Leadership models and community resilience to climate change events: A case study of an Alaskan bush village

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Leadership models and community resilience to climate change events: A case study of an Alaskan bush village

by

Wendy Young

A thesis submitted to the graduate faculty in partial fulfillment of the requirements for the degree of Master of Science

Major: Interdisciplinary Graduate Studies (Community Development)

Program of Study Committee:
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Iowa State University
Ames, Iowa
2013

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ACKNOWLEDGEMENTS

I would like to thank the people of the case study village for their help in this research as well as the City, Native Village, Native Corporation, and the Economic Development Corporation. A special quyanna to all those who were willing to participate in my research, without you this thesis would not have been possible. In addition, I would also like to thank my wonderful mentor Dr. Meredith Redlin for her endless support, as well as Dr. Mary Emery, Dr. Cornelia Flora, and Lori Youngberg.
Climate change in the Arctic is happening at twice the rate of the rest of the world. Arctic communities are struggling to survive as the effects of these changes threaten the very fabric of their communities. Resilience to these climate change events is determined by many factors. Communities must be able to act collectively, use local knowledge, have access to financial resources, and participate in the decision making processes. All of these factors are determined by the effectiveness of the leadership models employed to reach specific community goals.

Climate change events and leadership both occur at the local level. Studying the results produced by different leadership models employed in one Alaskan, Inupiaq village yields important insight into climate change and community resilience. The case study village uses three concurrent leadership styles to build community resilience for three different climate change events. The Native leadership model is being used for emergency preparedness and response to the increasing severity of fall storms and flooding. The rational bureaucratic leadership model is being used to build a protective sea wall to preserve and stabilize the eroding shoreline. The adaptive co-management model is being used to manage failing moose populations. Understanding the key role leadership has played in this community will provide pertinent insights for communities throughout the world suffering the effects of climate change.
The necessary ingredients for resilience to climate change events are a community’s access to capital resources, traditional knowledge and land skills, resource use flexibility, and strong social networks (Pearce, Smit, Duerden, Ford, Goose & Kataoyak, 2010). The research presented in this paper seeks to assess how leadership and decision making power also serve as necessary ingredients in the successful implementation of resilient activities. The effects of climate change unfold at the local level as do the leadership decisions in response to that change, creating opportunities to investigate the dynamics of the two (Berkes & Jolly, 2001). To elucidate the role of leadership in the development of resilient activities research for this paper focused on three questions: What are the major leadership models being used to build community resilience to climate change events? What are the strengths and weaknesses of the different leadership models? Are certain types of leadership models more effective then others at building community resilience?

The community highlighted in this case study was chosen for a number of reasons. First, the case study village is an Alaskan Inupiaq village located on the Bering Sea where the effects of climate change have been documented for over fifteen years (US GAO, 2003). They have experienced dynamic ecosystem shifts such as thawing permafrost, extreme flooding, erosion, loss of sea ice, ocean acidification, and changing animal migration patterns (Simpkins, 2009; Vagg & Hepworth, 2006; Vors & Boyce, 2009). Second, they have had a variety of leadership and decision making
styles used in the village to manage community-resilient activities. Each of these leadership styles has had a different success rate in the village. The use of these distinct leadership models allows us to examine the impact each has had in the village and draw a conclusion as to which leadership model has been more effective in building community resilience across three different climate adaptation challenges.

In the research presented in this paper is organized in a series of chapters. The first chapter presents the community context of this study, followed by a literature review placing this work in what is known about leadership in native contexts and indicating contributions to understanding leadership impacts in relation to climate change resilience. Second, the theoretical approach for analysis of leadership in this study is described. The third chapter explains research methodology, and key concepts and measures used in this study. Fourth, three distinct models of leadership used in the community are defined and analyzed in the context of three climate change issues and/or events. I conclude with a summary of key findings, limitations of the research and suggestions for future research.

**Background and study area**

The case study village, population 700, is an Alaskan "bush" village that has been a migratory stop by Inupiaq people for over 15,000 years and a permanent settlement for 200 years. The village sits exposed on a barren piece of land bordered on the south by a river, on the west by Norton Sound and the Arctic Ocean. Taiga, a combination of tundra and boreal forest, stretches for hundreds of miles to the east and north. The arrow on figure 1.1 shows the relative location of the village.
The extreme geographical isolation, low population, and severe climate build a character in the local population that is both strongly independent and capable as well as culturally and socially interdependent. Nonetheless, like most Arctic native communities, the case study village struggles. The unemployment rate was 14.5% in 2000 but that data is skewed as 48.6% of all adults were not counted in the workforce because they were not seeking work (Kawarak Inc., 2009). Year-round jobs are hard to find and most residents spend their summer months actively engaged in subsistence activities. The primary subsistence activities are fishing, netting, hunting, trapping, berry picking, and whaling.

Inupiaq people in this community rely upon the land for their subsistence. However, for the Inupiaq, subsistence is not just equated with activities to acquire food; subsistence activities are the very essence of the Inupiaq culture, economy, and way of life (Goldsmith, 2007). The harvest is used for food but also for clothing, arts and crafts, and other products. Traditional practices of sharing of the subsistence harvest increase social and cultural capital. For example, the first animal harvested by a family is always

![Figure 1.1 Map of the relative location of the case study village. Located on the Norton Sound of the Bering Sea. Source: Alaska.org](image-url)
given away, usually to an elder within the community. The sharing of the harvest strengthens social bonding and community cohesion, while ensuring that the elders within the community are cared for and respected.

The subsistence lifestyle is only possible because of the Inupiaq’s direct relationship with the ecosystem. Disruptions in the ecosystem can send repercussions throughout the community. One variable changing has a domino effect within the community. An example of this can be seen in the thawing of the permafrost. As permafrost thaws it can shift the foundations of important village infrastructure, it changes the migration patterns of important game such as the caribou, and it destroys underground cellars that have provided food storage for thousands of years. The current challenge facing individual and cultural survival is how to respond to the acute and chronic vulnerability of their community due to climate change.

For those most affected in the Arctic region (i.e., native and indigenous peoples), leadership on climate change is both a critical and an immediate concern. Indigenous leaders and their organizations often have to negotiate between two worlds in determining action—the cultural world of community order and subsistence dependency practices, and the political world of economics bound by governmental bureaucracies and private interests (Emery, Redlin & Young, 2012). In this research, I focus on the role Native leaders play in balancing these two worlds and assess three different leadership styles in response to climate change events.

**Literature Review**

This research was developed to help better understand how leadership influences successful strategies to build community resilience. Previous research on
which this study builds is organized in four areas: a) Native Alaskan Vulnerability to Climate Change events; b) Leadership and Environmental change; c) Traditional Ecological Knowledge and Leadership use by Alaska Natives and Native Americans; and, d) Concept Differences between Adaptation and Resilience to Climate Change.

Native Alaskan vulnerability to climate change events

Climate change in the Arctic is well researched and documented (Pungowiyi, 2009; Huntington, 2004; Vagg & Hepworth, 2006; Kofinas, Chapin, BurnSilver, Schmidt, Fresco, Kielland, Martin, Springsteen, Rupp, 2010). Those who live in the Arctic (especially indigenous populations) are experiencing the effects of climate change as an immediate concern. Over the last half century, the Arctic has warmed to a level unprecedented in at least the last four centuries, substantially altering ecosystem processes, fire regime, and the abundance of key plant and animal species on which people depend (Kofinas et al. 2010).

Changing ecosystems have altered the migratory patterns of animals, most notably that of the caribou (Vors & Boyce, 2009). Climate change has also prevented the formation of coastal sea ice causing 86% of Inupiaq coastal villages in Alaska to be at acute risk for destruction by erosion and flooding (US GAO, 2003). Changing sea temperatures have also negatively affected marine mammals, fisheries populations, and polar bear habitat (Simpkins, 2009; Vagg & Hepworth, 2006).

While the climatic and geophysical changes are well-tracked, there has been less social science research conducted regarding the implications of these changes on the Arctic people and their capacity to build resilience to these changing conditions.
Most social research focuses on outcomes of climate change and general impacts on affected Arctic communities by altering subsistence patterns, creating food insecurity, and disrupting travel routes (Berkes & Jolly, 2001; Carey, 2009; Pearce, Smit, Duerden, Ford, Goose, Kataoyak, 2010). Current research also suggests that changes will continue to affect Arctic communities and will do so at increasing rates (Pearce et al. 2010). The proposed research adds examination of leadership structures in the context of current climate outcomes and the community’s need to adapt. It is increasingly clear that to understand what climate change means for people and communities, research is required into how people experience and respond to changing conditions relevant to them (Pearce, et al., 2010).

**Leadership and Environmental Change**

Current research emphasizes that, while the concept and definition of leadership is always evolving and being redefined, at its core leadership is about managing change (Gallagher, 2012; Christensen, 2012; Abdel, 2012). In the context of this research, leadership is about managing issues dealing with environmental change. Gallagher (2012) states:

> Current research on environmental change leadership focuses on issues such as adaptation to a changing climate, design of sustainable food systems, reinvention of cities, development of markets for ecosystem services, implementation of renewable energy systems, and protection of vulnerable citizens from environmental injustice (p.3).

True environmental leadership in these circumstances demands more than the mere accommodation of inevitable change; it requires that change be understood and explicitly managed (Christensen, 2012). How this is done is a question of
academic debate. In environmental leadership research, there is no consensus as to the most effective style or personality type for effective leadership. What is acknowledged is the uncertainty and limited knowledge of the leadership allowed by this type of change. Trying to manage change when the change is uncertain affects the level of trust and confidence others have in the leadership (Christensen, 2012). Literature suggests that this uncertainty creates a situation where certain types of leadership may be more effective than others (Abdel & Hamid, 2012; Christensen, 2012; Shaffer, 2012).

Research shows that managing these complex environmental problems requires that social, political, economic, and ethical dimensions of the problems be addressed collaboratively, and that decisions be made in the context of local values (Shaffer, 2012). Complex environmental problems, such as those discussed here, require leaders to develop solutions that are both contextually appropriate and acceptable to multiple stakeholders. Due to this complexity it has been put forward that the most effective type of leadership is a form of co-management (Shaffer, 2012). This form is able to relate to others in the local context and allows for creating the relationships necessary for people to learn and work together (Abdel & Salem 2012).

Past studies indicate that replacing the common leadership structure of presiding over and commanding others (presented here as rational bureaucratic leadership) with one emphasizing the joy of working with followers and appreciating mistakes from everyone, leaders included, is most promising (Abdel & Hamid, 2012; Shaffer, 2012). Indeed, the best predictors of effective
environmental leadership include consideration of local context, adaptability, the ability to learn from mistakes, and the viewing of leadership as relationship building (Abdel & Hamid, 2012; Gallagher, 2012; Shaffer, 2012). Environmental leadership therefore, suggests that a community’s ability to develop resiliency depends upon the conditions created by the leadership model implemented to address the challenges of climate change.

**Traditional Ecological Knowledge and Leadership use by Alaska Natives and Native Americans**

Native Americans and Alaska Natives view leadership differently than traditional western society. Research has demonstrated that Western leadership focuses on competition and individual success, while Native leadership focuses on cooperation, self-denial, and consideration for others (Nygard, 2009). There are many studies documenting the different styles of native leadership and its strengths and weaknesses when compared to western leadership (Nygard, 2009; Cornell, Jorgensen, Kalt, & Spilde, 2005). The most reliable predictors of development success on American Indian reservations are a community’s level of trust and acceptance in the leader, as well as political legitimacy and quality of government (Cornell, Jorgensen, & Curtis, 2004).

