or the techniques that they learned. One respondent used the snares that his son brought back from a workshop but this respondent never attended a workshop himself. One respondent that set his workshop snares never caught anything with them.

Respondents that participated in snaring clinics described them as a way of learning something new but largely referred to them as a way of obtaining snares that would not otherwise be gotten. Previously, these workshops have not included the traditional methods for properly caring for wolf carcasses. Without this knowledge, some respondents are reluctant to attempt wolf harvests. Two respondents mentioned that bounties in the area once motivated people to harvest more wolves but no other respondents discussed the past or potential of wolf bounties.

One respondent mentioned that he received gas from the Tribal Office via a Tanana Chiefs Conference (TCC) grant to take someone out and teach them to trap. This

respondent was not clear on the specifics of who he was supposed to take out or how he was supposed to report back to TCC, saying:

I was supposed to send that paper back to Tanana Chiefs to reimburse them or something but they already buy, uh, 10 gallon gas for me, and I forgot what else, a box of something. So we could teach our younger kids how to trap and stuff. And nobody want to go. (Interview 3)

This exchange is at-odds with data from other respondents that points to youth being interested in trapping but not having anyone to teach them. This data exposes a missing link or lack of resource that is needed for the organization and connection of appropriate assets, such as this teacher and those that have been identified as interested in learning.

4.8 Examination of Hypotheses and Modification of Propositions

Hypothesis 1 states that residents of Allakaket and Alatna possess the capacity for local predator control. The results related to community capacity indicate that the community has many necessary resources needed for local predator control, but overall results suggest that Hypothesis 1 should be rejected. Evidence suggests that Allakaket and Alatna lack the key element of someone to organize and initiate a local wolf control effort. While at least one resident has been identified to possess the capacity for such an endeavor, that individual is already overloaded and not available for the task.

Hypothesis 2 states that community efforts towards local wolf control through hunting and trapping will provide benefits sufficient to outweigh the investment required by individuals and by the community and residents of Allakaket and Alatna understand

these benefits. The study fails to reject Hypothesis 2 based on the qualitative data relevant to the costs and benefits of local wolf control. The current lack of local wolf control efforts, however, indicate that Proposition 2 should be modified to say: A subsistence-based community will not engage in local predator control actions such as concerted hunting and trapping if there are not clear and sufficient benefits that can be utilized in a subsistence economy to balance the cost and effort required for such action. Identifying benefits that outweigh the costs is necessary, but is not a sufficient condition to ensure a local predator control program.

Hypothesis 3 states that local norms and values of Allakaket and Alatna do not prohibit local predator control actions. While local norms and values do limit some aspects of local wolf control (eg., the participation of women), evidence suggests that, overall, local norms and values do not prevent local predator control actions and so the study fails to reject Hypothesis 3. Proposition 3, then, is modified to say: Even with the capacity to take action a community will not engage in local predator control without cultural norms and values to support such action. Local norms and values that allow for local predator control are not alone a sufficient condition for a local predator control program to occur.

Hypothesis 4 states that residents of Allakaket and Alatna see local predator control as the responsibility of management agencies. While some residents do see local predator control as the responsibility of management agencies, the data suggest that the majority of residents do not see local predator control as the responsibility of management agencies alone. Residents generally believe that the community should

make more of an effort to control wolf numbers through local hunting and trapping.

Hypothesis 4, then, is rejected. Evidence does not suggest that government power dynamics are the major factor limiting Allakaket and Alatna from enacting local predator control. This factor can not be entirely eliminated, however, as certain aspects of agency authority and resources do show themselves to have an effect on some residents.

Proposition 4 is modified as such: When resource management such as predator control requires effort and resources but an outside institution controls resource management and management decisions and enforces management regulations through negative sanctions, a community will utilize its own role in resources management to seek assistance from management agencies to design and enact a management action, as those agencies have greater resources and overall authority.

Chapter 5: Conclusions, Discussion, and Recommendations

5.1 Conclusions and Discussion

This investigation revealed that , in the perspective of the respondents, modern education and technology and the influence of western lifestyles and cash economies have created a generational gap in the community of Allakaket and Alatna. Young adults in the community, up to adults about forty years of age, comprise the “gap” generation, as their interests lie more in indoor activities such as basketball, video games, and watching television. This generation is not taking its children out into the countryside to learn about the traditional subsistence lifestyle of their people. As such, their children have been following in their footsteps to value indoor activities and alternative lifestyles over being outside and living off the land. This is the process that seems to have precipitated the decline of trapping in Allakaket and Alatna

Children in the community are said to be interested in getting out and learning about the countryside and hunting and trapping, but their parents are not providing them with opportunities to do so. The older generations of the community have the knowledge and skills to teach the younger generations and are dismayed by the trends that they see as their traditions decline and lifestyles in the community change. It seems that the “gap” generation, which was non-existent before colonization, has created a disconnect between those in the community that wish to pass on their traditions and those in the community that are interested in learning those traditions. Bridging that gap and connecting those that wish to teach with those that wish to learn, while providing access to the necessary

resources and equipment, would require one or more people to initiate a forum of communication and a method of organizing and connecting the assets of the community to provide opportunities for youth to learn and appreciate traditions such as trapping.

Local norms and values, while limiting the role of women in local trapping, do not appear to limit the community overall from becoming more involved in local wolf harvest through hunting and trapping. Respondents recognized that the overall benefits within the community of increased local wolf hunting and trapping are well worth the costs that would be required. Ultimately, bridging the generational gap is the only way to ensure that trapping is an activity that continues over time in the community and so, on a temporal scale, it is the only effective way to increase trapping in the community. While the community has the combined skills, knowledge, time, and finances (if effectively gathered) to conduct local wolf hunting and trapping efforts and most likely be successful at limiting local wolf numbers, the resources needed to initiate such an endeavor and organize the community and its assets to bridge that generational gap do not appear to be realized within the community. Those resources include someone to initiate communication about the issue and initiate the development of a program to address the issue. Such a program would have to be developed with input from the community to address the needs of the community in a culturally appropriate manner, but the spark to organize the development of such a program is currently lacking. That spark can likely be provided by an outside agency, should the agency wish to pursue local harvest as a method of wolf control.

Previous endeavors to increase local trapping can provide insight into what may be needed for future efforts to be successful. Agency-sponsored snaring clinics and bounties most likely were not effective because they did not address the resource that was actually missing within the community, which is the organizational effort needed to collect and connect the assets available within the community and develop a presence or program that will be ongoing. While clinics are important as a method of teaching and sharing knowledge, they did not in themselves incite a change in local trapping levels.

Clinics spread snaring knowledge to more community members than it previously had, but only in one isolated situation that was not connected to the community as a whole or to a framework that would continue to spread the knowledge through other platforms. Furthermore, they did not leave participants with a sense of responsibility in wolf management or a sense of working together toward common goals. Participants viewed them as an isolated chance to learn something new and receive free snares. Without the organization of a community initiative to give residents a specific goal and clear role in wolf management, local workshops did not make a lasting impression.

