Public Land in a Changing Climate:

Planning for an Uncertain Future

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Master of Science

Degree

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ABSTRACT

This thesis investigates the ways in which institutions and actors consider climate change, and how the inclusion of diverse perspectives and challenges in the planning process shapes climate change governance. In particular, I asked how the participants, place-specific contexts, and decision-making processes affect environmental decision-making in Alaska's National Parks. I discuss the literature on geographical perspectives on climate change, environmental and climate change governance, how uncertainty and risk affect decision-making in the context of climate change, and the history of land use management in the United States. This project incorporates qualitative methods to research the Climate Change Scenario Planning project for the Alaska Region of the National Park Service. I participated in two Climate Change Scenario Planning project workshops to examine how institutions and actors prepare for climate change. I show that the participatory learning process is vital to climate change planning, particularly when a diverse group of institutions and actors are involved. I also use the Climate Change Scenario Planning workshops to understand the challenges to climate change response in Alaska's National Parks. The common challenges in the climate change decision-making process can be grouped into three categories: (1) a lack of comfort and certainty in planning for the future and discussing climate change; (2) climate change takes place in a larger environmental, social, and political context; (3) and a lack of guidance and leadership in climate change governance. Finally, I summarize the ways in which my thesis contributes to the literature of human-environment interactions and environmental governance studies. The findings provide insights into the inclusion of institutions and actors in climate change governance and how climate change planning operates.

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LIST OF ACRONYMS

APS	Alaska Park Science
CAKN	Central Alaska Network
CCSP	Climate Change Scenario Planning Project
DOI	Department of the Interior
ESA	Endangered Species Act
FWS	Fish and Wildlife Service
GBN	Global Business Network
GCM	Global Climate Model
ICC	Interstate Commerce Commission
IGAP	Indian General Assistance Program
IPCC	Intergovernmental Panel on Climate Change
LCC	Landscape Conservation Cooperative
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRC	National Research Council
SEAN	Southeast Alaska Network
SNAP	Scenarios Network for Alaska and Arctic Planning
US	United States

CHAPTER 1: Introduction

I woke up freezing on September 30th, 2010. Worried that I was going to get frostbite if we stayed in our tent a minute longer, I shook my boyfriend Sasha who was sleeping next to me, *"Can we please leave?"* He awoke and agreed. We stuffed our sleeping bags and tent into the trunk and jumped into the little blue car that we had rented for the first week of the trip. It was minus three degrees Fahrenheit...in September…in Alaska…and we were camping.

Sasha and I had planned a two month long road trip from Alaska to Tennessee after my seasonal job ended in Skagway. We were camping the entire way while driving a U-Haul truck for an acquaintance through Canada. This was a planner's nightmare. Had I thought about what might happen if we hit a blizzard in a small two-wheel drive vehicle between Tok and Glenallen, or how we were going to get gas in the Yukon Territory after the tourist season ended, or what we were going to do if Canadian customs would not let us cross the border while driving a truck filled with someone else's belongings, I may not have even taken the trip. If I told you all of these things *were* going to happen, you might say that I was crazy; but, in fact, all of these things *did* happen, and we had to rely on the supplies and knowledge that we had acquired before the trip to deal with each situation.

We are all scenario planners in our own way, anticipating possibilities for the future and preparing for them in the best way that we can. My fiancée, Sasha, has a chainsaw, MRE's (Meals, Ready to Eat), and a first aid kit in the trunk of his car. I have an umbrella, running shoes, and a spare work-appropriate outfit in mine. The items in our trunk reflect the scenarios we may encounter and have prepared for. In its simplest form, this is scenario planning. We look into the future and consider the possibilities that are relevant, plausible, challenging, and divergent. The different scenarios that we encounter, and how we plan for and react to each situation, create both challenges and opportunities in every step of the decision-making process. Climate change is altering the scenarios we encounter on a daily basis, thereby changing what we need to be prepared for and what we pack in the trunk of our car. In this thesis, I explore how we decide what to pack, and what to leave behind as we plan for a world with a changing climate.

Figure 1 September on the Alcan Highway. This was the coldest day in September ever recorded in Fairbanks, Alaska. Photo taken by the author 9/24/2010.

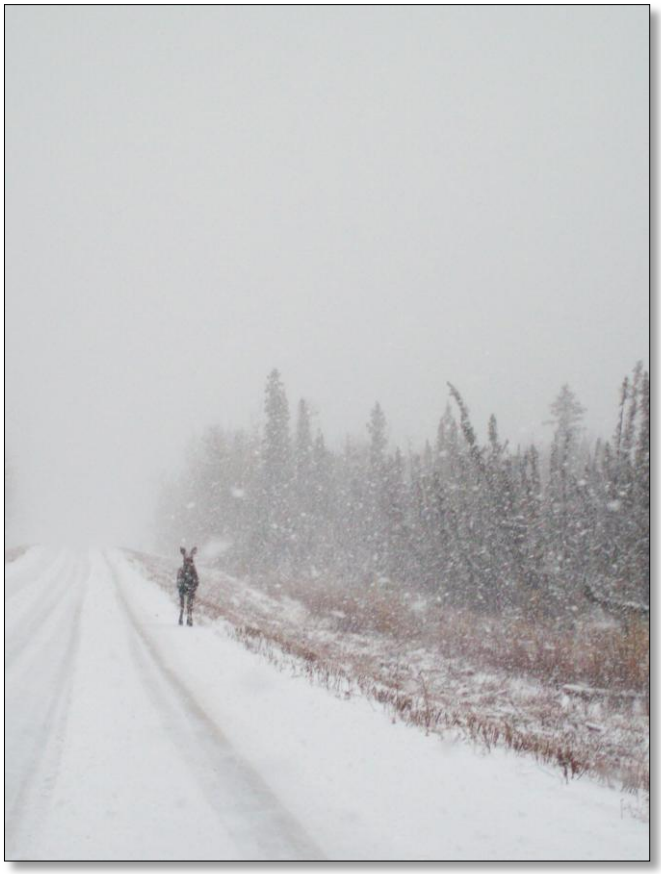

Figure 2 My first moose sighting on the Denali Parkway, the 87-mile gravel road that we took to avoid the worst of the snowstorm. Photo taken by the author 9/25/2010.