Traditional ecological knowledge, hereafter referred to as TEK, is “the knowledge and beliefs that indigenous people hold of their environments that is handed down through the generations” (Menzies & Butler, 2006:6). It is inherently locally focused, and relies upon transmission from elders to youth to understand both the variety and the specificity of environmental balance in a particular place and from the viewpoint of a
particular culture (Emery et al., 2012). TEK is an important aspect of any discussion of Native leadership or decision making (Berkes, 1999; Berkes, 2009; Menzies & Butler, 2006).

Very little research has been done addressing the specific leadership styles of Alaska Natives. Research that does exist focuses primarily on Alaska Native leadership styles as they relate to western institutions. Examples of this research include: public education reforms, the Native leadership role during the formation of the Alaska Native Claims Settlement Act, and the leadership styles of Native Corporations created to resemble western institutions and interact with the federal government (Branson, 2007; Chaffee, 2008; Barnhart, 2008; Huhndorf & Huhndorf, 2011).

The research in this paper is an important addition to the current academic literature as it elucidates the differences between Native and Western leadership models, and how those differences affect a community’s ability to build resilience to climate change events.

Climate Change Adaptation and Resilience

There is an ongoing discussion through the literature on the difference between climate change adaptation and resilience. Climate change adaptation refers to changing the actions in a community in order to improve the outcome (Lemos, Boyd, Tompkins, Osbahr, and Liverman, 2007). Resilience is the ability of a community to absorb disturbances while continuing to exist in the usual way (Johnson, 2011). Specific examples are helpful to clarify the difference between adaptation and resilience. In adaptation, a community facing energy shortages may choose to install
windmills, a technology never before used in the community and which requires the community to embrace of a new way of doing things. To build resilience in the same situation, a community may decide to build more storage tanks for heating fuel in order to absorb difficulties from any shortages that may occur.

Both adaptation and resilience are considered in this research, as leadership in the community used strategies reflecting both to mitigate the effects of climate change. Resilience takes priority as the main focus, however, as that concept highlights current leadership models dealing with specific ongoing events. Questions answered by this research include which leadership style is currently able to absorb and react to climate change events effectively. It may be that this research can help the community adapt by identifying which leadership style is more effective in certain situations. This information may encourage the community to choose one style of leadership over another in order to improve the climate change outcomes for the community.
CHAPTER 2

Three Leadership Theories

The research presented in this paper focuses on three types of leadership models employed to manage environmental change. As outlined in the literature review section, there is no agreement as to the most effective leadership style to manage for these changes. In the case study presented in this paper, three separate leadership theories are used as a foundation for the leadership models employed to address issues of climate change vulnerability. By looking at these theories simultaneously, within one geographical area, we can see how context influences leadership. The research presented in this paper uses the interplay of these theories to demonstrate the effectiveness of leadership models in responding to climate change events.

The first theory discussed is the Native theory of leadership. This model, informed by Native values and combined with traditional ecological knowledge, is used by the community to prepare for and respond to the increasing severity of fall storms. The second leadership theory is the rational bureaucratic theory used so prevalently in western society. Rational bureaucratic theory underlies the common western leadership model that provides little accessibility for Native input or leadership. In this model, control of resources and decisions are held by entities outside the village. The third leadership theory is an adaptive co-management model developed between village leadership and Alaska state government. This management style was developed to halt the drastic decline of the local moose populations as both village hunters and wild predators, such as the wolf, turned to moose after environmental changes forced the caribou to move 100 miles north.
Native Alaskan and Native American Leadership Theory

The theory of Native leadership is often defined in contrast to Western leadership. The differences between Native leadership theory and Western leadership theory stems from very different characteristics of culture and values. Al Nygard, President and CEO of a Native American owned firm specializing in culturally sensitive approaches to management, planning, and development explains:

Anglo leaders aspire to leadership, they seek it out and seek to hold leadership for as long as they can. In the Native world, leadership is not sought; rather it is given and then for a prescribed period of time or until a particular result is attained (2009).

It is important to consider the aspects of Native American culture that may influence leadership styles. These differences consist of important cultural aspects including: Native Americans do not view time as linear; silence is often used to communicate a sense of oneness with another person; and although Natives believe in an individual’s autonomy, the individual is a part of the extended clan (family), and family bonding is believed to be of greater importance then personal status (Nichols, 2004).

Building on these cultural aspects, researchers have posited that Native American Leadership is not based on position, as is the western tradition, but on persuasion (Warner & Grint, 2006). One of the most important differences between Native leadership and the traditional rational bureaucratic model of leadership is the ability to persuade. While the rational bureaucratic leadership focuses on the ability to command compliance with rules and regulations, the Native leadership model focuses
on the ability to persuade. This persuasion is often influenced by who one is related to and to which clan one belongs (Warner & Grint, 2006).

This Native Leadership model in combination with traditional ecological knowledge (hereafter TEK) is what is used by the community in this case study to address key climate change issues, such as the increased severity of fall storms and village flooding. As noted earlier, TEK is a valuable tool used to inform Alaska Native and Native American leadership styles. For both ethical and applied reasons western research is increasingly including TEK with Native leadership theory to better understand how these communities respond to and mitigate climate change vulnerabilities (Berkes, 1999; Berkes, 2001; Watson, Stumpff, & Meidinger, 2012).

Native leadership theory focuses on leaders as servants of the people and decision making is shared within the community, usually through an elders council, large community meetings, and informal gatherings (McLeod, 2002; Warner & Grint, 2006). The theory of an effective Native Leadership model put forth by McLeod (2002) states that:

(a) Indian leaders need to know both their own community (values and history) as well as the Euro-American community because they must function in both societies; (b) Indian leaders need to be holistic because Indian communities are small, Indians value interconnectedness, and Indians work on a wide variety of issues; (c) Indian leaders belong to communal societies that must accommodate both tribal values and Euro-American systems in which Indians and non-Indians coexist. (p. 1)

Using Native leadership theory others have proposed that the most reliable predictors of success on American Indian reservations are a community’s trust in leadership and acceptance from their own people, as well as political legitimacy and quality of government (Cornell & Kalt, 2001; Cornell, Jorgensen, & Curtis, 2004).
Decisions made locally by local people have a greater success rate but only if they have the power to enforce or enact those decisions. These studies have found that native communities are best able to adapt and build resilience when the community has the power to make informed decisions (Cornell & Kalt 2001; Cornell et al., 2005).

In summary, Native leadership theory differs from rational bureaucratic leadership theory in three important ways. Native leadership is built on relationships, is seen as holistic, and includes TEK. Native leadership positions are not sought after but instead leadership is recognized in an individual, especially in one’s ability to persuade others to do what needs to be done (Nichols, 2004). Native leadership is time limited and not a profession, as we will see outlined in the rational bureaucratic theory of leadership. This non-hierarchical leadership model moves from person-to-person as the situation unfolds. Everyone in the community is seen as a leader either in the past, present, or future.

**Rational Bureaucratic Theory of Leadership**

The rational bureaucratic model of leadership is exemplified in many different western institutions. Max Weber (1922) coined the term “rational authority” to describe this type of leadership in modern Western societies and this model underpins rational bureaucratic organizations. These rational bureaucratic organizations gave birth to the modern state which led to control by a centralized authority (Ogbor 2000; O’Neill, 1986). This model is often described as a pyramid with the elite decision makers at the top. This authority defines goals and objectives with little or no input from those outside the bureaucracy. Decision-making power and access to resources is held by an elite few, public input is accepted only through formal channels and only when the bureaucracy
feels community input would be helpful or when its leaders are pressured to do so (Battisti, Barcelos & Marlow, 2011; Armah, Ayan & Bernard, 2009). Public access to the decision makers is difficult as institutional barriers are erected to protect and isolate those at the top.

This formal hierarchical structure is purposely impersonal; order and rules are held in higher regard then the personal characteristics of the leaders. In contrast to the model of Native leadership, Western leadership is based on technical or professional qualifications. As Ogbor (2000) states;

> It is assumed that people in modern Western societies usually insist on evidence of "what a person can do" (e.g., scholastic examinations, quality and quantity of output, etc.) in determining the criteria for leadership position, role recruitment, allocation of duties and distribution of rewards. (p. 51)

The elite is made up of leaders that aspire to be leaders, train to be leaders, and seek to hold leadership for as long as they can (Nygard, 2008). Leadership in the Rational Bureaucratic model, then, does not recognize leadership an individual’s ability to persuade others or to share power but instead leadership is recognized as holding a position of power within an organization.

**Adaptive Co-management Theory**

state and communities (or user groups) about a set of resources or an area” (p. 1693). The hallmark of co-management is to have at least one strong vertical linkage involving the government and a user group, and some formalized arrangement for sharing power and responsibility (Berkes, 2009:1693).

The theory of co-management for natural resource management on Native land is not a new concept. It has been used for various projects including; wolf recovery programs, fisheries populations, and fire abatement (Cornell et al., 2005; Johnson 2011; Chapin, Lovecraft, Zavaleta, Nelson, Robards, Kofinas, Trainor, Peterson, Huntington & Naylor, 2006).

Adaptive management, on the other hand, is a “learn-by-doing” process that was developed as a way to deal with uncertainty and complexity. It is defined as a process by which institutional arrangements and ecological knowledge are tested and revised in a dynamic, ongoing, self-organized process of learning-by-doing (Berkes, 2009:1698). In this theoretical model, decision making must be adaptive and flexible in order to deal with situations that are very complex or in which there are many unknown variables.

In combination, the resulting model of leadership is based on a flexible system of resource management that is contextual, collaborative, and evolving. The new adaptive co-management model is defined by horizontal interactions among stakeholders, vertical interactions of communities with actors at other levels, combined with interactive learning on all levels (Berkes, 2009: 1698). It is suggested that the adaptive co-management arrangement is effective as local residents and government managers of fish and wildlife can take advantage of both local and regional observations of changes in subsistence resources and engage local stakeholders in the decision-making process
Table 2.1 further clarifies the distinctions between co-management, adaptive management, and adaptive co-management theories.

<table>
<thead>
<tr>
<th></th>
<th>Co-management</th>
<th>Adaptive management</th>
<th>Adaptive co-management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linkages</strong></td>
<td>Primary focus: vertical institutional linkages</td>
<td>Linking science and management for learning-by-doing</td>
<td>Horizontal and vertical linkages for joint learning-by-doing</td>
</tr>
<tr>
<td><strong>Temporal scope</strong></td>
<td>Short to medium: tend to produce snapshots</td>
<td>Medium to long: multiple cycles of learning and adaptation</td>
<td>Medium to long: multiple cycles of learning and adaptation</td>
</tr>
<tr>
<td><strong>Organizational level</strong></td>
<td>Bridging between local and government levels</td>
<td>Focus on managers’ needs and relationships</td>
<td>Multi-level, with self-organized networks</td>
</tr>
<tr>
<td><strong>Capacity building focus</strong></td>
<td>Resource users and communities</td>
<td>Resource managers and decision-makers</td>
<td>Needs and relationship of all partners</td>
</tr>
</tbody>
</table>

To address the primary research question pertaining to effective forms of leadership for community action in the face of climate change, I will examine use of each of these theoretical models; Native leadership, rational bureaucratic leadership, and adaptive co-management leadership. Comparisons and effectiveness of each will be outlined in relation to a specific challenge faced by the study community.

**Conclusion**

The research presented in this paper focuses on three types of leadership models, and their underlying theories, employed to address issues of climate change

(Chapin et al, 2006).
vulnerability in a case study village. These three leadership models; Native leadership, rational bureaucratic, and adaptive co-management have clearly defined differences in the characteristics of the leadership, decision making structure, and the qualifications needed for leadership. The key differences between these leadership models are outlined in table 2.2. The differences between these models allows each to create unique conditions to strengthen or diminish community resiliency.