Additionally, clinics focused on the generation that already appreciates and participates in trapping. No platform was included to specifically target youth or to help bridge the generational gap and spread knowledge and understanding past the generation that already has that knowledge and understanding. Without working toward both the management goals of decreasing wolf numbers and the community goals of continuing tradition, workshops have very little affect in the overall scheme of local trapping levels. Additionally, if trapping is to compete with activities such as basketball, it might be

beneficial for clinics to highlight the “challenge,” “sense of accomplishment,” and other recreational values that some respondents mentioned can be achieved through trapping.

The lessons of past workshops and clinics strengthen the evidence that an organized community initiative to connect the agency and the community to work toward management and community goals are necessary for management agencies to increase local involvement in resource management. Furthermore, legal authority and responsibility to manage the local wolf population is not currently in the hands of the community, nor does the community have an official role in the active harvest of wolves under the Intensive Management program that is in place for the area. To increase local participation in wolf management through hunting and trapping, it may be helpful to work with the community to task it with an official role in decreasing wolf numbers or maintaining lower numbers after aerial wolf control occurs.

5.2 Recommendations for Management Agencies

When seeking to increase local involvement in resources management, agencies must first identify what factors are limiting involvement. Once factors are identified that are to be addressed, the agency and the community should work together to identify the goals of each and the roles of each in obtaining those goals. Once goals are identified, the community and the agency must work together to develop a plan of community and agency action that works towards the goals of both management and the community and ensures that the community has the resources necessary for successful action while the agency fulfills its responsibilities in the eyes of the community. In this process, some amount of official responsibility or official role may need to be transferred to the

community in order to give a program or plan of action life, but this will only succeed if the community accepts and agrees to that responsibility, emphasizing the necessity of cooperation and co-development efforts between the community and the agency.

For Allakaket and Alatna the resource or person necessary to initiate communication and organization of a local wolf control effort appears to be lacking. If the management agencies assist in the initial organization of a local wolf control program, this would likely be an effective method of increasing local wolf harvest. Working with the community to develop a framework that addresses the goals of management as well as of the community in a context that is most appropriate for the community would be key to ensuring the success of such a program. There are countless forms that such a program can take, a few possible components of which are listed in Table 5.1. A program could include any or all of the ideas listed, plus many more, which is why co-development of such a program with the community and the agency would be essential to ensure the program meets the needs of both in a culturally appropriate manner.

Table 5.2.1 Possible Components of a Local Wolf Control Program

Components Suggested by Community Members	Components Suggested by ADF&G & ATA members	Other Component Ideas
<ul style="list-style-type: none"> • A season of aerial wolf control followed by local harvest through hunting and trapping to maintain low wolf numbers • Local wolf control through hunting and trapping combined with agency monitoring of wolf and moose populations • More trapping workshops and education about the benefits of trapping • Obtain grants and funds for equipment and fuel • Take youth out trapping 	<ul style="list-style-type: none"> • Community sponsorship of youth to obtain pilot's license and aircraft for the purpose of local wolf harvest • Wolf trapping workshops 	<ul style="list-style-type: none"> • Community fund to finance other components • Trappers can "buy" snares and equipment from community fund through volunteer hours with youth to pass on tradition of trapping • After-school trapping club for youth

The lessons from community-based wildlife management in other areas indicate that, after initiating and assisting with organizational efforts, putting the control and responsibility of the program in the hands of the community while also granting them a clear role and responsibility in local wolf management may have positive lasting effects on local trapping efforts in Allakaket and Alatna. Agency monitoring and participation may be necessary, but that would be decided through cooperation between the community and the agency in program development to ensure that the agency fulfills its responsibilities as seen by the community, and that the community has available the resources it needs to be successful. For example, per Table 5.1 and suggestions from respondents, the trapping program may include an initial year of aerial wolf control from

the agency to drop initial wolf numbers, followed by local trapping efforts agreed to by the community. While an official predator control program might include aerial wolf control, so too might it include local trapping. If an agency develops and initiates an official wolf control program, however, that does not include local trapping efforts as a co-developed and agreed-upon contribution from the community, the community is not included as part of the official effort to actively decrease wolf numbers and so wolf trapping efforts from the community are not likely to increase on their own for the purpose of wolf control.

After aerial wolf control ceases around Allakaket and Alatna, a local trapping program will likely be successful to prolong wolf control efforts in the area if such a program is developed as described above. Most importantly, such a program must incorporate the local goals of continuing tradition and perpetuating subsistence lifestyles rather than focus solely on the management goals of maintaining low wolf numbers. By focusing efforts on instilling the youth of Allakaket and Alatna with an appreciation for their natural resources, a value in traditional subsistence activities such as trapping, the ability and knowledge of how to participate in local resources management, and the responsibility to contribute to resources management and make a difference locally, agencies and the community can work together to ensure a future of cooperation and successful resource management.

References

- Alaska Constitution. 1956. Article 8 - Natural Resources. Office of the Lieutenant Governor. <<http://ltgov.alaska.gov/treadwell/services/alaska-constitution.html>>. Accessed 21 Apr 2013.
- Alaska Department of Fish and Game. 2011*a*. Feasibility Assessment for Intensive Management Program: Game Management Unit 24B: Proposed Upper Koyukuk Village Management Area (UKVMA) to Increase Sustainable Harvest of Moose. Feasibility Assessment.
- Alaska Department of Fish and Game. 2011*b*. Alaska Trapping Regulations. Alaska Department of Fish and Game, Juneau, Alaska.
- Alaska Department of Fish and Game. 2012. Map of Game Management Unit 24, Alaska Department of Fish and Game. <<http://www.adfg.alaska.gov/index.cfm?adfg=huntingmaps.gmumap&gmu=24>>. Accessed 21 Apr 2013.
- Alaska Department of Fish and Game. 2013*a*. Our History, Alaska Department of Fish and Game. <<http://www.adfg.alaska.gov/index.cfm?adfg=about.history>>. Accessed 19 Apr 2013.
- Alaska Department of Fish and Game. 2013*b*. Alaska Fisheries and Game Regulatory Process. <<http://www.adfg.alaska.gov/index.cfm?adfg=process.main>>. Accessed 22 Apr 2013.
- Alaska Department of Fish and Game. 2013*c*. Community Subsistence Information System. Database. <<http://www.adfg.alaska.gov/sb/CSIS/index.cfm?ADFG=harvInfo.resourceRegionData>>. Accessed 7 Feb 2013.
- Alaska Department of Revenue. 2013. Historical Timeline. Permanent Fund Dividend Division. <<http://www.pfd.alaska.gov/DivisionInfo/HistoricalTimeline>>. Accessed 21 Apr 2013.
- Alaska Humanities Forum. 2013. Alaska's Heritage - Chapter 4-5: Alaskans and the United States. Alaska History and Cultural Studies. <<http://www.akhistorycourse.org/articles/article.php?artID=170>>. Accessed 20 Apr 2013.