In 2007, the Alaska Region of the United States (US) National Park Service (NPS) and Alaska Geographic published the sixth volume of *Alaska Park Science* (APS), which focused exclusively on climate change. The timing coincided with the release of the *Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report*. The *APS* climate change volume had been more than a year in the making and won multiple awards for science reporting in journalism (Alaska Regional Office 2010). The two *APS* issues, *"Scientific Studies on Climate Change in Alaska's National Parks"* and *"Crossing Boundaries in a Changing Environment"* addressed climate change in multiple contexts, including a discussion of human responses, changes in animal migration patterns, the spread of invasive plants, and changes in fire regimes. The *APS* issues also recognized that human actions contribute to current climate changes (Chapin 2007: 8).[1] In the words of the NPS Alaska Regional Science Adviser Robert Winfree, *"the Alaska Region put out a journal about climate change when much of the rest of the federal government was not talking about it*" (Southeast Alaska Network Workshop, February 24, 2012). While many US agencies were debating the uncertainties of climate change, the Alaska Region of the NPS was working to address the issue. In particular, the Alaska Region of the NPS was considering how federal land management agencies should plan and respond to a changing climate.

The Alaska Region has taken a leading role within the NPS in terms of climate change planning, partly because Alaska is facing the effects of climate change more severely than much of the contiguous US (Alaska Region of the National Park Service 2010). While climate change increasingly affects the world, it does so in varying degrees and frequencies across different

[1]"Human actions throughout the world are affecting the Earth System so strongly as to have environmental and ecological consequences even in parks and monuments that are remote from direct population pressures and protected from most types of direct human impacts." (Chapin 2007: 8)

regions (IPCC 2007). Worldwide, sea levels and global average temperatures are rising, and ice and snow cover are decreasing (IPCC 2007). Climate change affects different regions across the globe in different ways, and the IPCC states that, "for several decades, surface air temperatures in the Arctic have warmed at approximately twice the global rate" (Anisimov et al. 2007: 656). Since 1980, average global temperature has increased at approximately one degree Celsius per decade, with the greatest increases in portions of northern Asia and northwestern North America; these two regions and the Antarctic Peninsula have warmed most rapidly over the past several decades worldwide (Anisimov et al. 2007). Alaska faces some of the most rapid climate changes in the world, heightening the need for response.

Many of the climate change-related effects in Alaska occur on federally owned land, which constitutes approximately 60% of the state's total land area (Alaska Department of Natural Resources 2000). These effects include an increase in forest fire size and duration, more rapidly melting glaciers, altered caribou migration times, the transition of tidal flats into spruce forests due to isostatic rebound, and disappearing cultural sites due to sea level rise (Rice 2009). Responding to climate change has been highlighted as a priority in many federal agencies in the US, but just what this response will look like remains unclear. Without specific guidelines at the national level, it is up to federal departments, agencies and regions, and individual parks and forests to determine how they will respond and adapt to climate change.

Research Questions

The primary goal of this thesis is to advance understandings of the factors that shape climate change planning. In particular, this thesis investigates how institutions make decisions about climate change through a study of the Climate Change Scenario Planning project (CCSP) for the Alaska Region of the NPS. I use two case studies of the CCSP to investigate these issues. The main question that guides this study is:

How does climate change planning operate within the CCSP workshops for the Alaska Region of the NPS?

To study this issue, I investigate the following three sub-questions:

1. What institutions and actors were included or excluded in the CCSP workshops and how did their participation affect the workshops?

This question, investigates how the attitudes and participation of institutions and actors affect the climate change planning process. I use case studies of two CCSP workshops to analyze the ways in which the participation of stakeholders influences the planning process. I also consider what institutions were absent in each case study and discuss their absence.

2. What environmental, social, and political factors influenced climate change planning in the CCSP workshops?

Environmental, social, and political factors shape power relations between actors and influence decision-making (Adger et al. 2003: 1099). These factors create a context within which decision-making occurs (Leitner et al. 2007). Context may influence values that guide decision-making (Adger et al. 2003: 1098). For instance, long-standing disagreements or pre-existing coalitions may halt the decision-making process. Additionally, the ethnic composition of a group, competition over resources, and divergent perspectives on land management can affect the progress of reaching a decision.

3. How is the CCSP scenario planning and adaptive management model carried out in the workshops?

I investigate how the organization of the CCSP may affect the climate change planning of the CCSP workshops. I also investigate how information was communicated and received in both CCSP workshops, and examine the intentions of the facilitators of both CCSP workshops and how they may have influenced the decision-making process.

Through question 1, I examined the institutions and actors involved in climate change planning and how their participation affected the CCSP workshops. Through question 2, I investigated the physical and social contexts in which climate change governance takes place; and through question 3, I explored how the forms and processes of decision-making in both case studies influenced climate change planning in the CCSP. Answering these questions will help broaden our understanding of climate change governance and the factors that contribute to or impede the environmental decision-making process.

In this thesis, I define decision-making as a process of a group of individuals or institutions coming to an agreement on a position, opinion, judgment, or conclusion. Adger et al. conceptualize decision-making as a process that involves individuals or groups with a vested interest and note that, "when undertaken on behalf of society by some authority, decisionmaking is akin to policymaking" [sic] (223: 1095). The 'decision' in environmental decision-making can be defined as a position an opinion, a judgment or a conclusion reached after consideration (Barrett and Fudge 1981; Adger et al. 2003). Thus environmental decision-making is not necessarily a clear outcome, but may also be an agreement or mutual understanding reached after consideration of an environmental issue.