Table 2.2 Key differences between the leadership models employed by the case study village to build resilience to climate change events.

<table>
<thead>
<tr>
<th>Defining characteristics of the leadership model.</th>
<th>Native Leadership</th>
<th>Rational Bureaucratic</th>
<th>Adaptive Co-management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership is an innate ability of a person in a given situation.</td>
<td>Leadership is a lifelong profession. Leadership power comes from the position not the person.</td>
<td>Embraces both the innate ability to lead from the village and the professional leadership of the bureaucracy.</td>
<td></td>
</tr>
<tr>
<td>Leadership can easily move from person to person.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision making structure</td>
<td>Decision making is shared within the community.</td>
<td>Decision making power is held by an elite few with little or no access for those outside the organization.</td>
<td>Decision making is a joint process between the local village and state agencies.</td>
</tr>
<tr>
<td>Leader qualifications</td>
<td>Based on the ability to persuade and TEK.</td>
<td>Professional qualifications needed from an accredited institution.</td>
<td>Combines the professional qualifications at the state level with persuasion and TEK of Native leadership</td>
</tr>
</tbody>
</table>
CHAPTER 3

Methodology

Leadership is a difficult concept to define because it is abstract, broad, and subjective (Nygard, 2002). It can be even more difficult when one tries to translate western leadership terms into tribal concepts. Therefore an in-depth study of leadership is usually limited to analyzing the tangible characteristics of individuals or organizations (Nygard, 2002). To address issues beyond individual or organizational measures an in-depth case study model was used for this research. A case study defined by Helen Simons (2009):

Case study is an in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project, policy, institution, programme or system in a "real life" context. It is research-based, inclusive of different methods and is evidence-led. The primary purpose is to generate an in-depth understanding of a specific . . . system to generate knowledge and/or to inform policy development, professional practice and civil or community action. (p. 21)

In this research, the case study model involved mostly qualitative methods with some addition of secondary quantitative and qualitative data. This process allowed the researcher to focus on and analyze the effectiveness of leadership response to three specific climate change events in the community. Data was collected over a period of two years as the researcher lived in the village. All methods employed for linking leadership models and successful resiliency outcomes came from three climate change events experienced by all members of the community. This shared experience allows for a common evaluation and analysis. As these three events were all recent, community members participating in the research had a shared knowledge and were able to assess how leadership worked in all three cases.
To ensure internal validity, the researcher used multiple sources and comparative techniques in the data gathering process. Collection methods included individual semi-structured interviews, records of public testimony, analysis of media reports, and secondary statistical data generated by Native organizations, the state of Alaska and the Federal government. Data included field notes from participant observation; recorded interviews with formal and informal leaders; State and Federal testimony; and visual analysis of photographs demonstrating the impacts of climate change in the village.

Semi-structured interviews were conducted with 16 residents of the village. Of those interviewed 11 self-identified as Inupiaq and five self-identified as white. Additionally, six were Inupiaq elders, and four were current village leaders. Contact in the form of email correspondence and phone conversations were also made with various agencies involved with climate change and village resiliency. These agencies included: the Alaska Division of Homeland Security and Emergency Management, Alaska Fish and Game, State and Federal Disaster Preparedness and private firms responsible for reports on relocation and erosion prevention. Secondary quantitative and qualitative data was drawn from documents and testimony including; the Army Corps of Engineers, the Government Accounting office, National Oceanic and Atmospheric Administration, the Alaska Immediate Action Workgroup, Denali Commission, city board meeting minutes, and Congressional testimony.

**Data Analysis**

To identify patterns in the data collected I performed a co-axial data analysis of interview and meeting transcripts to identify themes, concepts, and patterns. This was
done through a process where the variables were systematically examined for pattern identification and theoretical development. Each pattern identified was coded in order to conceptualize and organize the data. The data was then recorded in each of these themes. Main themes identified included: 1) climate change events, 2) acceptance of leadership by community, 3) community perception of the effectiveness of leadership, 4) community perception of cooperation, 5) community perception of leader success in addressing the different climate change issues.

**Document Content Analysis**

While no original statistical research was done for the purpose of this project, statistics from secondary data sources were reviewed and included. These data sources included documents from the Alaska Fish and Game, State and Federal Disaster Preparedness, Army Corps of Engineers, the Government Accounting office, National Oceanic and Atmospheric Administration. Qualitative data was also included from secondary data sources such as documents and testimony from the Regional Advisory Council, City Council minutes, Alaska Division of Homeland Security and Emergency Management, the Alaska Immediate Action Workgroup, Denali Commission, city board meeting minutes, and Congressional testimony. All of the documents were analyzed in order to understand leadership roles of various institutions and their effectiveness in building community resilience. They were coded with the five themes noted above. I also used these documents to develop a timeline of when and where issues moved from local to state or federal jurisdiction.
Ethical Considerations

The Institutional Review Board (IRB) provided approval and oversight for this research. Because this research did not deal with youth under 18, categorized as a vulnerable population by the IRB, no special consideration was required.

In this research, additional ethical consideration was given to the fact that the research being done was dependent upon the participation and support of the local Inupiaq population living in the case study village in Alaska. To ensure that the research was done with full ethical consideration the researcher used the “Ethics and Protocol” developed by the Alaska Native Science Commission as an ethical guideline (see Appendix A). Participants were also given an Informed Consent Document to read and sign. The purpose of this document was to fully disclose the intent of the research and provide information to the participants as to their rights (See Appendix B).
CHAPTER 4
Leadership Models in the Case Study Village

Three leadership models are currently present in the study community, which were previously outlined in the theory discussion. Each model is evaluated on its effectiveness to meet stated goals. The first model outlined is the Native leadership model implemented to respond to the increasing severity of fall storms and village flooding. The second model is the rational bureaucratic model, which has been employed in the village to protect and secure the eroding shoreline. The third leadership model is the adaptive co-management model used by the village and State of Alaska to manage moose populations.

Native Leadership
Emergency preparedness and implementation

As stated earlier Native leadership is leadership built on relationships. It is seen as holistic, and includes traditional ecological knowledge (TEK). Native leadership positions are not sought after but instead leadership is recognized in an individual, especially in one’s ability to persuade others to do what needs to be done (Nichols, 2004). Native leadership is time limited and not a profession. This non-hierarchical leadership moves from person to person as the situation unfolds.

In the following analysis, I look at how Native leadership has been used by the village to prepare for and implement strategies to deal with the increasing severity of fall storms due to climate change. I first detail the context of the problem explaining how the increasing severity of the fall storms is affecting the village. Second, I outline how the
leadership style has been used by the village to build resilience. I conclude with a discussion of the effectiveness of the Native leadership style in this context.

**Background and Context of the Climate Change Event**

Climate change has made the fall storms that take place on the coast of Alaska, more frequent and more dangerous. The sea ice that forms along the western and northern coasts of Alaska is thinning and retreating, leaving the coastline ice-free for a greater portion of the year. Without the protective barrier of the sea ice the shorelines are more vulnerable to waves and storm surges (Battisti et al., 2011). The loss of the protective sea ice combined with stronger fall storms and stronger winds have increased the incidence of village flooding.

The case study village, located at sea level and completely surrounded by water and wet lands, is in great danger from storm surges and flooding. A storm with high water and surge can completely overwhelm the village. Figure 4.1 shows the location of the case study village in relation to the ocean, the river, and the backwater slough. The photo clearly demonstrates the vulnerability of the village to storm surges and flooding.

![Figure 4.1 Case study village. Photo taken by the author 2009.](image)
The village saw devastating storms in 2003, 2004, 2005, 2009 and 2011 (GAO 2003; Overland, Key, Kim, Kim & Liu, 2012; personal communication, 2012). The Bering Sea storm of November 2011 was one of the most powerful storms on record to affect Alaska and caused extensive coastal flooding. The storm reached category 3 hurricane status as the storm's forward speed exceeded 100 km/hour with 35 foot waves (Overland et al., 2012). One village resident described the 2011 storm in the following manner:

Down by the cannery the river was flowing reverse way up the river. It looked like the Colorado River flowing in reverse. If they would not have raised the road the river would have been over it. The river was 10 feet higher than what it usually is. All the way to the snow fence. The water was way up, way out there, and moved all the wood around. One of the things that I thought was so interesting, [was] that the flood left behind these massive pieces of ice from the river. There were chunks of ice as big as a living room, as big as a building, all over the place.

The city manager described the same storm this way:

The water started coming in 20-30 miles an hour in the mouth. It just took a matter of minutes for the water to reach the Beach Road. We would have been in more dire straits then what we were if the road would not have been there. The waves were getting pretty close to the building, this building [the city office and command center]. Right out here, I was watching the pile of drift wood [8-10 feet long] right behind you moving around like toothpicks. Over by that house there it was a river running down the road.

It is left to the leadership of this village to determine how to handle this dangerous situation. There is no outside entity to help the village prepare for and respond to this crisis. Like many tribal communities, the case study village has assumed the responsibility for emergency preparedness within their community. Local control of
emergency preparation was established as part of the Indian Self-Determination Act (Grinnell, 2011). Due to this unique relationship, the Federal Government provides only technical assistance and support during an emergency. The responsibility of preparing for, and protecting the village from, emergencies falls to the tribal village. The only time a tribe can request oversight by the Federal government is if an area is declared a presidential emergency or a disaster area (Grinnell, 2011). If a presidential emergency is declared, Tribes are eligible to receive support and resources from the Federal Government. The fact that the Federal Government provides no leadership for emergency preparedness and response on native land has left a vacuum that allows for the development of a unique Native leadership style.

The preparations for, and implementation of, village emergency preparedness provides a window into how this Native leadership model, a leadership model built on relationships, persuasion, and TEK, works in this complex and life threatening situation. It demonstrates how decisions are made and strategies implemented without professionally trained leaders, in a culture that is non-hierarchical, and believes leadership moves from person to person in any given a situation.

**Preparing for the Storm**

We knew we had to do something. We have always been very proactive. Why? Because it just needs to be done. You know one of the things that, for whatever reason, was recognized early on is that we needed to work together and be forward thinking.—Village Leader

To prepare for, and respond to, the increasing severity of these fall storms the case study village looked to the leaders that exemplified the Native leadership model. An excellent example of this is the city manager, the man hired to deal with this crisis, a
man without higher education. The city manager is a local Inupiaq man, he has no qualifications for the job other than his innate skills at building relationships and knowing his community’s strengths and weaknesses. He never aspired to leadership. He describes himself this way:

People ask me what I do for the city and I tell them I am a servant of the city. I don’t see myself as a boss and I don’t see myself as a leader. I am a servant, that is what my position is. And so I go and try and serve the community as best I can.

When discussing how people in the village become leaders in the community the City Manager paused, confused by the question. He explained:

We have a lot of good leaders in our community who step up and take their job seriously. I don’t know exactly how people learn to be leaders, I don’t know, it is just to some of them it comes really naturally, and some of them they learn the process as they go through, you know, working on different problems.

What is noticeable in his description is the lack of educational experience, or professional qualifications. To be a leader is a natural talent or a skill that is learned through experience.

The city manager is responsible for preparing for emergencies and leading throughout those situations. One of the ways a City Manager can accomplish this is by creating and implementing an emergency plan. When asked if the city had a written plan listing individual responsibilities and hierarchy of duty for emergencies the City Manager answered:

Ya we have one, it is fairly old we have not touched it for while that I know of. Since I have been here [seven years] we have never touched it. You know we just learned do the incident commander and the different steps about how to prepare for disaster and who to try and contact and stuff. But we already just knew who would be good, we wrote it down but have not looked at it in years.
When an emergency happens, leaders in the community just know who will do a task. Like many small towns where everyone is known, responsibilities can be more fluid and leadership is about knowing how your individual community works.