- Alaska's Digital Archives. Date Unknown. Photograph No. UAF-2003-109-61: Children and boys with rabbits. Dr. Ernest A. Cook Photograph Collection, University of Alaska Fairbanks. <<http://vilda.alaska.edu/cdm/ref/collection/cdmg11/id/1624>>. Accessed 28 Apr 2013.
- Allen, L. H. T. 1887. Report of an Expedition to the Copper, Tananá, and Kóyukuk Rivers, in the Territory of Alaska, in the Year 1885, For the Purpose of Obtaining All Information Which Will be Valuable and Important, Especially to the Military Branch of the Government. Government Printing Office, Washington, D.C.
- Balint, P. J. 2006. Improving community-based conservation near protected areas: the importance of development variables. *Environmental Management* 38:137–148.
- Balint, P. J., and J. Mashinya. 2006. The decline of a model community-based conservation project: Governance, capacity, and devolution in Mahenye, Zimbabwe. *Geoforum* 37:805–815.
- Ballenberghe, V. V., and W. B. Ballard. 1994. Limitation and regulation of moose populations: the role of predation. *Canadian Journal of Zoology* 72:2071–2077.
- Barnhardt, C. 2001. A history of schooling for Alaska native people. *Journal of American Indian Education* 40:1–30.
- Baron, R. S., N. L. Kerr, and N. Miller. 1992. Group process, group decision, group action. Brooks/Cole Pub. Co.
- Beckley, T. M., D. Martz, S. Nadeau, E. Wall, and B. Reimer. 2008. Multiple capacities, multiple outcomes: Delving deeper into the meaning of community capacity. *Journal of Rural and Community Development* 3:56–75.
- Beetus, J., C. Beetus, and W. Arundale. 1992. Project Jukebox: Gates of the Arctic H93-15-23. <<http://jukebox.uaf.edu/GatesN/allakak/jobbe.htm>>. Accessed 12 Feb 2013.
- Beetus, J., C. Beetus, W. Schneider, and M. Bryson. 1993. Project Jukebox: Gates of the Arctic H2002-27-10. <<http://jukebox.uaf.edu/GatesN/allakak/jobbe2.htm>>. Accessed 12 Feb 2013.
- Bergerud, A. T., W. Wyett, and B. Snider. 1983. The Role of Wolf Predation in Limiting a Moose Population. *The Journal of Wildlife Management* 47:977–988.
- Bergman, Lindberg, Lydia Bergman, and W. Arundale. 1992. Project Jukebox: Gates of the Arctic H93-15-03. <<http://jukebox.uaf.edu/GatesN/allakak/lybe.htm>>. Accessed 12 Feb 2013.

- Berkes, F. 2004. Rethinking community-based conservation. *Conservation biology* 18:621–630.
- Berkes, F., J. Colding, and C. Folke. 2000. Rediscovery of traditional ecological knowledge as adaptive management. *Ecological applications* 10:1251–1262.
- Bernard, H. R. 2000. *Social research methods: qualitative and quantitative approaches*. SAGE.
- Bogdan, R. C., and S. K. Biklen. 2002. *Qualitative Research for Education: An Introduction to Theories and Methods*. Fourth edition. Allyn & Bacon.
- Brennan, R. L., and D. J. Prediger. 1981. Coefficient kappa: Some uses, misuses, and alternatives. *Educational and psychological measurement* 41:687–699.
- Brosius, J. P., A. L. Tsing, and C. Zerner. 1998. Representing communities: Histories and politics of community-based natural resource management. <<http://www.tandfonline.com/doi/full/10.1080/08941929809381069>>. Accessed 23 Apr 2013.
- Bureau of Land Management. 2013. *Spatial Data Management System*. Alaska BLM. <<http://sdms.ak.blm.gov/isdms/imf.jsp?site=sdms>>. Accessed 20 Apr 2013.
- Carey, J. W., M. Morgan, and M. J. Oxtoby. 1996. Intercoder agreement in analysis of responses to open-ended interview questions: Examples from tuberculosis research. *Cultural Anthropology Methods* 8:1–5.
- Child, B. 1996. The practice and principles of community-based wildlife management in Zimbabwe: the CAMPFIRE programme. *Biodiversity and Conservation* 5:369–398.
- Clark, A. M. 1974. *Koyukuk River Culture*. Canadian Museum of Civilization / Musée canadien des civilisations.
- Cox, M., G. Arnold, and S. V. Tomás. 2010. A review of design principles for community-based natural resource management. *Ecology and Society* 15:38.
- David, D., K. David, and E. Mack. 2004. Project Jukebox: Raven's Story H2004-01-25. <<http://jukebox.uaf.edu/RavenStory/htm/jm.htm>>. Accessed 20 Oct 2012.
- David, K., D. David, and W. Arundale. 1992. Project Jukebox: Gates of the Arctic H93-15-53. <<http://jukebox.uaf.edu/GatesN/allakak/kida.htm>>. Accessed 12 Feb 2013.

- Department of Commerce, Community, and Economic Development. 2012. Community: Allakaket. Community and Regional Affairs. <<http://commerce.alaska.gov/dca/apps/DCRAExternal/community/Details/3dab0bf2-69d6-4a39-845b-722247ac6070>>. Accessed 11 Feb 2013.
- DeWalt, K. M., and B. R. DeWalt. 2010. Participant observation: A guide for fieldworkers. AltaMira Press. <<http://books.google.com/books?hl=en&lr=&id=ymJJUkR7s3UC&oi=fnd&pg=PP1&dq=participatory+observation&ots=Ufts4eIwVb&sig=Q-4-Xm-wlY4zR3hHcTUMIVUuIiM>>. Accessed 21 Apr 2013.
- Dilley, P. 2000. Conducting Successful Interviews: Tips for Intrepid Research. *Theory Into Practice* 39:131–137.
- Dowling, J., and J. Pfeffer. 1975. Organizational legitimacy: Social values and organizational behavior. *Pacific sociological review* 122–136.
- Doyon, Limited. 2013a. ANCSA. <http://www.doyon.com/corporate_profiles/anca.aspx>. Accessed 20 Apr 2013.
- Doyon, Limited. 2013b. Doyon Lands - Allakaket. <http://www.doyon.com/lands/landstatus/land_allakaket.aspx>. Accessed 2 Feb 2012.
- Edwards, A., E. Sam, and W. Arundale. 1992. Project Jukebox: Gates of the Arctic H93-15-54. <<http://jukebox.uaf.edu/GatesN/allakak/aned.htm>>. Accessed 12 Feb 2013.
- Fishbein, M., and M. J. Manfredo. 1992. A theory of behavior change. *Influencing human behavior* 29–50.
- Foggin, C. M. 2003. The elephant population problem in Zimbabwe: can there be any alternative to culling. *Managing African elephant populations: live or let die* 17–21.
- Fulton, D. C., M. J. Manfredo, and J. Lipscomb. 1996. Wildlife value orientations: A conceptual and measurement approach. *Human Dimensions of Wildlife* 1:24–47.
- Getz, W. M., L. Fortmann, D. Cumming, J. Du Toit, J. Hilty, R. Martin, M. Murphree, N. Owen-Smith, A. M. Starfield, and M. I. Westphal. 1999. Sustaining natural and human capital: villagers and scientists. *Science(Washington)* 283:1855–1856.
- Gibson, C. C., and S. A. Marks. 1995. Transforming rural hunters into conservationists: an assessment of community-based wildlife management programs in Africa. *World Development* 23:941–957.