Theoretical Framework

This study is based on the transition from "scientific management" to adaptive management in environmental decision-making. "Scientific management" arose at the turn of the 20th Century as a response to degradation of natural resources. This degradation resulted from a free market approach to natural resources management (Nelson 1995; Brunner et al. 2005). President Theodore Roosevelt sought to replace the free market approach that dominated land management practices in the late 19th Century with "scientific management" that would use the

latest scientific knowledge to achieve objective decision-making (Nelson 1995). “Scientific management” became the dominant form of environmental decision-making until the 1960s. At that time, rapid societal change sparked many social movements, including the environmental movement (Ross 2000). This movement demanded increased participation in environmental decision-making (Brunner et al. 2005; Brunner and Lynch 2010) and positioned the environmental movement at odds with “scientific management,” which relied on a single-centralized authority to make decisions.

As demand for participation grew, adaptive management was utilized across parts of the US throughout the 1970s and 1980s (Brunner et al. 2005). However, stakeholders often positioned themselves at odds with one another, which altered (often negatively) the environmental decision-making process. These challenges led to an emphasis on compromise and shared understanding for successful environmental decision-making (Ozawa 2005). An adaptive management framework uses public and participatory learning to increase shared understanding between groups and to make complex environmental decisions with a variety of resource users (Brunner et al. 2005). The public learning process brings together multiple stakeholders to obtain a level of shared understanding of a problem (Ozawa 2005). As stakeholders go through the learning process together, they begin to establish rapport and they better understand each other’s needs. This creates a shared understanding between stakeholders, and leads to greater cooperation in the environmental decision-making process (Brunner et al. 2005; Ozawa 2005).

The CCSP utilizes a participatory learning environment and other tools of adaptive management to encourage compromise and collaboration with CCSP participants. This thesis studies how the transitions from “scientific management” to adaptive management influence climate change planning in the CCSP. I study the legacies of “scientific management” within the

system, the response of workshop participants to the adaptive management framework, and the challenges to climate change decision-making within the CCSP.

Thesis Overview

This thesis is divided into six Chapters. In the first Chapter, I presented the research questions and sub-questions, and introduced the theoretical framework of the thesis. Next, I provide an overview of the CCSP project in the Alaska Region of the NPS, and discuss the place-specific climate change effects in the SEAN and CAKN regions. In Chapter 2 I review the literature on geographical perspectives on climate change and environmental decision-making in the US; I place climate change governance into a larger environmental governance theoretical framework, and I consider how uncertainty and risk influence the decision-making process. In Chapter 3 an overview is provided of the methods that were utilized in this study; and site selection, my positionality as a researcher, and lessons learned in the field are also discussed.

In Chapters 4 and 5 I present the major findings of the research. In Chapter 4, I analyze how institutions, actors, and their participation in the CCSP workshops affect climate change planning. I consider the first sub-question of my thesis: What institutions and actors were included or excluded in the CCSP workshops and how did their participation affect the workshops? In Chapter 5, I consider the challenges of climate change planning and analyze the ways in which the social and physical context shapes these challenges. In this Chapter, I also consider the second and third sub-questions of my thesis: What environmental, social, and political factors influenced climate change planning in the CCSP workshops? and How is the CCSP scenario planning and adaptive management model carried out in the workshops? Finally, in Chapter 6 I summarize the main finding presented in this thesis and consider avenues for future research on climate change decision-making.

Brief History of Land Management in Alaska

The environmental governance histories of Alaska and the NPS provide insight into the power relations between participants in the workshops and the social and physical contexts of this study. Alaska is the largest state in the US, with an area of over 500,000 square miles, larger than Texas, Montana, and California combined (Ross 2000). Alaska's history of statehood, beginning on January 3, 1959, has been marked by environmental and land-use conflicts (Ross 2000). Conflicts existed prior to statehood, particularly between Alaska Natives and gold prospectors in the late 1800s and early 1900s.[2] The history of Alaska's land use involves various stakeholders, including miners, loggers, hunters, oil drillers, Alaska Natives, environmentalists, the state government of Alaska, and the federal government. The mining industry held a prominent position in Alaska politics well before Alaska officially became a state in 1959, and logging and oil interests increased in Alaska after statehood (Ross 2000: 91). As Alaska was transitioning into statehood the interests of developers, Alaska Natives, hunters, and environmentalists often collided over the use of land and resources (Ross 2000). Each group wanted to control the land for its own purposes. These early conflicts over Alaska's land and resources resulted in deeply held beliefs about how the land and its resources should be governed (Haycox 2002). These beliefs continue to influence environmental governance in Alaska today.

Most of Alaska's land is publicly owned, and approximately 60% of all state land is owned and operated by the federal government (Alaska Department of Natural Resources 2000). Figure 3 depicts land ownership in Alaska based on federal, state, and privately owned lands. The federal government and its agencies have taken a variety of approaches to land management in Alaska.

[2] This thesis uses the preferred term Alaska Native to refer to indigenous and aboriginal people in Alaska. This term includes the Athabaskan and Pacific Northwest Indians, and two groups of non-Indian aboriginal people: Eskimos and Aleuts. There are 211 designated Native villages in Alaska, and 227 federally recognized tribes. Alaska Natives comprise 16% of the total population in Alaska (Haycox 2002: 8)

The NPS and Fish and Wildlife Service have historically been the most supportive of environmental protection, often siding with environmentalists (Ross 2000: 92). The Bureau of Land Management has often sided with oil and mining interests while the Forest Service has remained close with the timber industry. The state government of Alaska has remained, in the words of environmental and political historian Ken Ross, "mildly tolerant to firmly negative" on pro-environmental issues and has often promoted development over environmental protection (Ross 2000: 93). This pro-development stance by the state of Alaska has resulted in a division between the federal and state government in Alaska, which continues to shape environmental governance in the state today (Ross 2000; Haycox 2002).