The city manager relies heavily on TEK. When asked how knowledge is gained in order to protect the city he provided this example:

We know how to help the village. The State Department of Transportation elevated the evacuation road on this side [on Department of Transportation property]. Eleven months after they did it, it looked like a bomb had hit it, rocks all over, from a storm. Eleven months after it was constructed, but we kinda knew that would happen because they used too small of rock and we thought the design was flawed but they thought it was a good fix to that problem... We provided a lot of information and photos to the State DOT on that project but they did not use it.

Additionally, the fall storms have exposed and damaged the only water line bringing fresh water into the village. The next storm may ruin it completely. The village used TEK to inform where and how the line needs to be moved. The City Manager described the situation this way:

We looked at different options of moving the water transmission line. We really pushed for North River. We knew it was cheaper to go to North River and it had better water, and more water, than we are receiving right now from [the current source]. They [State funded Village Safe Water] did not listen to us so we asked them to do a study. They came in and we discussed with them the different possibilities... Their report showed it was two or three million dollars cheaper to go to North River. Finally they did listen, they said it was okay [to do the project].

Another important leader protecting the village from fall storms is a local Inupiaq man responsible for transportation infrastructure in the region. His position is not a state-paid position; he does not have the qualifications for that job. His paycheck
comes from a regional non-profit set up to help villages. He admits freely that he is not a professional leader. “Now, in a village, you can only have so many professional people working and I am not a professional by no means” (personal communication, October 29, 2012).

Regardless of his lack of professional qualifications he was instrumental in funding and organizing the building of two of the most important pieces of village infrastructure to deal with the storms. The first was the improvement of the road along the beach that serves as a wall between the sea and village. The second was an evacuation road over the slough and up into the hills. This leader was able get village approval, find funding for, and organize both of these projects. The village leader stated:

In some areas we elevated almost 3 feet of that road and that was really huge. The previous two the floods, 2011 and the one in 2009, would have flooded us. We elevated that road a month before the storm [2009]. That was really huge, that kept a lot of water out.

His work getting those projects completed before the storms hit the village was one of relationship building and persuasion. In Native leadership the building of relationships and persuading others to work with you often includes the telling, and selling, of your story to those outside your community:

In the summer time we host. We invite a lot of people out here. We invite people from the Federal and State agencies, [our youth] take heart to what good hosting can do, you know. You really need to sell your story and make a good argument cuz it is so competitive out there for funding.

He goes on to explain that there is no one leader in the community hosting these events, but that everyone is involved. “It is not just one person. There are so many involved and this community is an exceptional community when it comes to
cooperation between the city, the tribe, and the corporation.” He too views himself as a servant of the city stating; “I reflect on what I do. It’s like I get paid to improve the lives of my children, family members, and our people. That is awesome.”

The work of building the roads started with the relationship building and persuasion between all three village entities, then the regional non-profit corporation, and finally combining the needs of these four entities with Federal and State programs. This village leader explains that once the village and regional corporation were on board, then the relationship building extended outside the village:

The building of the roads was a combination of Army Corps of Engineers, Department of Transportation, Indian Roads, State capital budget, and the Denali commission on transportation. So there were five funding partners in that project.

Many village members, throughout this research project, commented on the protection that roads have provided for the village. When talking about the storm of 2011 one village member stated, “If they would not have raised the road the seas would have been over it.” Another commented about the same storm, “You know, the road was lower before. When it was lower it [the village] filled in with water and we were almost as surrounded as an island by water. What has saved us these last storms was that [the road] recently got built up.”

The use of TEK has been of great value to the leaders of the village as they prepare for the fall storms. The same village leader also stresses the use of TEK to
inform his decisions and to help get projects done in the village. He has found the acceptance of TEK is dependent upon each agency with whom they work:

We provide them [Federal and State Agencies] knowledge from our experiences. I think many agencies tend to not give enough merit to that. Like with the fisheries management, it is our frustration that they do not give enough merit to traditional knowledge and fortunately with dealing with our flooding and erosion issues both the State and the Federal agencies have given lots of merit to traditional knowledge as far as we are concerned.

The next task for both of these leaders is to try and persuade village members to move their homes away from the traditional village located between the sea and river and up into the hills. By moving homes away from the sea and river, the village will be better prepared to deal with emergencies pertaining to the flood, sea surges, and erosion caused by the fall storms. This is a difficult undertaking as traditional Inupiaq villages have always been located at an apex between a river and sea. In addition the entire infrastructure for the village, including the store, school, airport, and fuel tanks, are also located at the current location next to the Arctic Ocean. Inupiaq families have always lived close to each other, and the idea of individual plots of land where each house is separate from another is also a difficult concept for some members of the community to accept. Regardless of these facts, leaders in the village realize that moving homes away from the sea is the safest place for families to be. Instead of commanding people to move or evicting families from the homes in most danger, the leaders of the village decided to persuade people to move by holding a lottery and making the land very affordable:

We had a lottery for the first time and sold some portion of land. We’re not moving the community, we are just relocating some people or making some land available because we are tight in housing here. We are on a spit and we have no more room to expand to and it is safer on
the hill then it is in town. We are eventually hoping to develop the whole hill side up there we will do it in phases. We are hoping that in 20 years the village looks different. I am sure there will still be people living down here on the spit. I don’t think they will ever go away.

This quote, describing the process of moving families up into the hills, exemplifies the Native leadership style. Families are persuaded and supported to move up to the hills. No one is forcibly moved and there is the understanding that some in the village may never move away from the sea despite the dangers.

**Leadership During the Storm**

The previous analysis outlined how village leaders are preparing and implementing strategies to deal with the extreme weather dangers that accompany the fall storms. Once the storm hits the village has a need for a different set of leadership skills. One community member explained how organized the village was during the crisis of a severe fall storm:

I just love how organized our community is during a storm. Everyone just helps out everyone else. This last big storm they came to our house and told us that everyone had to evacuate. The winds were so strong that they had to tie us all together. The wind was over seventy miles an hour and the water....the water was so high it was like a river by the city office and the bridge was scary, driving over the bridge the water was over it, we had to hurry, they were going to close the bridge.

Preparing for the storm, the village needed leaders that were forward thinking and could persuade villagers and outside agencies to work together to protect the village. These skills were demonstrated by two individuals that did not consider themselves leaders, but were recognized by the community for having the needed skills. During a storm a different type of leadership is needed. In a Native leadership model
the movement from one leader to another is natural and encouraged. The city manager explains his role during a storm as bringing everyone together:

We just contact the entities in town, the Native Corporation, the Clinic, the school district, the police department, the State of Alaska DOT, and the construction company. We ask them to send representation over and then anyone else that may be interested in helping.

After all are gathered, leaders are identified by the group. One wife explained how her husband got the job of incident commander: “My husband is a good leader because he knows how to make things happen and he is very quiet about it. He has knowledge and everyone calls him. They put him [her husband] in charge of the command center, organizing everything” (personal communication, October, 2012). The village recognized this leader’s skills in staying calm in a crisis, quietly organizing things, and persuading others to work together, therefore he was the natural choice for that leadership position. The wife then goes on to explain how that leadership switched when a different skill set was needed:

[Her Husband] was the Commander except for when all the media showed up. He did not want to talk to the media. When they asked who the Incident Commander was he told the media that [another man] was the Incident Commander! (Laughter) He just pointed at [another man] and said he is the one to talk to. [The other man] walked them around and talked to all of them. He loves to do that, and that way [my husband] did not have to talk to the media.

This flexible leadership style, moving smoothly between one leader to another, works so well in this community that the city manager explains roles are not dictated by the Incident Commander, instead he just asks the group who would be the best person for a task. The city manager explains:
Roles are not really delegated. We just ask for volunteers and then people will volunteer to do certain things. Like I said, we know they are reliable people, they will follow through with what they are in charge of. You just work on your task and know that the other people are being taken care of ... that is a big relief to have such responsible people. I think it is just everybody caring for each other and, um like we serve pretty much the same people, we serve everyone in the community.

While leadership flows between specific individuals, it seems not to flow between the genders. The research demonstrated that the emergency personnel working at the command center are almost entirely male. Despite the fact that the current mayor and the Tribal Chief during the storm of 2009 were both women neither were mentioned during the interviews. Women play a different role in the community during the emergencies. When asked about women’s roles one male leader stated; “Oh yeah! Like at the command center. It is a smorgasbord, there is more food then you really need, and the community always pitches in very well” (personal communication, 2012). Food, shelter, health care, the children, and the elderly seem to be the focus of the women’s leadership. As with the roles held by the men in the village, there was no hierarchy between the women’s leadership. One woman explained her role during the storm this way:

The storm [2009] we offered to house people. We took in two families and another couple and two dogs. Everyone brought lots of food, the ladies were cooking up a storm and the kids thought we were having a big party. I think we counted about 15 extra people. [My daughter’s] big story was that one of the visitors was a lady who is a bit of a celebrity for dog mushing. She was here filming GCI commercials and got caught in the storm.

The second time [2011], it wasn't so crowded. We did have two families up for two days. They were forced to evacuate the Beach Road. I think we had about 7 extra people and a dog this time. Again, we just stayed around the house visiting, feeding people, and waiting out the storm. We occasionally took turns going into town to check out the conditions. But mostly just waited and hoped for the best.
This local woman was not “in charge” of providing food, shelter, and safety, for those evacuated from the dangerous coastline. She was not even asked by those who were organizing village safety to provide space for evacuees in her house. She and her house were just known as a place people could go to if there was need. A non-native couple living near the coast talked about the evacuation and finding a safe location to wait out the storm this way:

During the storm you would certainly be invited and welcome anywhere you went. If you showed up at someone’s house, like if we went to [a certain person’s] house, or [names the house and person quoted above] or whoever else lives up there [on the hill away from the dangerous shoreline] you know it would be like “come on in” it would not be like “what are you doing here?”

Another local man that volunteered at the command center talked about how his wife was taking care of other evacuees and providing them with food and shelter, “I think like last year when we had the flood we had 20, I think 20 adults and kids at our house. I was down here working, but they were up there nice and safe” (personal communication, 2012).

Such specific gender roles help to organize the informal delegation of responsibilities to members of the community. The fluidity of leadership, lack of hierarchy, the focus on persuasion as opposed to command, and reliance on gender specific roles, all demonstrate how the Native leadership model is used to prepare for and implement emergency strategies in response to the increasing severity of fall storms brought about by climate change.
Conclusion: Leadership Style Effectiveness

The local population of the study village believes that their style of leadership is effective for building resilience to the increasing severity of fall storms. The research provided in this study supports this claim with a few limitations.

Certainly, a style of leadership that allows for traditional ecological knowledge and is built on relationships and personal characteristics, as opposed to leadership based on professional credentials, has worked well for the community. The research also demonstrated that, in this cultural context, the use of persuasion instead of command is the most successful method for effective leadership. A village leader and elder sums up village leadership this way:

Not one person leads, but a collection of a bunch of incredible leaders, both native and non-native, lead. You know if you want me to name names I sure could, I would be happy to. Sure I mean, sure we could name names, and people are given credit when credit it due, but we don’t need to do it.

This comment clearly demonstrates the effectiveness of this leadership style in the study village. It exemplifies the foundational belief that leadership is shared, communal, and moves in a circle. Names can be named but neither the community nor the individual leaders “need” the recognition. The belief that the community has “a bunch” of leaders demonstrates, how in this leadership style, anyone can become a leader given the right context.