- Gifford, R. 2011. The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist* 66:290–302.
- Gilgun, J. F. 1993. Analytic Induction: A Focused Approach to Interpretive Research. *Qualitative Family Research* 8. <<http://www.scribd.com/doc/38411381/Analytic-Induction-A-Focused-Approach-to-Interpretive-Research>>. Accessed 14 Mar 2012.
- Hackel, J. D. 1999. Community conservation and the future of Africa's wildlife. *Conservation biology* 13:726–734.
- Harrington, A. M. 2011. Human well-being in recreation: an investigation of the expectancy-valence theory. University of Alaska Fairbanks, 2011.
- Hensley, W. L. I. 2010. *Fifty Miles from Tomorrow: A Memoir of Alaska and the Real People*. Picador.
- Henzie, Marie, Moses Henzie, and W. Arundale. 1992. Project Jukebox: Gates of the Arctic H93-15-50. <<http://jukebox.uaf.edu/GatesN/allakak/mohe.htm>>. Accessed 12 Feb 2013.
- Holen, D., S. M. Hazell, and Kostner, editors. 2012. *Subsistence Harvests and Uses of Wild Resources by Communities in the Eastern Interior of Alaska, 2011*. Volume Technical Paper No. 372. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 372, Alaska Department of Fish and Game, Division of Subsistence, Anchorage, Alaska.
- Huntington, H. P. 2000. Using traditional ecological knowledge in science: methods and applications. *Ecological applications* 10:1270–1274.
- Huntington, H. P., S. F. Trainor, D. C. Natcher, O. Huntington, L. DeWilde, and F. S. Chapin III. 2006. The significance of context in community-based research: understanding discussions about wildfire in Huslia, Alaska. *Ecology and Society* 11:40.
- Huntington, J., and L. Elliott. 2002. *On the Edge of Nowhere*. Fifth Edition. Epicenter Press.
- Huntington, S. 1993. *Shadows on the Koyukuk: An Alaskan Native's Life Along the River*. Alaska Northwest Books.
- K'oyitl'ots'ina, Limited. 2013a. Allakaket. <http://www.koyitlotsina.com/wordpress/wordpress/?page_id=29>. Accessed 20 Apr 2013.

- K'oyitl'ots'ina, Limited. 2013*b*. Board of Directors.
<http://www.koyitlotsina.com/wordpress/wordpress/?page_id=11>. Accessed 20 Apr 2013.
- Kassam, K.-A. S. 2009. Biocultural diversity and indigenous ways of knowing: human ecology in the Arctic. University of Calgary Press.
<<http://dspace1.acs.ucalgary.ca/handle/1880/48645>>. Accessed 12 Feb 2013.
- Koyukuk Advisory Committee. 2012. Koyukuk Advisory Committee Meeting. Fairbanks, AK.
- Lombard, M., J. Snyder-Duch, and C. C. Bracken. 2002. Content Analysis in Mass Communication: Assessment and Reporting of Intercoder Reliability. *Human Communication Research* 28:587–604.
- Mapaure, I. N., and B. M. Campbell. 2002. Changes in miombo woodland cover in and around Sengwa Wildlife Research Area, Zimbabwe, in relation to elephants and fire. *African Journal of Ecology* 40:212–219.
- Moore, S. A., R. C. Severn, and R. Millar. 2006. A Conceptual Model of Community Capacity for Biodiversity Conservation Outcomes. *Geographical Research* 44:361–371.
- Moses, J., and W. Arundale. 1993. Project Jukebox: Gates of the Arctic H93-15-24.
<<http://jukebox.uaf.edu/GatesN/allakak/jomo.htm>>. Accessed 12 Feb 2013.
- Moses, J., and O. Huntington. 2003. Project Jukebox: Raven's Story H2004-01-25.
<<http://jukebox.uaf.edu/RavenStory/htm/jm.htm>>. Accessed 20 Oct 2012.
- Mutandwa, E., and C. T. Gadzirayi. 2007. Impact of community-based approaches to wildlife management: case study of the CAMPFIRE programme in Zimbabwe. *The International Journal of Sustainable Development & World Ecology* 14:336–344.
- Napoleon, H. 1996. Yuuyaraq: The Way of the Human Being. E. Madsen, editor. Alaska Native Knowledge Network.
- National Park Service. 2009. Map of the Gates of the Arctic National Park, Alaska.
<http://commons.wikimedia.org/wiki/File:Map_Gates_of_the_Arctic_National_Park.png>. Accessed 21 Apr 2013.

- National Research Council. 1997. *Wolves, Bears, and Their Prey in Alaska: Biological and Social Challenges in Wildlife Management*. Committee on Management of Wolf and Bear Populations in Alaska, The National Academies Press, Washington, D.C.
- Ned, S., and W. Arundale. 1992. Project Jukebox: Gates of the Arctic H93-15-51. <<http://jukebox.uaf.edu/GatesN/allakak/stne.htm>>. Accessed 12 Feb 2013.
- Nelson, R. K. 1986. *Make Prayers to the Raven: A Koyukon View of the Northern Forest*. Later Printing. University Of Chicago Press.
- Norton, I. M., and S. M. Manson. 1996. Research in American Indian and Alaska Native communities: navigating the cultural universe of values and process. *Journal of consulting and clinical psychology* 64:856.
- Perecman, E., and S. R. Curran. 2006. *A handbook for social science field research: Essays & bibliographic sources on research design and methods*. Sage Publications, Incorporated.
- Peterson, R. O., J. D. Woolington, and T. N. Bailey. 1984. Wolves of the Kenai peninsula, Alaska. *Wildlife Monographs* 3–52.
- Randolph, J. J. 2005. Free-Marginal Multirater Kappa (multirater K[free]): An Alternative to Fleiss' Fixed-Marginal Multirater Kappa. Online Submission. <<http://www.eric.ed.gov/ERICWebPortal/detail?accno=ED490661>>. Accessed 6 Feb 2013.
- Randolph, J. J. 2008. Online Kappa Calculator. Online Kappa Calculator. <<http://justusrandolph.net/kappa/>>. Accessed 11 Feb 2013.
- Rearden, J. 2007. *Sam O. White, Alaskan: Tales of a Legendary Wildlife Agent and Bush Pilot*. Pictorial Histories Publishing Co.
- Regelin, W. L. 2002. *Wolf Management in Alaska with an Historic Perspective*. Intensive Management in Alaska. <<http://www.adfg.alaska.gov/index.cfm?adfg=intensivemanagement.historicwolf>>. Accessed 22 Apr 2013.
- Sherif, M. 1936. The psychology of social norms. <<http://psycnet.apa.org/psycinfo/1937-00871-000>>. Accessed 10 Feb 2013.
- Simon, P., and E. Mack. 2004. Project Jukebox: Raven's Story H2004-01-02. <<http://jukebox.uaf.edu/RavenStory/htm/ps.htm>>. Accessed 20 Oct 2012.