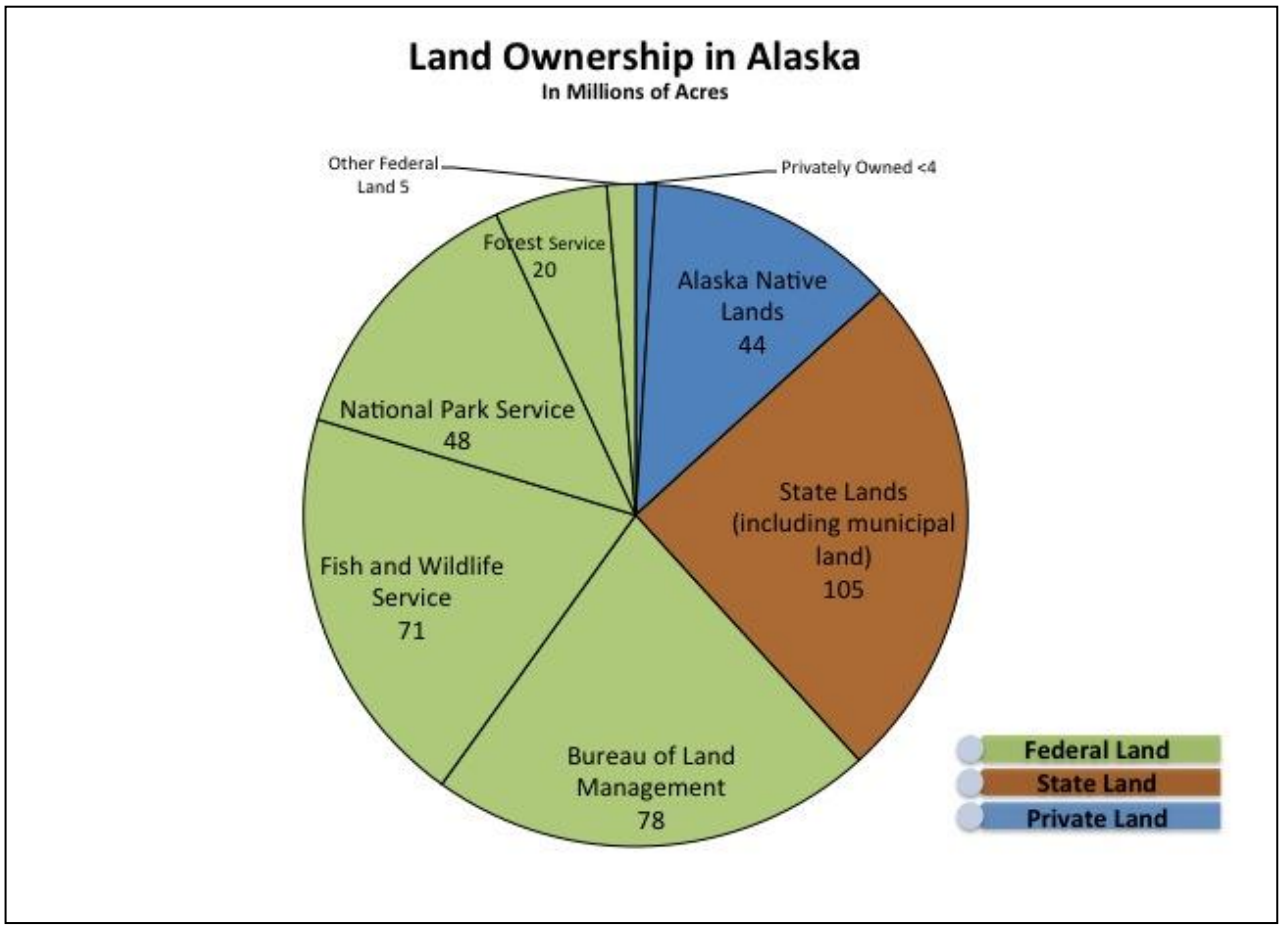

Figure 3 Land ownership in Alaska, chart created by the author. Data from Alaska Department of Natural Resources (2000).

The Climate Change Scenario Planning Project

The CCSP project began in 2009 as a partnership between the Alaska Region of the NPS and the University of Alaska-Fairbanks Scenarios Network for Alaska and Arctic Planning (SNAP). SNAP's primary goal is to provide current data on climate change at the regional level for management, subsistence, and personal needs (Scenarios Network for Alaska and Arctic Planning 2012).[4] SNAP uses Global Climate Models (GCM) to create regional-scale projections for Alaska and the Arctic.[5] To accomplish this, SNAP back-casts each GCM to determine which models fit best for a specific region, then creates a composite model of the most accurate GCMs for that region. SNAP then creates three temperature and precipitation projections for every month of every year until 2100. These three projections (low, medium, and high degree of change) are used in climate change planning and decision-making in the CCSP workshops.

The CCSP was created to teach NPS staff and other actors and institutions how to plan for, communicate, and respond to climate change. The CCSP held workshops in Alaska from 2010 to 2012 to teach adaptive management and scenario planning techniques as tools to plan for climate change. The CCSP project also worked with each National Park in Alaska to create Climate Change Scenario Plans for future climate change decision-making for the National Parks. These plans included scaled-down GCM projections for Alaska and considered place-specific issues in relation to climate change.

[4] "SNAP is all about helping people plan in a changing climate. We work with a wide range of partners and collaborators on many projects to explore a range of possible futures based on the best scientific knowledge and data available" (Scenarios Network for Alaska & Arctic Planning, 2012).
[5] Global Climate Model was originally referred to as General Circulation Model, though the former is currently more common.

The CCSP workshop format was created collaboratively with the NPS and the scenario planning consulting firm, Global Business Network (GBN). GBN was founded in 1987 based on the principle that sustainable growth could occur even with increasing uncertainty if people were able to "question—and change—their mental maps, embrace uncertainty, and stop predicting the future based on the past" (Global Business Network 2012). GBN partnered with the NPS to formulate a scenario planning process that would help land managers think about the decisions they would have to make concerning climate change. The first CCSP workshop for the Alaska Region of the NPS was taught by GBN for CCSP facilitators. The remaining CCSP workshops were divided based on the geographical divisions of the NPS Inventory and Monitoring program for the Alaska Region: Southwest, Central, Arctic, Interior Arctic, and Southeast. I attended the Southeast Alaska Network (SEAN) workshop in Juneau, Alaska, which was the third CCSP workshop and took place from February 21st to 24th 2012, and the Central Alaska Network (CAKN) workshop in Fairbanks, Alaska, which was the final CCSP workshop, from April 16th to 18th 2012. Figure 4 displays the sub-regions of the Alaska Region of the NPS and highlights the SEAN and CAKN sub-regions.