There are challenges with the use of this leadership style. Two challenges highlighted in this research are the lack of financial resources to implement some of the desired emergency preparations, and the conflict caused when the local Native
leadership style must integrate with the rational bureaucratic leadership style outlined in the next section of this paper.

These two challenges often appeared together in the research for this project. The case study village has few financial resources and must work with organizations outside to finance village projects. This can prove difficult as rational bureaucratic organizations, such as banks, require a hierarchical structure with well-defined leadership roles. One example of this challenge can be seen in the moving of village households away from the dangerous sea shore and up into the hills.

Village leaders agree that opening up land on the hillside owned by the Native Corporation and allowing families to use those lots and build houses would make the village safer. Farther inland and up on nearby hills houses would not be in danger from storm surges, flooding, or erosion. The proposed new housing sites are located on Native Corporation land. Because of this, the decision was made not to sell the individual pieces of land but instead let families lease. This way the land could still be owned communally by the village as is the tradition in this culture.

Instead of commanding families to move, or selling lots to for the highest price, village leaders encouraged families to put in for a lottery. Each family entered into the lottery would have the chance to “win” a lifetime lot that they could lease from the corporation for $3,000. One village leader stated, “$3,000 is less than half of what an acre costs but we wanted to say okay we will help you as much as we can to get a portion of land and build a home” (personal communication, 2012).

These leadership decisions again demonstrate the Native leadership model, using persuading instead of commanding and by providing all families with an equal
chance to “win” a lease to the land. The problems arose when the community then worked with outside organizations to fund the project. One community leader described the process this way:

So our policy for the Village Corporation is that we grant, [land] lots to shareholders with a lifetime lease with their children or designated family members first right of refusal upon their death. So if someone were to build a home, their offspring or family member could fill out an application and acquire that property for their lifetime. That way [the land] is always retained in Native ownership. It has been hard to do ... because the banks have been reluctant to do business with people that don’t outright own the land.

Native leadership chose a solution to the housing problem based on the value system of the community culture. The solution was contextually appropriate but ineffective when forced to integrate with an outside rational bureaucratic organization, like a bank.

Another village leader expressed his frustration working with banks in order get funding for his own house up on the hill:

Building a house is very expensive here and [it is] very hard to get a loan in rural Alaskan communities. They [the banks] have changed the banking regulations so much you cannot get a loan. My wife and I, you know, we both have very good jobs and very good credit scores and stuff , and it was like worse than getting a root canal trying to get the loan. It was almost impossible.

The village leader explained that the community was trying to come up with a solution that would meet the needs of the banks and the needs of the community:

We don’t have a grant or loan program right at the moment but we are working with the Native Corporation. They [the Corporation] kinda worked up a program where they have contacted different banks and different organizations to try and help. The Corporation can help do the foot work and let the banks and different people know that it can be done. There might be like a pilot project to help not only [this village] but the surrounding villages as well.
Trying to move homes away from the shore and up into the hills clearly demonstrates the challenge of using the Native leadership model in situations where an outside agency is needed for financial or program support. We will continue to see this struggle as this paper goes on to discuss the rational bureaucratic model as it is used within the community to build resilience to climate change events.

Rational Bureaucratic Model
Creation and Implementation of a Seawall to Protect the Eroding Shore

The rational bureaucratic model of leadership is often described as a pyramid with the professionally credentialed leaders at the top and the un-credentialed population at the bottom. The goals and objectives are often developed with little or no input from those outside the bureaucracy. Decision-making power and access to resources is held by an elite few, and public input is accepted only through formal channels (Battisti, Barcelos & Marlow 2011; Armah, Ayan & Bernard 2009).

In the study village, the rational bureaucratic model of leadership has been used to build resilience to climate change events. The research for this paper looked specifically at the planning and development of a sea wall to protect the eroding coast line. In the following analysis, detail is given as to the background and context of the problem, explaining how the rapidly increasing erosion of the coast line is affecting the village. Next, the rational bureaucratic leadership style is outlined as demonstrated by the United States Army Corps of Engineers (USACE). USACE was contracted by the village to help build a sea wall to protect the village from shoreline erosion. Last, an analysis and conclusion are provided discussing of the effectiveness of the leadership style in this context.
Background and Context of the Climate Change Event

Alaska has 34,000 miles of coastline. The coastline constantly changes due to wave action, ocean currents, storms, and river deposits and is subject to periodic yet severe erosion (Battisti et al. 2011). Ice jams and flooding of riverbanks during spring break-up change the contour of valleys, wetlands, and human settlements. Inupiaq settlements used to be temporary; the Inupiaq moved from place to place following salmon runs, whale hunts, and caribou migrations. The last century has seen the permanent settlement of these villages. Coastal Inupiaq, like those in this community, chose as their permanent settlement locations close to the sea and rivers, often settling on barren sand spits situated between the two. The location of these coastal villages makes them incredibly exposed and susceptible to the natural occurrence of buildup and erosion caused by river and ocean ecosystems.

Global climate change is accelerating the process of coastal erosion in North Western Alaska. The permafrost responsible for holding these villages together has been thawing at an increasing rate in recent years due to rising temperatures (US GAO, 2003). The accelerated erosion rate is due to the fact that subtle change in temperature causes extreme reactions; life in the Arctic depends upon staying below the 32 degree tipping point of ice into water. Moving from 31 degrees to 33 degrees changes everything: ice melts and permafrost thaws. These changes are leading to an increasing pace of environmental change and are having significant impacts on communities, including accelerated coastal erosion (Battisti, et al. 2011).
The United States General Accounting Office did a study outlining the erosion and flooding dangers faced by coastal villages in Alaska. They found that 31 of Alaska’s Native villages are in immediate danger due to flooding and erosion caused by climate change (US GAO, 2003). After this study a subsequent investigation, conducted by the Army Corps of Engineers, designated 26 communities “Priority Action Communities,” meaning these communities were at high risk for destruction due to flooding and erosion (U.S. Army Corps of Engineers, 2009).

In the past, these communities would have simply moved away from erosion sites, but as these communities have become tied to the land through infrastructure development, it has become more and more difficult to move away. Figure 4.2 is an example of the damage that the severe coastal erosion has had on the case study village. The house pictured is still being lived in by a family but will soon be uninhabitable due to coastal erosion.

![Figure 4.2 House on the eroding coast line. Village economic development plan. Source: (Local Hazard Mitigation Plan, 2008, p.1 )](image)

The case study community must find a way to build resilience by either reducing coastal erosion or moving the village, and its infrastructure, away from the coast. Both
solutions are beyond the fiscal ability of the village. The village lacks the funds and capability to independently lessen the erosion or move village infrastructure. To accomplish either task leaders in the village realized they required the assistance of outside agencies to help them protect the village from the effects of climate change.

**Army Corps of Engineers - Cost-Benefit Ratio**

Members of the study village, along with other affected villages in the region, began reaching out to their congressional representatives in the 1990’s asking for assistance. What they found was that sea walls were being used as a substantial way to protect coastal villages from the effects of coastal erosion. They were encouraged by the fact that Federal Government and the Army Corps of Engineers could assist communities protecting valuable public infrastructure from chronic sea coast erosion. With this knowledge in hand the community leaders approached the United States Army Corps of Engineers (USACE) for assistance.

The USACE is an engineering agency located within the Department of Defense and is under the command of the U.S. Army. The USACE operates under the authority of a military officer, who reports to the civilian Assistant Secretary of the Army for Civil Works (Battisti et al., 2011). USACE is an excellent example of the rational bureaucratic organization. Each position within the military not only has a professional credential associated with the level of authority, but leaders within the organization must move up through the ranks of the closed bureaucracy itself. This allows very little influence or power to be given to those outside the organization.
The United States Congress approves all USACE civil works projects. These civil works projects are highly valuable to members of Congress because they can bring money and jobs into a Congressman’s state. As a result, USACE has a strong and close relationship with Congress (Battisti et al., 2011). Despite the fact that Alaska’s Senator Ted Stevens was the chair of the Senate Appropriations Committee at the time, he could not authorize a USACE project for shoreline stabilization in rural Alaska due to the cost benefit-ratio rule.

The cost-benefit ratio is “an accounting framework in which benefits and costs associated with a decision are set out for purposes of information and discussion” (Armah, Ayan, Bernard, Blumenthal, Fortmann, Garretson, Godwin, & Runolfson, 2009;25). A cost-benefit ratio provides objective information as to how expensive a project will be in relation to the number of benefits it will have to a certain number of individuals. The decision-makers then use the cost-benefit ratio to compare the costs of a project against the benefits. If the costs are low enough or the benefits high enough, the project will be allowed (Armah et al., 2009).

The high cost of rural Alaska shoreline erosion abatement projects and the low population density resulted in a high cost to benefit ratio for the construction of a sea wall. The case study village, along with the other affected villages in the region, was denied assistance by USACE because the cost-benefit ratio was too high. One community member noted:

It was not just our community. It was [five other villages] that had some pressing USACE projects. USACE kept on coming back and saying cost-benefit ratio is not there, cost-benefit ratio is not there, for any rural Alaskan project. So no rural Alaska project, none, [could get funding] due to the cost-benefit ratio. It was a long uphill battle.
Rational bureaucratic organizations are structured so that decision makers are not accessible to the public. Community leaders in the case study village could not plead their case. There was no way to gain an audience with USACE, and even if they could, USACE was required by law to follow the rules of the cost-benefit ratio. This demonstrates a fundamental characteristic of the rational bureaucratic leadership model: formal hierarchical structure is purposely impersonal, and order and rules are held in higher regard than individual needs (Ogbor, 2000). One village leader explained the situation this way:

USACE kept telling us no. It was all very bureaucratic. [It was] very hard to be heard. We kept running into road blocks. There were 14 agencies early on trying to piecemeal the project and make something happen. We worked on this from 1999 to 2003.

Rational Bureaucratic Leadership stalled. They were unable to help the village move forward even though the United States General Accounting Office clearly stated in its own report that prevention in the form of a sea wall was the best course of action (GAO, 2003).

Knowing that a sea wall was one of the best options to protect the village, local leaders did not give up. Instead they used their relationship building skills to find a way around the problem of the cost-benefit ratio. One village leader explained the situation this way:

The villages worked together to come up with resolutions to present to the Alaska Federation of Natives and to take to Congress. We also worked with Senator Stevens who came out to the village. We were all very persistent and would not take no for an answer. Sen. Stevens was very supportive and eventually worked with us to help pass Section 117 of the FY 2005 [Energy and Water Development Appropriations Act]. Section 117 allowed ACE to override the cost-benefit analysis ratio when considering erosion control in Alaska.
By working with the Alaska congressional delegation, and the Alaska Federation of Natives, the affected villages were able to pass Section 117 of the 2005 Energy and Water Development Appropriations Act. This new section allowed projects constructed by USACE to be funded at full Federal expense and did not require that those projects be justified by using the traditional benefit-cost ratio test (Armah et al., 2009). The USACE could now begin construction of the sea wall.

**Making Rational Bureaucratic Leadership Work in a Native village**

Because of the hard work and effective relationship building of local leaders, USACE now had permission, and funding, to undertake coastline erosion stabilization projects in rural Alaska. USACE now held the leadership position on sea wall and erosion abatement projects in the case study village.

As stated earlier, one of the characteristics of a rational bureaucratic organization is that there is little input from those outside the organization. One local leader described the experience of village leaders with outside agencies as “It is our frustration that they do not give enough merit to traditional knowledge” (personal communication, 2012). Another village leader stated his concerns about working with the Federal Government, and specifically USACE, this way: “I think the feds are the hardest to work with. They are further away, and a big bureaucracy. They do not know the small rural communities in Alaska and probably, maybe, rural communities anywhere” (personal communication, 2012).