- Simon, S., and W. Arundale. 1993. Project Jukebox: Raven's Story H93-36-04.
<<http://jukebox.uaf.edu/RavenStory/htm/SSimon.htm>>. Accessed 20 Oct 2012.
- Stout, G. W. 2000. Unit 24 wolf. Pages 233–242 *in*. Wolf management report of survey-inventory activities federal aid in wildlife restoration 1 July 1996-30 June 1999. Alaska Department of Fish and Game, Juneau, Alaska.
<http://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/mgt_rpts/09_wolf.pdf>. Accessed 8 Feb 2013.
- Stout, G. W. 2009. Unit 24 wolf. Pages 237–247 *in*. Wolf management report of survey and inventory activities 1 July 2005-30 June 2008. Project 14.0, Alaska Department of Fish and Game, Juneau, Alaska.
<http://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/mgt_rpts/09_wolf.pdf>. Accessed 8 Feb 2013.
- Stout, G. 2010. Unit 24 moose. Pages 572–610 *in* P. Harper, editor. Moose management report of survey and inventory activities 1 July 2007-30 June 2009. Project 1.0, Alaska Department of Fish and Game, Juneau, Alaska, USA.
- Stout, G. 2011. Wildlife Biologist III, ADFG: Interviewed on August 10, 2011.
- Stuck, H. 1920. The Alaskan missions of the Episcopal Church : a brief sketch, historical and descriptive. New York : Domestic and Foreign Missionary Society.
<<http://archive.org/details/alaskanmissions00stucuoft>>. Accessed 19 Apr 2013.
- Stuck, H. 1988. Ten Thousand Miles with a Dog Sled: A Narrative of Winter Travel in Interior Alaska. reprinted. University of Nebraska Press.
- Titus, K. 2007. Intensive Management of Wolves and Ungulates in Alaska. Pages 366–377 *in*. Transactions of the Seventy-second North American Wildlife and Natural Resources Conference. Wildlife Management Institute, Portland, Oregon.
- University of Alaska Museum of the North. 2013. Timeline - Hunting and Trapping in Alaska's Interior: Our Stories, Our Lives. Fairbanks, AK.
<<http://www.uaf.edu/museum/exhibits/Virtual%20Exhibits/hunting-and-trapping-in-interior-alaska/Timeline-Hunting-and-Trapping.pdf>>.
- US Census Bureau. 2012a. Alaska QuickFacts from the US Census Bureau.
<<http://quickfacts.census.gov/qfd/states/02000.html>>. Accessed 6 Nov 2012.
- US Census Bureau. 2012b. Allakaket age distribution.
<http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_QTP1&prodType=table>. Accessed 2 Feb 2012.

- US Census Bureau. 2012*c*. Alatna age distribution.
<http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_SF1_QTP1&prodType=table>. Accessed 2 Feb 2012.
- US Census Bureau. 2012*d*. Fact Finder: U.S. Income w/Alaska.
<http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_10_5YR_S1902&prodType=table>. Accessed 2 Feb 2012.
- US Fish and Wildlife Service. 2008*a*. Plan your Visit. Kanuti National Wildlife Refuge.
<<http://kanuti.fws.gov/hunting.htm>>. Accessed 21 Apr 2013.
- US Fish and Wildlife Service. 2008*b*. About the Federal Subsistence Program, U.S. Fish and Wildlife Service. Federal Subsistence Management Program.
<<http://alaska.fws.gov/asm/about.cfml>>. Accessed 22 Apr 2013.
- US Fish and Wildlife Service. 2013*a*. About the U.S. Fish and Wildlife Service.
<http://www.fws.gov/help/about_us.html>. Accessed 20 Apr 2013.
- US Fish and Wildlife Service. 2013*b*. Federal Subsistence Laws & Regulations. Laws and Regulations. <<http://alaska.fws.gov/asm/law.cfml?law=7&wildyr=2012>>. Accessed 21 Apr 2013.
- Usher, P. J. 2000. Traditional ecological knowledge in environmental assessment and management. *Arctic* 183–193.
- Wolfe, R. J., and J. A. Fall. 2012. Subsistence in Alaska: A Year 2010 Update. Division of Subsistence, ADF&G, Anchorage, Alaska.
- Wyman, J. N. 1988. *Journey to the Koyukuk: The Photos of J. N. Wyman, 1989-1899*. Pictorial Histories Publishing Co.

Appendix A

Semi-Structured Interview Template

Date and Time:

Place of Interview:

Respondent ID:

Age and Place of Birth:

I am conducting interviews to learn about wolf trapping in Allakaket and Alatna. I am interested in how wolves and wolf trapping are viewed, and why residents do or do not choose to hunt or trap wolves. You will be compensated \$50 for your time at the end of the interview.

I have a series of questions about this topic, but feel free to expand on areas that interest you.

Would you mind if I recorded the interview? Your answers will be kept anonymous and confidential and used only for the purpose of this study.

Your participation is voluntary and we can stop the interview any time. The interview should take 30-45 minutes.

Do you have any questions before we get started? If you have concerns about this study please contact the UAF Office of Research Integrity at (907) 474-7800 or fyirb@alaska.edu.

All Interviewees

- 1) How do you feel the moose population is doing right now?
 - a) How has the moose population changed in your lifetime?
 - b) What do you think has caused these changes?

- 2) Can you tell me about the wolf population in the area?
 - a) Have you noticed any changes in the population?
 - b) Does it affect the moose population?
 - c) How does the health or scarcity of local wolf populations affect the health or scarcity of other animals?
 - d) Do you ever see wolves either near the village or farther out? How many? Where? (Map?)