All CCSP workshops have a similar format. First, the workshops are limited to 40 participants, with the intention to include approximately 50% of the participants from the NPS, 25% from other state and federal agencies, and 25% from local communities and Alaska Native villages.[6] The CCSP program intends to provide diversity in the workshop, expand the reach of the CCSP, and focus the content of the workshops on the National Parks in the specific sub-region (Rice 2009).

[6] Generally, Alaska Natives use the terms village, community, or corporation to describe themselves. In this thesis, I will use "village" for consistency. There are no reservations in Alaska, because Alaska Natives never made any treaties with the US federal government. Aboriginal title was postponed during statehood, January 1959, and not resolved until the Alaska Native Claims Settlement Act of 1971 (Haycox 2002: 51).

Figure 4 Map of Alaska's National Parks. Image from the National Park Service (2012).

GBN and the NPS collaborated to create the CCSP project to help NPS managers consider potential future effects of climate change and other anthropogenic changes in the Alaska Region of the NPS. A goal of the CCSP is to move away from forecast planning with minimum and maximum projections, and to move towards envisioning and planning for futures that are relevant, divergent, plausible, and challenging (Rice 2009). This allows for a better understanding of the ways in which climate change effects can affect management decisions. The scenario planning process also incorporates local knowledge into planning to consider a wide range of possibilities of the climate change-related effects and events that may occur.

The CCSP workshops aim to teach participants how to apply scenario planning and adaptive management techniques to adapt and respond to the effects of climate change. All CCSP workshops have a similar format. Before each CCSP workshop, two pre-workshop

webinars explain climate change and the scenario-planning process to participants. Readings are assigned and participants complete surveys that ask about climate change-related effects in their region. At the CCSP workshop, facilitators provide an overview of topics covered in the webinars and share the results of the survey. After the steps of the scenario planning process are explained, a discussion follows on the climate change effects that may occur in the specific region of the CCSP workshop. Next, participants are divided into two groups and begin the scenario-planning process.

Once the workshop participants are divided into groups, facilitators encourage the groups to identify climate-change effects that have a high level of uncertainty and the potential to have broad effects in the region. Once the climate-change effects are listed, each group determines end points for the lowest and highest possibilities of future change for each climate change effect. For example, the SEAN coastal group chose ocean acidification as a climate change effect and predicted that it would change by (-0.1) to (-0.4) pH units. These numbers were the end points for each climate change effect arrow. Figure 5 shows an example of climate change effects and the spectra of change assigned to each effect.

Next, each group creates a future scenario matrix by crossing two of the climate change effects and their spectra. A sample Climate Change Impact Matrix from the SEAN workshop is shown in Figure 6. The horizontal effect with the least amount of change is positioned on the left side of the spectrum, and the most amount of change on the right side of the spectrum, while the vertical effect with the least amount of change is positioned at the bottom and the most amount of change is at the top. Crossing the two effects creates four distinct potential futures: the upper right corner (2) has the greatest amount of change; the lower left corner (3) has the least amount of change; the upper left corner (1) has the most amount of change for the vertical effect and the

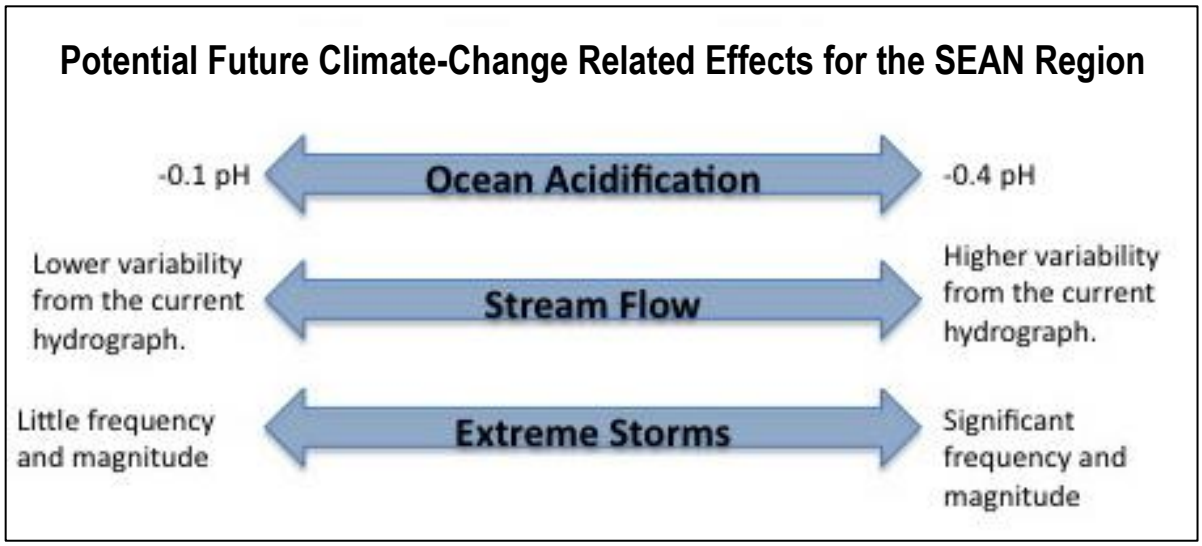

Figure 5 Examples of climate change impact effects from the SEAN CCSP workshop. Image created by the author.