Historically USACE has had a reputation of being unresponsive and closed to suggestions and input from outside populations, including Native Tribes (Batsi, et al.
2011). USACE recognized that the exclusion of these populations was making the completion of projects more difficult. To remedy this situation the USACE established more rules and protocols to instruct the conduct of USACE personnel. The report by the University of Washington, outlining roles and responsibilities for relocating Alaska villages, states that:

USACE has made a substantial effort to improve its relationship with Alaska Native Tribes ... The USACE has established the Tribal Nations Community of Practice (TNCoP), which aims to strengthen the partnering relationship between Alaska Native villages and the USACE with regards to water projects. The TNCoP’s purpose is to change the culture of the USACE to be more respectful to tribal rights and needs and to enable USACE personnel to incorporate the tribes into decision making (p. 22).

As this comment clearly states, the culture of USACE has not historically been open to building working relationships with Native Tribes in the past. To remedy this problem the rational bureaucratic organization imposes rules and protocol instructing its leaders to build relationships with Native communities and incorporate the tribes into decision making.

To comply with the TNCoP new rules and regulations, USACE created opportunities for local leadership inclusion. In the Baseline Erosion Assessment report by USACE, the organization states that they would try to include input from local stakeholders in the affected areas by “assembling a coordinated team of Federal, State, Tribal, and local stakeholders to assist in identifying problems, developing criteria for assessing those problems, and disseminating the compiled information” (2004:1). To accomplish this goal the USACE helped to organize a group to address climate change and erosion within Alaska. This group, the Immediate Action Working Group, (IAWG) is a collaborative effort consisting of senior leaders from several State and Federal
agencies and is co-chaired by the Deputy Commissioner and the Chief of Engineering Division of the Corps Alaska District (USACE).

Although no local leaders sit on the committee or have decision making power, local leaders believe the IAWG has been effective. One local leader described his experience with IAWG this way:

We were invited to speak to the Immediate Action Work Group...IAWG which is the work group, a highly successful workgroup, because it consists of high level staffers from both the State and Federal government, Army Corp of Engineers, Village Safe Water, and State Department of Commerce. There was just a really a good mix of Federal and State staff members on the IAWG. I did not serve on the IAWG but they had asked the villages that were identified in the General Accounting Office report of 2003 to do presentations for it.

The USACE set out to assemble a coordinated team of Federal, State, Tribal, and local stakeholders to assist in developing and implementing strategies to build resilience to climate change events. We can clearly see the rational bureaucratic model in the way the group was formalized. This group, led by the Chief of Engineering Division of the Corps Alaska District, is full of credentialed, professional elites. Non-credentialed community members are invited to speak to the panel, but not to be on it. This hierarchical system that allows public input only when invited clearly demonstrates one of the fundamental characteristics of the model, that decision-making power and access to resources is held by an elite few; public input is accepted only though formal channels (Battisti et al., 2011).

Further on in the Baseline Erosion Assessment report USACE continues to describe its diligence in complying with the new regulations intended to make the USACE more open and inclusive:
To ensure appropriate coordination with the Alaska Native Tribes and rural communities, various letters were sent to Tribes and communities. An initial letter was sent to each Tribe and community, informing them about the study and asking for input. For many rural communities, a second letter was sent—one to the mayor and another to Tribal leadership (2004; 3).

This attempt at inclusion made an impact on the local population. The little bit of courtesy made local leaders felt heard and respected by USACE officials and staff.

One local leader stated that:

The nice thing about working with the corps is that they sent lots of staffers here to present different ideas and come up with joint recommendations. [They] made sure the community blessed their recommendations. The community would think this should be done but the corps would explain to us that if that was done that way then over a 50 year period we would have problems. Like we thought abutments would be the answer to our problems down here but the wear and tear of the wave action on abutments over a 50 year cycle would be really high compared to what we ended up accepting from their recommendations, which was the rip-wrap.

This comment demonstrates that changing the USACE culture through rules and protocol seems to have made a difference in its relationship with the local population.

Another leader even stated that USACE listened to traditional knowledge: “Fortunately when dealing with our flooding and erosion issues, they have given lots of merit to traditional knowledge” (personal communication, 2013).

By 2012 the sea wall was mostly completed. One local leader described the village success in getting the sea wall built this way:

If you reflect on what really happened we were denied [funding] in 2000 for a project of less than a million dollars. Here we are almost 12 years later with an almost 38 million dollar project. It is just a matter of selling your story and working with agencies (personal communication, 2012).

The cost of the Sea wall in 2010 was $25,000,000 with $5,000,000 coming from the State of Alaska and the other $20,000,000 provided by USACE. This funding
completed 75% of the needed sea wall (USACE). Figure 4.3 shows a photo of the completed sea wall in the case study village.

![Completed sea wall in the case study village. Photo taken by the author in 2012](image)

There have been critics of the sea wall project and of the amount of money spent to protect such a small population. These critics support the cost-benefit ratio as a way to limit such expensive projects that benefit very small populations. A local leader responded to this criticism this way:

> You know some people might see it as handouts. But it is not handouts in the sense that we advocated and we did a lot of work, a lot of groundwork to get it to happen. The money was available, and was there, and the money needed to be spent. Whereas in other communities, [they] get the money when a catastrophic event happens like a flood, so they need money to fix it. We have just always been very proactive.

**Conclusion: Leadership Style Effectiveness**

The rational bureaucratic organizational leadership style, employed to build a protective sea wall in the village, accomplished most of its goals. The sea wall was mostly completed, has protected valuable village infrastructure, and will provide the
community with much needed time to move their village away from the shore and into the hills. That being said, this leadership style was not without its challenges.

The project never would have been started without the leadership skills of the local population that focused on building relationships and telling stories. It was the Native leadership skills of the local population that moved lawmakers to take up their cause in Congress. It is also important to note that this project may never have happened if the lawmaker that took up the cause was not Senator Stevens, the influential chair of the appropriations committee. Senator Stevens had oversight of appropriations, was very knowledgeable about USACE, and knew how to move through the impasse created by the cost-benefit ratio.

This leadership style also struggled in its effort to change organizational culture and become more inclusive. It took rules and regulations from within the bureaucracy to force public involvement and input into the project. Even then, the goals of public participation in decision making were not accomplished. The elite decision making group was still made up of credentialed professionals. Community members were only given permission by these professionals to speak to the group or to provide comment. Although members of the community felt pleased with the way the USACE treated the village, this speaks less to a new culture of inclusion and more about how exclusive the culture was in the past. Any step forward toward more inclusion was seen as improvement by the community.

The biggest challenge to employing this type of leadership to build community resilience to climate change events is the individual community’s lack of power. Without the power to make decisions or have some control over funding the village is left at the
whim of outside influences. This is clearly seen in the breakdown of the IAWG. The limited but important access provided to the community by the IAWG was lost when leadership changed and the IAWG fell out of favor with some politicians. Speaking on the status of the IAWG a community leader said:

Unfortunately they [IAWG] lost both of the co-chairs. The State Assistant Deputy retired and moved. The other co-chair was the Federal co-chair, she retired and then passed away right after she retired. Anyways those two co-chairs were lost and kinda got, it seemed like, it was not a high priority of the governor.

So when leadership within the organization changed and the IAWG fell out of favor with the local politicians, the local communities had no power to reinstate it. Local communities lost an effective tool for presenting idea and concerns to other agencies.

Now rural Alaska communities are faced with the very real possibility of losing funding for all future shoreline erosion projects. The USACE even predicted that something like this could happen and stalled shoreline abatement construction. The USACE Baseline Erosion Assessment for the case study village describes the possibility that although the leadership is mainly apolitical, all civil works projects require Congressional approval. They point out that with the recent recession, Congress asked the USACE to do more with less money. The USACE may be overestimating its capability to manage a growing project list with a shrinking budget (2003).

Then in 2009 rural Alaska lost the very important exemption from the cost-benefit ratio. That section of the law was repealed in the Consolidated Appropriations Act of 2009 and replaced with a Section 116. Section 116 reinstates the traditional cost-benefit ratio and communities are expected to pay up to 35% of the total cost. It is
neither possible for the Alaska Native communities to raise 35% of the total cost, nor are they likely to receive such funds from the State of Alaska or other sources (Battsi, 2011).

With a hard long fight the case study village was able to influence USACE, an exemplary rational bureaucratic organization, to plan and implement a sea wall in order prevent further erosion of the village coastline. This bureaucratic organization was slow to act, focused on rules and procedures, and provided community members very little input into the process. The goals were accomplished, but only by a great force of will by the community. Now this community and others like it are left without any recourse as funding disappears and the USACE is commanded again, by Congress, to limit its work in rural Alaska.

Adaptive Co-Management
Leadership to save the Local Moose Population

The new adaptive co-management model of leadership is defined by horizontal interactions among stakeholders, vertical interactions of communities with actors at other levels, combined with interactive learning on all levels (Berkes, 2009). Research suggests that the adaptive co-management leadership model is effective at building community resilience as local residents and government managers can take advantage of both local and regional observations of climate change events and engage local stakeholders in the decision-making process (Chapin et al, 2006).

In this third analysis, I look at how adaptive co-management leadership has been used by the case study village and the State of Alaska to implement strategies to deal with the declining moose population due to climate change. I first provide a historical context explaining the effect climate change has had on the local moose population,
and why moose populations are so critical to local survival. The next section outlines the complex jurisdiction regarding moose management and the interplay between stakeholders. The third section details the co-management leadership style that has been used by the village and the State of Alaska to address natural resource management. I then explain how this model spontaneously combined with adaptive leadership to form an adaptive co-management leadership model. The final section concludes with a discussion of the effectiveness of this leadership model to building community resilience to climate change events.

**Background and context for the climate change event**

As stated earlier in this paper, subsistence activities, activities that provide food, shelter, and warmth for a family, are at the very essence of the Inupiaq culture, economy, and way of life. About 90 percent of rural households are engaged in subsistence hunting and fishing activities (Goldsmith, 2007). This lifestyle is only possible because of the Inupiaq’s direct relationship with the ecosystem. Disruptions in the ecosystem can send repercussions throughout the entire community’s way of life.

The effects of climate change in the Arctic are clear and immediate in relation to one key subsistence resource—the caribou. Evidence shows that caribou herds are changing their migration patterns all over the Arctic due to the changing climate (Vors and Boyce, 2009). Caribou herds are moving north due to the effects of extreme weather events, most significantly, freezing rain. Freezing rain can ‘lock pastures’ under an impenetrable layer of ice; forage is then inaccessible to the caribou causing entire herds to starve (Vors and Boyce, 2009). Figure 4.4 shows a map of the declining caribou herds in the arctic. The red areas are all areas of significant caribou decline.
The arrow points to the approximate location of the caribou herd closest to the case study village.

![Figure 4.4](image.png)

**Figure 4.4** Red areas on the map are locations of declining caribou herds. Source: Walker, 2009.

Over the last 15 years the caribou herd that used to migrate through the case study village has moved over 100 miles to the north. As the people of this village are now based in a permanent settlement, they could no longer follow this migration, as was common in past practice, but are now reliant instead on an alternative wildlife resource in the area (Emery et al., 2012). In response to this changing migration of the caribou the local population turned to moose hunting for meat, as did the bear and the wolf.

The State Fish and Game Department estimated the moose population in the case study area dropped to only 71 moose in 2003 (personal communication, 2010). This number was well below the Alaska State Fish and Game management goal of 600–800 moose for the case study area (Brown, 2004). Using TEK the local Inupiaq also recognized the precariousness of the moose situation. One village leader described the declining moose population this way: “There were obvious signs the moose were in trouble. Moose were not seen, and the Inupiaq could observe this
locally. Something was wrong” (personal communication, 2011). Because of their close relationship with the land and the local wildlife, Inupiaq leaders, elders, and community members, knew that the moose situation was salient—indeed the immediate drop in population was creating a situation which directly challenged the long-term survival of the community and its people (Emery et al., 2012). The residents had lost the caribou, and now they were in danger of losing the moose as well.