- e) Do you ever see wolf sign? (Map?)
 - f) How do wolves affect the village?
 - g) How do the wolves in the area affect your life?
 - h) Do you know how wolves and humans traditionally interacted in this area?
 - How has that changed over time/how is it different from now?
- 3) Please tell me what you know about wolf trapping.
- a) Are you familiar with trapping laws?
 - Are these laws important to you? Do they seem appropriate and effective?
 - b) Do you know any wolf trapping methods?
 - c) Are there benefits to wolf trapping? Drawbacks?
 - d) How does wolf trapping affect your life?
 - e) Do you own trapping equipment?
- 4) Do you or have you ever trapped for furbearers?
- a) Why/Why not?
 - b) If yes, have you trapped for wolves in particular? Why/Why not?
 - c) When is the best time of the year to trap wolves?
 - d) When is their pelt at its highest quality? Why?
 - e) What are the indicators that tell you when wolf pelts are ideal for trapping?
- 5) Are you involved with the ADF&G Advisory Council (AC)?
- a) Does or would wolf trapping take away from your ability to stay active with the AC?
 - b) Same for Work? Regional Corp? Family? Other activities?
- 6) Do you attend the musher bingo nights?
- a) Would you support a trapping club or trapping fund in a similar way?
 - b) Could wolf trapping be an activity that the community as a whole would support and become involved in? Why?
 - c) What would it take to make this happen?
 - d) What would be the benefits? How could these benefits be enhanced?
- 7) How do you feel about state resource management?
- a) Federal resource management?
 - b) How do hunting and trapping laws affect your life?
 - c) Have you tried to change regulations on hunting and trapping?
 - d) What would you prefer for fish and wildlife management in your region?
- 8) How do you see your role in resources management?
- a) The role of the tribe?
 - b) The role of the corporation?
 - c) The individual?

- 9) Were forms of predator control traditionally practiced in this area?
- What methods were used?
 - How do these methods compare to trapping? (Effectiveness? Balance? Respect? Spirituality?)
 - If those methods were legal today, would they still be practiced here?
 - If the state discontinues the wolf control program in five years, would hunting and trapping be a possible way to keep the local wolf population low?
 - Would you participate?
 - What would it take to ensure enough wolves were harvested each year?
 - How could interest and effort in wolf trapping be maintained year after year?
- 10) Have you ever been to a wolf trapping or snaring clinic?
- Yes:
 - Why did you go?
 - What did you learn?
 - Would you attend another?
 - Did you use what you learned after the clinic? How/Why not?
 - Are you still using that knowledge and trapping for wolves? Why/Why not?
 - What would have made the clinic better?
 - What would have kept your interest in wolf trapping?
 - No:
 - Why not?
 - Would you be interested in attending one? Why/Why not?
- 11) Would wolf trapping be an appropriate activity for the youth of the village to become involved in?
- Why do you think the youth are not involved in wolf trapping now?
 - What would encourage them to become interested and involved in wolf trapping?
 - What would be the benefits of involving youth in wolf trapping? Drawbacks?
 - How would this affect the village?
 - Would you share your knowledge of furbearers and trapping with the youth if they were interested?

Trappers

- T1) How much time/effort/gas/resources do you put into wolf trapping?
- Why do/don't you trap for wolves?
 - What are the benefits of wolf trapping?
 - Has this changed over the years? How and why?
 - What equipment do you prefer to use for wolf sets? Why?
 - Do you focus on trapping wolves or are your wolf sets more an occasional thing?
 - What do you do with your wolf pelts?
 - If you sell your pelts, to whom? What would make this easier, and how could you get more money for them?

- g) If more people in the village trapped for wolves, would this affect your trapping? How?
- h) After the wolf population is drastically reduced, will you continue to trap for wolves? Why/Why not?

T2) Is there something that would encourage you to put more effort/focus into trapping specifically for wolves?

- a) What would make wolf trapping easier or more productive for you?
- b) What keeps you from trapping more wolves now?
- c) Can it be a sustainable yearly activity? How?

T3) Is there anything that would encourage you to trap more in general than you do now?

- a) Are you satisfied with how much you trap now?
- b) If you expanded your trapping activities, how would you do it?
- c) Do you feel that the furbearer populations in the area could sustainably handle an increase in local trapping?
- d) What effects would an increase in local trapping have on the ecosystem and other species?

T4) Would you encourage others in the community to become involved in wolf trapping?

- a) Would you share your knowledge and skills with others in the village? With interested outsiders?
- b) Would you share your equipment and tools?
- c) If the village decided to decrease the number of wolves in the area through hunting and trapping, would you participate? Why/Why not?
 - Is that an endeavor worth doing? What would be needed?
 - How would this affect the village?

Non-Trappers

NT1) Is trapping something that you would ever be interested in doing (again)?

- a) Is there anything that would encourage you to trap (again)?
- b) What keeps you from trapping now?

NT2) How do you spend your time in the winter?

- a) How would trapping affect your time and life if you took it up?

NT3) If you wanted to learn to trap/start trapping again, what would you do?

- a) What would you need that you don't have or can't get now?
- b) Who could teach you?
- c) Do you see it as a worthwhile or profitable activity?

Elders

E1) How has trapping in the village changed over time?

- a) What caused these changes?

- b) What have been the effects of these changes?
- E2) How has local interest in trapping changed over time?
- a) What caused these changes?
 - b) How could interest be regained in the community?
- E3) Would you share your skills and knowledge of furbearers, trapping, pelt handling, etc with others in the village? Outsiders?
- E4) If the village decided to decrease the number of wolves in the area through hunting and trapping, would you support this decision? Why/Why not?
- a) How would this affect the village?

Appendix B

Institutional Review Board Approval Letter



(907) 474-7800
(907) 474-5444 fax
fyirb@uaf.edu
www.uaf.edu/irb

Institutional Review Board

909 N Koyukuk Dr. Suite 212, P.O. Box 757270, Fairbanks, Alaska 99775-7270

April 12, 2012

To: Peter Fix
Principal Investigator
From: University of Alaska Fairbanks IRB
Re: [327899-1] Local Trapping as Predator Control in Rural Alaska: Limiting Factors and the Potential for Increased Community Involvement in Wildlife Management

Thank you for submitting the New Project referenced below. The submission was handled by Expedited Review under the requirements of 45 CFR 46.110, which identifies the categories of research eligible for expedited review.

Title: Local Trapping as Predator Control in Rural Alaska: Limiting Factors and the Potential for Increased Community Involvement in Wildlife Management
Received: April 4, 2012
Expedited Category: 7
Action: APPROVED
Effective Date: April 12, 2012
Expiration Date: April 12, 2013

Required Information:

The project cannot be exempted, as originally requested, as it does not completely meet established criteria for exemption. Although the focus groups is observable public behavior, the individual interview is not.

Different funding agencies and business offices require different means of tracking informant payments, however if the researchers conduct the interview orally (subject not writing on the survey instrument) and keep that totally separate from any receipt for the informant payment (name & SSN usually required), then we can consider the two as not readily linked (specific data cannot be directly linked with an individual respondent).

Thus we can also grant a waiver of written consent since it would be the only document directly linking a subject with specific research data. This can be approved as expedited.

This action is included on the April 19, 2012 IRB Agenda.