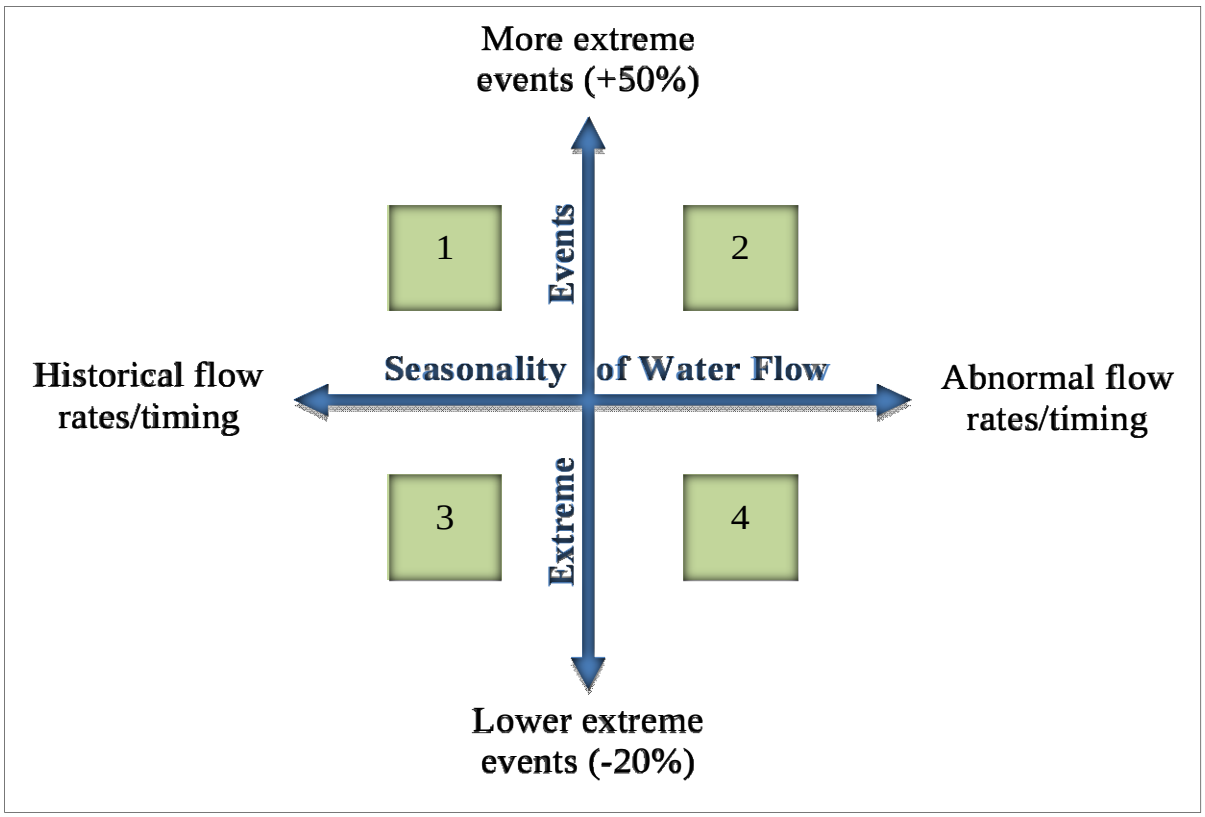

Figure 6 Climate change impact matrix with four potential futures. Image sourced from CCSP workshop data (Climate change scenarios for Southeast Alaska summary 2012).

least amount of change for the horizontal effect; and the lower right corner (4) has the least amount of change for the vertical effect and the most amount of change for the horizontal effect. Each group lists potential effects for the four potential futures and writes a short narrative about what those conditions might mean for their region in the future.

Next, all workshop participants reconvene to discuss the Climate Change Impact Matrices and explain the futures that were created in the four quadrants. After the Climate Change Impact Matrix is completed and the futures are discussed, participants discuss the social and political context of climate change. Then groups nest the Climate Change Impact Matrix into a Social and Institutional Response Matrix, which is shown in Figure 7. Next, participants reconvene with their groups to nest their Climate Change Impact Matrix into the quadrants of the Social and Institutional Response Matrix. This creates 16 future scenarios. Each group discusses the scenarios, and eventually chooses two of the 16 future scenarios to write a story about.

Once the final scenarios are chosen, each group creates a narrative about the future scenarios. The narratives can vary widely and are up to the will, imagination, and creativity of the participants in the group. Narratives can range from a children's book, a monologue, a letter, or a National Park report (five of the narratives from the SEAN and CAKN workshops are included in Appendix A). Once each narrative is written, the participants reconvene to share and discuss the narratives. Then, everyone discusses management actions and decisions that could be made today to prepare for the future narratives. At this time, a facilitator discusses how scenario planning can be included into current planning and management activities. This talk introduces different kinds of management actions that may be taken to respond to each of the narratives: "robust" actions respond to all of the narratives, "satellite" and "core" actions respond to narratives that have the potential to make large impacts, and "hedge your bets" actions are management actions that can be taken to respond to a specific narrative. Figure 8 (page 17) displays how the different management types work within the scenario planning matrix.