**Jurisdiction to Save the Moose**

Alaska has only been a state for 50 years. State and Federal control over natural resources is in its infancy and is still challenged. Natural resource management is often contentious and difficult as State and Federal policy conflict with Inupiaq sovereignty and culture. These challenges are compounded by the drastic impacts effecting land, wildlife, and Inupiaq culture due to the effects of climate change.

In rural Alaska, natural resource management occurs at the village level, Native Corporation level, State level, and Federal level. The subsistence way of life is surrounded by a complex interplay of institutional processes that regulate, restrict, and manage Alaska Natives’ interactions with the environment (Carey, 2009). All of these stakeholders have part ownership in policy decisions as they affect any natural resource management issue. This makes natural resource management leadership in rural Alaska very complicated.

Wildlife crosses private and political boundaries and therefore is controlled by the State, as are rivers and the fish within them. The State has regulatory power over most of the wildlife policy. The Alaska State Fish and Game has the responsibility to protect, maintain, and improve fish and game, and manage their use and development in the
best interest of the economy and the well-being of the people of the state (Alaska Department of Fish and Game n.d.). The well-being of the moose was clearly within the jurisdiction of the Alaska Department of Fish and Game.

Moose may be under the jurisdiction of Fish and Game, but subsistence activities are a special consideration. Alaska state law dictates that the State provide a reasonable opportunity for subsistence uses first, before providing for other uses of any harvestable surplus of a fish or game population (Alaska Department of Fish and Game, n.d.). This provision gives Native subsistence users the right to harvest game on state land outside the Departments normal stipulations.

The Inupiaq are a sovereign nation and have never relinquished the rights to their land or their traditional way of life. As a sovereign nation, Tribes can deny non-natives access to subsistence activities. These non-natives are guests on Native Alaskan land and are often not permitted to participate in activities such as hunting or berry picking. This can cause conflict as Native Alaskans work to secure their own sovereignty over natural resources and exclude non-natives from participation, while State and Federal governments implement policy with no such restrictions and allocates permits allowing non-natives access to natural resources. Examples of this include the management of salmon fishing on rivers. Salmon fishing and river access is controlled by the State. Access to land and subsistence fishing activities are controlled by the Native Government. These two entities can be at odds placing the activities of non-natives squarely in the middle of long-standing natural resource management disputes.

Finding the appropriate leadership model to save the moose was a challenging activity. To bring the moose back all of these entities were going to have to share
information, observations, and most importantly, leadership. To do this the groups involved developed a unique adaptive co-management style of leadership.

**Co-management and the Department of Fish and Game Advisory Committee**

As stated earlier, the theory of co-management for natural resource on Native land is not a new concept. It has been used in wolf recovery programs, fisheries populations, and fire abatement (Cornell, Jorgensen, Kalt, Spilde, 2005; Johnson 2011; Chapin, Lovecraft, Zavaleta, Nelson, Robards, Kofinas, Trainor, Peterson, Huntington, and Naylor, 2006). The co-management leadership model is defined as the sharing of power and responsibility between the government and local resource users. The State and local tribal government recognized early that to manage fish and game, as well as the complex regulations regarding subsistence use, they needed a way to work together and share leadership.

Co-management is intended to be short to medium term. Its primary focus is to build vertical linkages between local and governmental officials. Responsibility as well as decision making power is to be shared. To accomplish this end the State Department of Fish and Game developed the Fish and Game Advisory Committees (AC).

The Advisory Committee (AC) is a local "grass roots" group that meets to discuss fishing and wildlife issues and to provide recommendations to the State Fish and Game Board. They provide advice and recommendations to the State of Alaska about subsistence hunting, trapping, and fishing issues on public lands. AC members are elected by the villages they serve, usually for three-year terms. The role of the AC is to
provide information on local natural resource management issues, review and make recommendations on proposals for regulations, policies, management plans, and other subsistence-related issues on lands within the region (State of Alaska, n.d.). The AC is also asked to inform the Department on the traditional use of subsistence resources using traditional ecological knowledge. The Fish and Game staff member responsible for organizing the Advisory Committee for the case study region, explained the AC this way:

The state looks to the advisory committees for local information and knowledge on animal numbers and changes in ecology, in addition to being feedback for the creation of policy. For example, right now in many regions of Alaska there is little to no scientific knowledge of predators, particularly in the Northwest Arctic, however, there is lots of traditional knowledge that may lead to more scientific studies later. I know the area biologists in our region often compare what they are finding on studies to what local people say too.

This comment, by a staff member for the Alaska Department of Fish and Game, clearly states the importance of the Advisory Committee to the Department and its policies. The Department not only looks to the AC for policy input but the AC is also seen as expert in local ecology. Unlike the community’s relationship with the IAWG, local community members serving on the AC are seen as recognized experts in TEK. This knowledge is used to inform Department scientists and enhance natural resource management data.

One community member who served on the AC for the village stated his role on the AC this way:

The State of Alaska put together a Fish and Game Advisory Committee. I think there are 6 of them. Anyway, I served on our regional committee during the moose moratorium. It is a good committee. We get to have input on all of the policies and give feedback. They ask us to let them know what is happening in the village.
Clearly the community members thought that the Advisory Committee was important and effective. The case study village was not the only village expressing satisfaction with the way the AC was organized. Another village located in the interior of Alaska also had similar research results. A report by Carey (2009) states that: “The regulatory practices most often cited as helpful were collaborative agency-tribal processes, including the Advisory Committees and councils...In fact, these types of collaborative efforts received only positive comments in the survey” (p. 29). The same report goes on to state that most people remained positive about the AC in general: “…even though AC recommendations are frequently rejected by the Board of Game. Some of the respondents specifically described the actual process of the AC – sharing information, generating recommendations and presenting them to decision makers – as positive...regardless of the outcome” (p. 30). Both villages and the Department felt that the information sharing between the two was of great value. It is also clear, though, that while the AC could provide input, the real decision making power continued to lay with the State Department.

**Saving the Moose**

When the village realized that the moose were in trouble they called a village-wide meeting. Following traditional Inupiaq values and decision-making processes, and successfully negotiating across diverse structures of authority, the community decided to postpone immediate gain in order to ensure the long-term sustainability of the moose (Emery et al., 2012). Despite the fact that their people depended on the moose meat for food, the village decided to pass a five year moose hunting moratorium. Social bonding in the village is high, as demonstrated by the fact that everyone in the village agreed to
the moratorium and agreed to share the hardships this decision would place on their families (Emery et al. 2012).

With this decision, the village moved into an adaptive management leadership model. As described earlier, adaptive management is the linking of science and management to make informed decisions while also continuously learning from the changes in the environment. It was developed as a way to deal with uncertainty and complexity. The time scale for this type of management is medium to long, as leadership is required to understand the local ecology before implementing policy. It is understood that, with adaptive management, learning works in a feedback loop as ecological knowledge is tested and revised in a dynamic, ongoing, self-organized process of learning-by-doing (Berkes, 2009). One tribal leader demonstrates this adaptive leadership model as he explained the decision to impose a moratorium:

This traditional knowledge, added with the knowledge done by aerial surveys—western knowledge—helped to push the moratorium . . . The native corporation and the council and the city decided that this is what we needed to do. There were people that were disappointed but everybody saw what was happening. We used the three governing bodies to convey that message [the moratorium] to everybody.

Adaptive co-management leadership is obvious in the way the tribe learned from the environment and used traditional and western knowledge to inform the decision. They also linked horizontally between local governing bodies to ensure that everyone had the needed information.

To implement the moratorium, however, the Inupiaq had no power, as sovereignty did not extend to making policy decision affecting wildlife. As explained earlier, only the State of Alaska can make policy decisions affecting wildlife. Further,
local private nonnative interests in the area were opposed to the moratorium, as they
depended on tourist hunting for income.

Having already established the co-management leadership model with the State of
Alaska Fish and Game Department, Tribal leaders took their concerns and their
proposed moose moratorium to the Fish and Game Advisory Committee. The AC
described the situation to the State of Alaska Fish and Game Department. They
presented their findings and their community's decision and asked that the State of
Alaska support the moratorium.

In this instance, the State of Alaska did just that. The State implemented a
command and control policy prohibiting the hunting of moose on any land near the case
study village and in surrounding areas. They recognized the effectiveness of the
adaptive management leadership model that informed the decision making process of
the local community.

Adaptive management leadership combined with TEK and traditional practice
informed more than just development of the moose moratorium policy. They also
informed practices surrounding enforcement, again as noted by the young tribal leader
who was involved in its development and implementation:

The caribou were 128 miles away and some families really needed the
meat. . . . The people that needed it would harvest a cow or a bull every
year and that was okay because they live a totally subsistence lifestyle.
Ninety-eight percent of their year is fish and game. [Tribal] Members see
these people out harvesting fish every day or harvesting caribou or moose
—see it and don’t report it. It was okay because we all knew that they
needed the moose—there is an understanding about who needs meat and
who does not. We all share that information all the time. No one tries to
keep that knowledge to themselves. That is Inupiaq and Yupik tradition too
I guess.
The combining of the co-management model, in the form of the AC, with the adaptive management model created a new way of working for both the local village and the State Department of Fish and Game. Together they created an adaptive co-management model of leadership. As Berkes explains, adaptive co-management is defined by strong horizontal and vertical linkages as well as joint learning by doing. It is dependent on multi-level organizations built on a relationship of responsibility and power sharing (2007).

The moratorium worked. Using this adaptive co-management model the state and local community monitored the moose for five years. By 2008 the moose population was up to 282 and by 2011 there were over 600 moose in the case study area (Tibbles, 2011). Both subsistence and game hunting are again allowed. This new way of monitoring, learning, and sharing information will continue to be the leadership model used by the community and the State of Alaska for moose management in the case study area.

Conclusion: Leadership Style Effectiveness

The adaptive co-management model of leadership worked. The moose were brought back to stable numbers and the village can again engage in subsistence hunting. This model of leadership was effective and will continue to become more important as natural resource management becomes more complex and uncertain due to increased and unforeseeable climate change events. To adapt to these events, leadership will have to become more flexible and develop strong vertical and horizontal linkages to deal with natural resource management issues.
The State of Alaska Department of Fish and Game is a rational bureaucratic organization. As a bureaucratic organization it has a leadership style that is based on credentialed professionals, rules and protocol, and limits public access to decision makers. Due to the complex jurisdiction of natural resource management in Alaska the state was forced to build a way, within the organization, to include outside information and cede some of its power to other stakeholders. Negotiation and compromise were needed when dealing with resources controlled by various tribal, state, and federal governmental agencies, as well as, in many cases, with private and corporate interests.