Appendix C

Final Codebook

Codes:

Community Capacity for Wolf Control through Trapping and Hunting: Except for the *Changes* and *Deterrent* codes, these codes are used to document what resources are available *now* within the community to frame the current capacity that the community has to enact local predator control efforts. References to past resources (furbearers, trappers, equipment, etc) may be relevant to the *Changes* code but do not apply as current resources available to the community (previous availability of wolves, previous trappers, etc do not fall under *Furbearers* or *Trapper*.

- **Capacity: Changes**
 - Used to note changes in community capacity that may be linked to the decline in wolf trapping. Examples are better housing, better security, new food sources, or loss of trappers. Examples may also include changes in capacity that are related to wolf trapping but that may not have a clear connection to the decline of wolf trapping, such as the change from trapping with dogs to snowmachines.
- **Capacity: Deterrent**
 - Any uncontrollable obstacle that relates to the *ability* of the community to affect wolf control through trapping and hunting. This may include factors such as terrain, snow depth, luck, and wolf cunning. If the community can not reasonably gain the capacity to overcome an obstacle (ex: terrain), this code is applicable.
- **Capacity: Resource: Furbearers**
 - Notes the presence and abundance of furbearers in the area. Any reference to presence or quantity of furbearers. Refers only to current presence/abundance, so only sightings or abundance within the last few years. References to abundance “before” (before population changes occurred) or to an undefined distant past are not included. References to the past few years, if they seem to be used to describe current population trends, are included.
- **Capacity: Resource:**
 - **Support:** Notes the presence and abundance of general support for community wolf control through local trapping efforts as well as the potential for financial support. Examples include comments about willingness to attend fundraisers, donate money, or not donate money, as well as feeling that community wolf control would be a “good idea,” effective, etc. Support of efforts to increase local trapping (snaring clinics and trapping classes, etc) would also be included.
 - **Doesn’t Support:** Comments related to a lack of support or unwillingness to participate in any way (financial, clinics, etc), although lack of support

due to a belief that community wolf control will not be effective falls under the code “Resource Management: No Role/Responsibility.”

- **Capacity: Resource: Trapper**
 - Notes the presence and abundance of experienced trappers in the area. Wolf trappers and general trappers are both included. Once a distinct individual has received a “Trapper” code within an interview, they should not receive another code in that same interview. References to other individuals that are trappers should receive the “Trapper” code, but only once per discernable individual in each interview. Only trappers still in existence and available to the community are included. Former trappers are included, as they have knowledge and experience that may be helpful to the community.
- **Capacity: Resource: Willing to Participate**
 - Notes willingness of community members to participate in community wolf control through trapping and/or sharing their knowledge with others. Notes a willingness to be involved in a deeper capacity than simply supporting the project. Willingness to support the project financially is not included, but willingness to participate in trapping clinics or teach others is. This code only applies to comments made specifically about willingness to participate in present or future efforts. Comments documenting wolf trapping or hunting or clinic participation in the past do not imply a willingness to participate in future wolf control efforts and are not included in this category.
- **Capacity: Resource: Wolf Trapping Knowledge**
 - Examples of the knowledge available in the community that is necessary for successful wolf trapping, including wolf abundance, location, trapping methods, skinning and proper respect for spirits. Wolf trapping and wolf hunting are synonymous for this code, as wolf hunting is included under wolf trapping regulations, both contribute to the overall goal, and both require similar knowledge in relation to wolf abundance, location, etc. Only specific and current knowledge is included. Knowledge of past wolf abundance or location (from an undefined distant past or former trapping days) is not included as it may no longer be relevant. If knowledge is clearly from the past few years or is referenced with the intention of describing the current wolf population it may be included. Comments referencing general trapping knowledge or general trapping experience (not specific bits of knowledge about specific aspects of wolf trapping/hunting) are not included, as they reference knowledge or experience that is documented by the fact that the respondent is a trapper (Capacity: Resource: Trapper).
- **Capacity: Resource: Equipment**
 - Presence and abundance of wolf trapping equipment in the area. This code only applies to equipment that is identified to be available to at least

one resident of the area, as it notes the resources already available. This code does not apply to the need for equipment.

- **Capacity: Understand Problem**

- The “problem” here being too many wolves and not enough moose and the negative effects that the wolves have on the village (including contributing to a lack of moose), as well as how the problem can be addressed. Includes knowledge of low moose population in the area, how high predator numbers affect the moose population, how predator control by whatever means may result in less wolves and in turn more moose or caribou, etc. This may include statements that refer to more wolves or less moose due to a lack of trapping, since it shows that trapping may address the problem. Lack of trapping only falls under this code if it’s in reference to addressing wolf problems (not if it is an unrelated statement of changes in trapping). Comments regarding lack of moose are only included if they are linked in some way to wolves, trapping, predator control, etc.

Incentives for Wolf Control through Local Trapping:

- **Incentive: Deterrent**

- Obstacles that relate to the costs, risks (superstitious or otherwise), or requirements of community wolf control through local trapping efforts. These are all obstacles that may presumably be overcome with sufficient benefits or incentives and relate to the worth of the activity and its outcomes. Obstacles for wolf trapping or general trapping are both included, as a person must overcome the general obstacles that might prevent them from trapping at all before the specific obstacles for wolf trapping can be addressed. These may include financial costs, time commitments (other winter activities or jobs), possibility of injury, inefficient equipment, distance to travel, need for participation, etc. This code is not related to the resources that may or may not be actually available in the area. It notes the resources that would be needed to enact community wolf control regardless of current availability of those resources. If a person were to trap, anything they mention that would have to be (and could conceivably be) overcome or put aside for them to do so would fall under this category (unless it is a cultural or capacity deterrent). If obstacles are mentioned that a person does overcome to go trapping, those obstacles are still included. The person may find it worthwhile to overcome such obstacles, but that doesn’t negate the existence of the obstacles. If an obstacle is not the main deterrent that is keeping a person from trapping but would still have to be overcome if they were to trap (wolves or otherwise), it would be included. This code is mutually exclusive with the other deterrent codes, but not with the change codes. Video games, for example, may be the new descriptive norm for kids, but the pull of video games is a deterrent that could conceivably be overcome with the proper incentives or exposure to other activities (such as trapping).

- **Incentive: Positive**

- Benefits already associated with wolf trapping. Financial, cultural, social, etc. This includes benefits related to continuing tradition, teaching others, getting youth outdoors, etc. Benefits that are identified relative to future efforts would be included, as they are already associated with wolf trapping activities even if those activities are not yet realized.