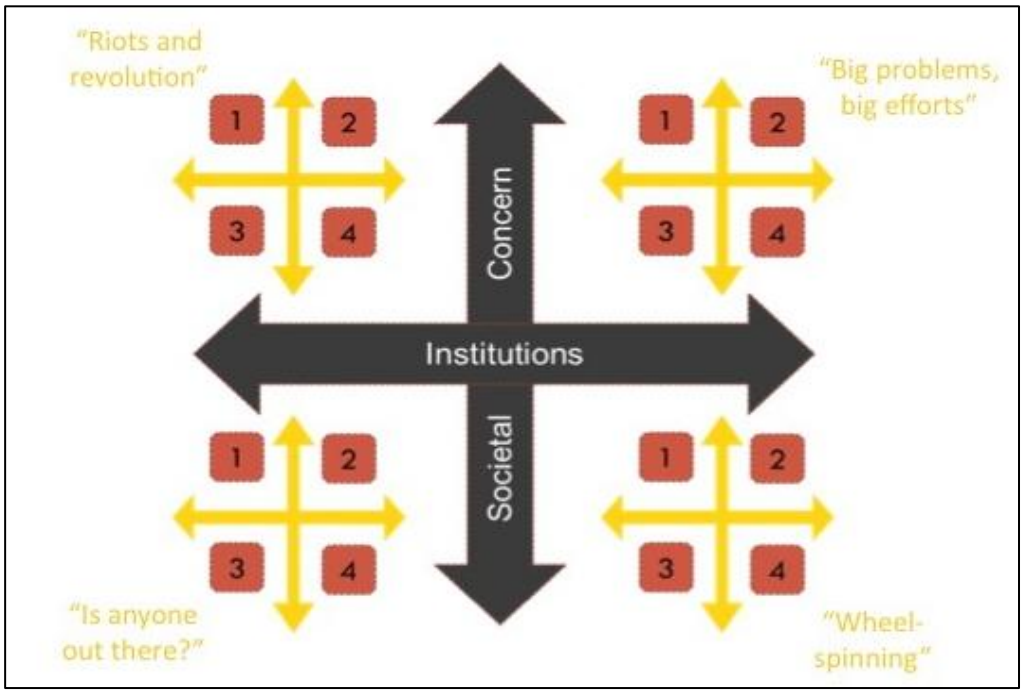

Figure 7 Social and institutional impact matrix with climate change matrices. Image sourced from CCSP workshop data (Climate change scenarios for Southeast Alaska summary 2012).

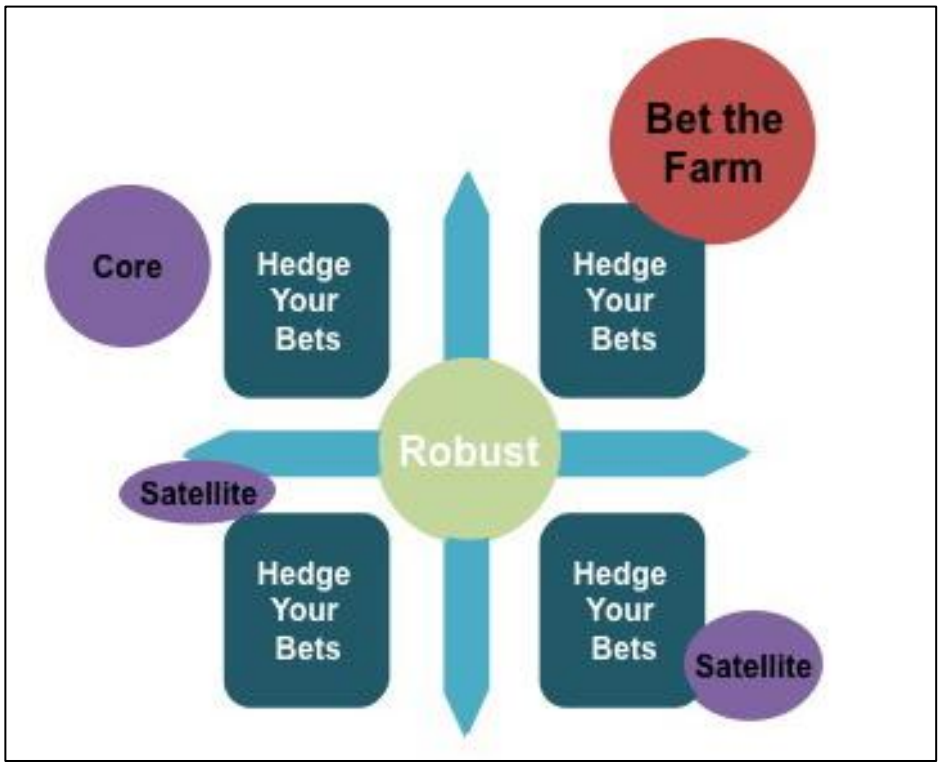

Figure 8 Potential management actions to take a within the scenario planning matrix. Image sourced from CCSP workshop data (Climate change scenarios for Southeast Alaska summary 2012).

After everyone discusses the different kinds of management actions, participants meet with their groups again to discuss and list management actions that respond to the future narratives. Then the groups discuss similarities of the proposed actions. Similar management actions from each group are considered “no-regrets” actions and “robust” decisions. These are actions that we can feel comfortable about today because they would positively affect multiple future scenarios. Other actions might fall into the “core,” “satellite,” or “hedge your bets” categories of management decisions, and need to be considered with greater care at the institutional level. Each CCSP workshop closes with a discussion on how scenario planning can be useful in different planning and management situations. Finally, each workshop discusses how each participant can continue to work with the scenario planning process and what tools, support, and information participants can utilize after the end of the workshop.

Place-Specific Climate Change Effects in the SEAN and CAKN Regions

Climate change is a global, human-induced issue that affects different regions of the globe with various frequencies and intensities (IPCC 2007). Therefore, it is necessary to understand the physical effects of climate change on the SEAN and CAKN regions of Alaska. I consider the effects of climate change in both the SEAN and CAKN regions by discussing the first step of the scenario planning process for each workshop: determining the effects for the Climate Change Impact Matrices. The climate effects selected by workshop participants represent the place-specific climate change effects that concern each region. Many of the climate change effects participants chose had already been experienced to some degree in Alaska. Participants were also encouraged to speculate about what effects may occur in the next 30 to 50 years that we have yet to encounter. The goal of this portion of the CCSP workshops was to

discuss and determine climate change-related effects that had a high degree of uncertainty and the potential to make an impact on the region.