This leadership style is not without its challenges. The biggest challenge is that this type of leadership model is built on trust and power sharing. Neither of these core requirements comes easily to rational bureaucratic organizations. The only reason this style of leadership worked in the case of the moose was because all ten conditions for successful adaptive co-management, created by Armitage et al. (2009), were met. These ten conditions are listed and analyzed in the study community context in the following table 4.1:

Table 4.1 Ten conditions for successful adaptive co-management.
Source: Adapted from Armitage et al., 2009

<table>
<thead>
<tr>
<th>Ten conditions for successful adaptive co-management</th>
<th>Adaptive co-management in the case study village</th>
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<tbody>
<tr>
<td>Well defined resource system.</td>
<td>This management policy was working on moose in a well-defined resource system.</td>
</tr>
<tr>
<td>Small scale resource use context.</td>
<td>The moose being targeted were in a small scale resource use context</td>
</tr>
<tr>
<td>Clear and identifiable set of social entities with shared interests.</td>
<td>All stakeholders had clearly defined roles with a shared interest in moose rehabilitation</td>
</tr>
<tr>
<td>Reasonably clear property rights to resource of concern.</td>
<td>Property rights are complex but boundaries are established and clear.</td>
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</table>
This table identifies ten requirements for adaptive co-management to work. The reason that this style of leadership must have all ten of these requirements is because this style of leadership is built on power sharing and trust between entities. Creating trust and power sharing is a daunting task as most resources are contested by multiple stakeholders, and competing interests and values are the norm (Armitage et al., 2009). Establishing the rules and use of a resource is complex and contentious when organizations tend to compete rather than to cooperate within and between stakeholders.

Another reason adaptive co-management is a difficult leadership model to employ is because learning and reevaluating is a constant process infused with a complex interaction of changing variables. Unlike other models where rules and

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<tr>
<th>Ten conditions for successful adaptive co-management</th>
<th>Adaptive co-management in the case study village</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to adaptable portfolio of management measures.</td>
<td>State of Alaska was open to a wide array of management measures</td>
</tr>
<tr>
<td>Commitment to long term institution building process.</td>
<td>The Advisory Committee had been established and supported for over a decade.</td>
</tr>
<tr>
<td>Key leaders or individuals prepared to champion the process.</td>
<td>Key leaders in both the village and at the state level were willing to champion the process.</td>
</tr>
<tr>
<td>Training, capacity building, and resources for local state and national stakeholders.</td>
<td>The regional advisory committees are supported by the State of Alaska which is willing to offer training and resources to the AC.</td>
</tr>
<tr>
<td>Openness of participation to share and draw upon a plurality of knowledge and systems.</td>
<td>All meetings were open to the public. Transparency was a stated goal. State demonstrated its willingness to include Native TEK.</td>
</tr>
<tr>
<td>National and regional policy environment explicitly supportive of collaborative management efforts.</td>
<td>State law supported the formation of the Advisory Committees and required the collaborative management efforts.</td>
</tr>
</tbody>
</table>
procedures can be created once and then referenced when needed, such as in the command and control paradigm, rules and procedures with adaptive co-management must remain flexible to deal with uncertainty. A foundation of trust between organizations and a constant dialogue is a must for this leadership style to be effective.

There are ways that groups can determine if the use of the adaptive co-management leadership style will be effective in a given situation. In situations where there is a common purpose, where the resource is limited in scope and context, and communication is open and trusted, adaptive co-management leadership may be viable. It must be remembered that adaptive co-management is an evolutionary process that encourages flexibility and innovation - key ingredients of adaptive capacity. In a rapidly changing world of climate change, trust building, conflict resolution, and social learning quickly become governance (Armatige et al., 2009). Learning adaptive co-management now may help communities become better able to govern in the uncertain future.
CHAPTER 5
Outcomes, Analysis, and Conclusion

It has been put forward that the necessary ingredients for resilience to climate change events are a community’s access to capital resources, traditional knowledge and land skills, resource use flexibility, and strong social networks (Pearce, Smit, Duerden, Ford, Goose, Kataoyak, 2010). The findings in this research demonstrate that leadership and decision making power are also necessary ingredients in the successful implementation of resilient activities in response to climate change events.

The effects of climate change unfold at the local level, but capacity to deal with this change extends beyond the community. Understanding the interplay between climate change events and the leadership model most effective to deal with that event can provide communities with a relevant paradigm for informing future actions. As leadership embodies a community’s ability to make and carry out decisions, using the appropriate leadership model in a given situation can rally a community’s resources and capital to effect change. The use of inappropriate leadership styles in a situation can at best be ineffective, and at worst result in decisions that will harm those whom the leaders are trying to help.

Understanding the three leadership models outlined in this paper is a first step in the creation of that paradigm. Table 5.1 outlines the different styles of leadership and the important characteristics of each one comparatively.
Both Native leadership and the rational bureaucratic leadership models were effective in building community resilience, though not as effective as the adaptive co-management model. Both the Native leadership and the rational bureaucratic leadership models will continue to struggle as climate change accelerates. Native leadership will struggle to find adequate funding for the larger community projects. It will also be a challenge for the Native communities to work with outside agencies as they try to integrate their style of leadership with hierarchical and rule driven bureaucracies. Using Native leadership alone will only work when a solution to a
problem is financially viable, and decision making is autonomous and within tribal sovereignty.

The rational bureaucratic organizations will struggle with shifting variables and the need for information sharing and exchange between those outside the bureaucracy and those within. Rational bureaucratic leadership will only be successful when non-local and external solutions to a problem are the only option. As demonstrated in this paper, external decision makers leave a community vulnerable and powerless to effect change. Neither Native leadership nor the rational bureaucratic leadership alone will be able to build the resiliency needed to address the complex problems facing the village due to climate change.

What is needed is a way to combine the strengths of both the Native leadership and the rational bureaucratic model in a way to effectively build community resilience. Adaptive co-management is the key to developing this new way of working together by building an intentionally institutionalized reflective learning process that includes multiple stakeholders and stimulates innovative outcomes. Adaptive co-management is the only leadership model that can be flexible and adaptable enough to respond to climate change events, while providing multiple stakeholders decision making power as well as access to the necessary financial capital.

Given that climate change will continue in Alaska for the next half century and beyond, adapting to these changes will be essential (Kofinas, Chapin III, BurnSilver, Schmidt, Fresco, Kielland, Martin, Springsteen & Rupp, 2010). Residents of coastal communities will increasingly face novel conditions that require novel solutions. Conditions of rapid social, ecological, technical, and economic change allow limited time
to address emergent problems or test in systematic ways for the “right solution” (Kofinas, Susan & Chanda, 2007). Information exchange and participation in decision making will thus emerge as important determinants of community resilience (Carey, 2009).

However, for the adaptive co-management leadership model to work numerous institutional walls must be broken down. Many resilient activities available to Native communities, such as relocating the village up into the hills to protect it from the fall storms and flooding, are strongly constrained by bureaucratic rational leadership models defined by private, state, and federal governments. To create an adaptive co-management leadership style, working relationships must be started now. Currently there are examples of how formal adaptive co-management arrangements can be used effectively, and can become key components of an adaptive co-management learning process (Kofinas et al., 2007). These working models, such as the State Department of Fish and Game Advisory Council, can serve as examples for other organizations to replicate.

The question at the end of this research is to what extent can formal adaptive co-management leadership address the increasingly complex set of challenges posed by climate change. Adaptive co-management has demonstrated, that if used effectively, it can allow communities to act collectively both horizontally and vertically, and use traditional ecological knowledge in combination with western science. It has also demonstrated that if used appropriately communities can have access to financial resources such as state department funding, and have meaningful participation in the
decision making processes while still maintaining local Native leadership models and values.

Further research will be needed to identify areas where adaptive co-management has been effective and what steps are needed to ensure the success of these projects. If adaptive co-management can be instituted early, building linkages between local communities, private, state, or federal agencies, there will be a greater chance for the creation of locally attuned solutions to build community resiliency to future climate change events.
REFERENCES


Carey, E., (2009). Building Resilience to Climate Change in Rural Alaska; Understanding impacts, adaption and the role of TEK. Practicum, University of Michigan.


City of Unalakleet, WHPacific, Inc. of Alaska, Bechtol Planning and Development. (2008). Local Hazards Mitigation Plan, Bechtol Planning and Development.


APPENDIX A

PRINCIPLES:

1. The community must be involved as a full partner in all aspects of the research. Continuous consultation and collaboration should characterize the partnership.

2. The strengths and culture of the community, including community researchers and staff as well as material resources, must be respected and utilized whenever possible.

3. Written permission must be obtained from the partners before beginning the research projects.

4. Permission from all individuals participating must be obtained prior to collecting personal information.

5. The confidentiality of all individuals must be respected. If necessary, the community involved may choose to remain anonymous when reporting the results.

6. All research results, analyses and interpretations must first be reviewed by the partners to ensure accuracy and avoid misunderstanding.

7. All data collected belongs to the community and must be returned to the community.

8. The partners must all be involved in making decisions about the publication and the distribution of all or parts of the research results.

9. The community must agree to the release of information.

OBLIGATIONS OF THE RESEARCHERS:

1. To do no harm to the community.

2. To involve the community in active participation rather than passive acceptance.

3. To ensure the design, implementation, analysis, interpretation, reporting, publication and distribution of the research are culturally relevant to the community and in agreement with the standards of competent research.

4. To undertake research that will contribute something of value to the community in which the research is being conducted.

5. To impart new skills to community members.

6. To help to address any issues that are raised as a result of research.

7. To provide expertise to scientifically answer questions that emerge from the community.

8. To promote academic diffusion of knowledge through written publications and oral presentations. This includes the documentation of the undertaking of the project and of the results.

9. To be guardians of the data until the end of the project and to return that data to the community at the end of the project.

10. To be involved in any future analysis of the data after the data has been returned to the community.
Community researchers are regarded as the Project Staff and those Co-investigators who are employed within the community. In addition to the obligations listed for researchers, the community researcher is obligated:

1. To maintain a long-term relationship of trust in the dual role of caregiver, educator, and researcher: this will only be possible if the needs of the community are always considered as the first priority in any decision.

2. To communicate with researchers during all phases of the research.

3. To arrange for researchers to meet with the partner Committees and/or Board of Directors, and any other local organizations to implement and promote the project.

4. To facilitate supervisory meetings of the Intervention and Evaluation teams.

5. To participate in all phases of the project, review all research results, analyses and interpretations for accuracy and present information to the community.
APPENDIX B

INFORMED CONSENT DOCUMENT

Title of Study: Leadership and Resilience in Unalakleet, AK

Investigator: Wendy Young

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this study is to build an understanding about how a community builds resilience. This research will look at how your community can build resilience to the increasing fall storms in the village. You are being asked to participate because you are a resident of the village over the age of 18. You should not participate if you are under 18 or have lived in the village less than five years.

DESCRIPTION OF PROCEDURES

If you agree to participate, you will be asked to complete an interview asking your experience and thoughts about the increasing severity of fall storms on the community. This interview will take approximately 30 minutes. The types of questions you will be asked include questions about what you and your family does to prepare for the storms, how this has changed over the years, and what you think the village needs to do to better prepare for these events. Audio tapes will be used to record the interview to ensure accuracy.

RISKS

There are no anticipated risks to participating in this study.

BENEFITS

If you decide to participate in this study there may be no direct benefit to you. It is hoped that the information gained in this study will benefit society by providing valuable information to the village about building resilience in the community to the fall storms.

COSTS AND COMPENSATION

You will not have any costs from participating in this study and you will not be compensated for participating in this study.
PARTICIPANT RIGHTS
Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled. You can skip any questions that you do not wish to answer.

CONFIDENTIALITY
Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken: identifying information will not be taken and interviewees will be given pseudonyms. Only the person conducting the interview will have access to the data. Data will be kept on a password protected computer or in a locked file cabinet for one year. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS
You are encouraged to ask questions at any time during this study.

   · For further information about the study contact Wendy Young at (406)462-4610 or wyoung@riseup.net. You may also contact the professor supervising the research at Cornelia Flora at cflora@iastate.edu.
   · If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

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PARTICIPANT SIGNATURE
Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the
document, and that your questions have been satisfactorily answered. You will receive a copy of the written informed consent prior to your participation in the study.

Participant’s Name (printed)
____________________________________________________

____________________________________  ______________________
(Participant’s Signature)   (Date)