Norms and Values must support Action:

- **Norms and Values: Changes**
 - Notes changes in norms and values as well as how that has affected wolf trapping. Changes in descriptive norms within the community are included, as well as changes in values regardless of causation. Examples may be the general decline of trapping within the community or shifts in pastimes and interests from trapping to video games. Some of these changes may pose deterrents that can be overcome with proper incentives, some may pose deterrents that can not be addressed and some may not pose deterrents at all. Comments regarding appropriate ages for youth to become involved in trapping virtually always fall under this category, as children as young as 3 were historically taken hunting and trapping in this area.
- **Norms and Values: Cultural Deterrent**
 - Deterrents to wolf trapping that arise from social pressures related to norms and values. This may include Elder influence, gender roles, issues of group dynamics, or views on age appropriateness. These deterrents are not likely to be overcome with incentives, as they have cultural roots. Superstitions that can be addressed with proper handling of the wolf carcass represent risks that can be overcome with the proper knowledge, so they fall under “Incentive: deterrent.”

Effects of Institutions and Perspectives on Community Wolf Control through Trapping

- **Past Efforts**
 - Any references to past efforts to increase trapping, such as bounties, snaring clinics, etc. This code does not reference past efforts of predator control in general; only past efforts to increase local levels of trapping/snaring/hunting.
- **Historical Disconnect**
 - Lack of knowledge about past human-predator interactions, if predator control was practiced, how it was practiced, etc.
- **Involvement in Institutional Efforts**
 - **Involved or Not Involved**
 - Notes individual involvement in institutional efforts of resources management. “Involved” includes involvement in ADF&G Advisory Councils, attempts to alter laws or regulations, tribal involvement in regards to resources management, etc. May coincide with Resource Management: Role/Responsibility for that individual. Lack of knowledge

regarding hunting and trapping regulations would be coded as “Not Involved.”

- **Resource Management:**

- **Role/Responsibility :** Refers to specific comments regarding or identifying the roles of government, corporation, tribe, or individual in resources management, responsibilities of those entities, and how these factors may or may not be affecting local trapping efforts. An evaluation of an entity’s management of natural resources will also receive this code, even if a specific role is not identified in the statement. May also refer to responsibility or advantage of government in relation to specialized equipment or regulations (ex: shooting wolves from helicopters in predator control programs).
- **No Role/Responsibility :** Used if a respondent identifies an entity (self, tribe, corporation, etc) as having no role or responsibility in resources management. Perceived program inadequacy (the belief that local trapping will not be effective in reducing the wolf population) may also be included in this category, as it reflects the idea that the village does not have the ability to address the problem and so IM efforts by the state are necessary. A negative evaluation of an entity does not imply that the entity has no role or responsibility. Unless such a relationship is expressly stated, a negative evaluation receives the “Role/Responsibility” code.

Appendix D

Interview Results Organized by Analysis Themes

	Number of Respondents	Percent of Respondents
Community Capacity		
Cognition: Understanding Problem		
• Not enough moose	15	93.75
• Wolves negatively affect moose	16	100
• Too many wolves	9	56.25
• Bears a factor	5	31.25
• Less wolves will help moose	12	75
• Wolves eat dogs	8	50
• Wolves affect personal safety	7	43.75
• Too many wolves because of lack of trapping	5	31.25
• Local hunting and trapping can be effective as wolf control	10	62.5
• Local hunting and trapping would not be effective or aerial wolf control is needed first	2	12.5
Furbearers and Trapping Knowledge		
• Know where to find wolf sign outside of village	14	87.5
• See wolves or heavy wolf sign in village	15	93.75
• Enough furbearers to sustain increase in trapping	8	50
• Have trapping experience	13	81.25
• Actively focus on trapping wolves	4	25
• Knowledge of general methods used for wolf trapping	12	75
• Described specific wolf sets	5	31.25
• Stated that wolves must be handled carefully to avoid injury or bad luck	7	43.75
• Know how to properly handle carcass so as to avoid injury	4	25
Community Support		
• Support the idea of local wolf trapping program	16	100
• Willing to contribute financially as they do to other community funds	16	100
• Not willing to participate in ways other than contributing funds	1	6.25
• Involve themselves in community programs	8	50

• Would participate in trapping	10	62.5
• Would share knowledge	15	93.75
Economic Capital		
• Better snowmachines would be needed	5	31.25
• Own or have access to traps or snares	10	62.5
• Lack of traps or snares limit current trapping	6	37.5
• Personal finances limit trapping currently	7	43.75
Capacity-related Deterrents		
• Terrain	5	31.25
• Snow	2	12.5
• Cold	4	25
• Wolves are a challenge	10	62.5
• Luck	4	25
Effects of Changes in Capacity		
• Modern comforts contribute to decline in trapping	3	18.75
• Lack of warm gear	3	18.75
• Dog teams no longer used: less trapping	3	18.75
• No snowshoes results in less trapping	2	12.5
Cost/Benefit		
Costs and Risks		
• Cost of gas	12	75
• Cost of snowmachine	12	75
• Cost of equipment	7	43.75
• Risk of personal injury or bad luck from mistreating carcass	7	43.75
• Don't harvest wolves because of above risk	2	12.5
• Respect for wolves limits trapipng	5	31.25
• Physical injury from live wolf	2	12.5
• Investment of time	4	25
• TV and/or video games competes with trapping	11	68.75
• Basketball competes with trapping	3	18.75
• Drugs and Alcohol competes with trapping	4	25
• Hard work	8	50
• Lack of knowledge	9	56.25
• Fear of negative sanctions from breaking the law	2	12.5
• Organizer needed to start things	5	31.25
• More people need to teach/share knowledge	9	56.25

Benefits

• More moose	13	81.25
• More subsistence foods such as beaver and hare	6	37.5
• Safer streets	2	12.5
• Wolf pelts for potlatches	8	50
• Warm gear from pelts	13	81.25
• Extra income	10	62.5
• Sense of accomplishment	8	50
• Recreational value	7	43.75
• Learn new things	4	25
• Perpetuate tradition and culture	10	62.5
• Youth learn important skills	11	68.75
• Alternatives to TV and drugs	3	18.75
• Work together toward positive goals	2	12.5

Social and Cultural Barriers

• Trappers should be age 16+	5	31.25
• Age 10-14	3	18.75
• Any age	4	25
• Changes in norms related to upbringing of younger generation	5	31.25
• No one taking youngest generation out	10	62.5
• Would rather live subsistence lifestyle than working or watching TV	2	12.5

Resources Management Roles

• Government has responsibility for predator control	3	18.75
• Government has responsibility because of technological advantages	2	12.5
• Community should put greater effort into hunting and trapping wolves	10	62.5
• Agencies doing well managing resources	6	37.5
• Trapping regulations should be changed	1	6.25
• Agency should monitor populations even with local wolf control efforts	2	12.5
• Have issues with moose management	6	37.5
• Have active role in local resource management	10	62.5
• Village has a role in local resource management	16	100
• Regional corporation has role in local resources management	13	81.25

Past Efforts to Increase Local Trapping

• Have not heard of local snaring or trapping clinics	4	25
• Had participated in clinics	5	31.25
• Had used the snares or techniques from clinics	2	12.5
• Bounties used to work	2	12.5