SEAN workshop participants were divided into two groups based on land designations: one group focused on coastal issues while the other group focused on inland issues. I joined the coastal group. Each group was tasked with determining potential climate change effects that have a large degree of uncertainty for the region, and the potential to make a large impact on the region. During the discussion, the coastal group first discussed the duration of the snowpack and the precipitation that the southeast region is experiencing at different times of the year. We also discussed the first date of frost within the region, the length of the growing season, river and stream temperature, sea level rise, water availability, relative humidity, and wind speed. We eventually removed sea-level rise because it was not considered a compelling factor in the southeast due to isostatic rebound in the area.[7] We then discussed extreme events and storms. Eventually, someone mentioned changes in ocean acidification and ocean temperature as potential climate change effects for the region, which resonated with the group. All of the potential future climate-change related effects that we considered for the SEAN region are listed in Table 1.

Table 1 Potential Future Climate-Change Related Concerns for the SEAN Region

Shorter duration of snowpack	Later freeze-up date	Longer growing season
Higher river and stream temperature	Greater variability in stream flow timing and/or magnitude	More or less water availability
Greater relative humidity	Greater and more variable wind speed	Increased extreme events and storms
More ocean acidification	Higher ocean temperature	

After much discussion, we chose ocean acidification and stream flow as the two potential climate-change related effects for the SEAN to create the four future scenarios. These effects

[7] Land is rising in southeast Alaska due to glacial melt (isostatic rebound) masking the effect of sea-level rise.

represent potential place-specific climate change concerns that participants believed would have the highest amount of impact and uncertainty for the region. Next we reconvened with the inland group to discuss the different climate change effects that would be included in the future scenarios. Interestingly, they had discussed many of the same impacts. The inland group of the SEAN workshop chose extreme weather events and stream flow as the potential future climate-change related effects for their climate change impact matrix (see Figure 6, page 15).

The CAKN region deals with very different climate change impacts than the SEAN region. The SEAN region consists mostly of a coastal temperate rainforest, while the CAKN region is situated in a much drier and colder area of Alaska. After the introductory session of the CAKN region, we divided into groups based on National Park affiliations: one group consisted mostly of Denali National Park and Preserve personnel, while the other group consisted of Wrangell-St. Elias National Park and Preserve personnel and Yukon-Charley Rivers National Park and Preserve personnel. I joined the latter group. We discussed a number of different climate change effects in the region, including river and stream temperature, mean annual temperature, precipitation, evapotranspiration, length of season, water availability, extreme events, wind, changes in permafrost, and changes in the fire regime. Many participants wanted to focus on permafrost and fire issues; however, the facilitators encouraged the groups to choose impacts that were more related to climate. They argued that it would be more beneficial to discuss fire and permafrost in the context of the climate change-related effects. All of the potential future climate-change related concerns we considered for the CAKN region are listed in Table 2.

Table 2 Potential Future Climate-Change Related Concerns for the CAKN Region

Warmer river and stream temperature	More or less water availability	Greater wind speeds and more wind events
Longer growing season	More extreme events and storms	Increased evapotranspiration

CHAPTER 2: Literature Review

Geographers have become increasingly interested in climate change governance and planning over the past two decades. They have focused on the emergence of urban and regional initiatives and the lack of national leadership in climate change governance, particularly in the United States (US) (Benson 2010: 1028 and 1031). Climate change governance often occurs within the realm of environmental governance and encompasses multiple environmental decisions. Therefore, it is necessary to understand climate change governance in the theoretical context of environmental decision-making. This chapter discusses geographical perspectives on climate change, provides an overview of the role of risk and uncertainty in climate change decision-making, provides an overview of environmental governance and decision-making in the US, and discusses climate change governance in Alaska's National Parks.

Geographical Perspectives on Climate Change

Climate change is a global process that is experienced in disproportionate ways in different locations and alters the relationship between people and their environments—in sum, climate change is distinctly geographical. Geographer Richard Aspinall argues that climate change is an "inescapable theme" that confronts society through various environmental, social, and economic priorities (2010: 715). The National Research Council (NRC) report, *Understanding the Changing Planet: Strategic Directions for the Geographical Sciences* notes that "the contributions of geographical sciences have focused particularly on understanding how people (and ecosystems) produce, and respond to, changing environmental conditions, and the social and political processes that produce differential exposures, sensitivities, and adaptive

capacities" (2010: 43). Additionally, Harden notes that climate change intersects almost all of what geographers study and that, as geographers, we "have traditionally led research and teaching to connect the dots between scales and locations, between local and global, and between people and their environments" (2010: 3). These contributions place geographers in a strong position to research and teach the processes and challenges of climate change.

The *Annals of the Association of American Geographers* focused its 2010 special issue on climate change, highlighting the salience of the topic within geography. Aspinall emphasized that climate change has distinctly geographical features; it "spans spatial, temporal, and organizational scales and has links with many other persistent geographical themes: nature-society relationships, environmental dynamics, and vulnerability" (2010: 715). Aspinall also notes that the wide scope of geographers and their ability to work with other disciplines creates opportunities for geographers to contribute to "integrative and interdisciplinary" climate change focused research (Aspinall 2010: 716). This section reviews geographical perspectives on climate change. In particular, it explains how the complexities and interconnectedness of climate change create spaces for geographical research and how geographers consider human response to climate change.

Wilbanks and Kates note that the importance of climate change "is wrapped up in how it interacts with other driving forces such as demographic change, global economic change, technological change, and institutional change" (2010: 722). Geographers are well aware that "a variety of natural occurrences and social processes can increase the vulnerability of peoples and places" (National Research Council 2010: 41). While climate change influences human-environment systems, it does not exist in a vacuum, and geographers are well positioned to study

and understand the interconnectedness of multiple processes at local, regional, state, national, and global levels.

Climate change research within geography is increasingly focused on interactions between humans and the environment. According to Harden, "the need to understand, predict, and respond to climate change creates considerable opportunity for research on human-environment interactions" (2012: 745). Human-environment interaction studies have been central to geography, but have historically been one-sided "as a result of the type of relationship studied or the perspectives (physical or social) brought by the investigators" (Harden 2012: 737). Climate change intensifies the need for geographers to consider human-environment interactions in a complex manner that is not simply one-sided.

In 2006, then president of the Association of American Geographers, Alexander Murphy, argued that geographers must enter public policy debates of immediate relevance (Benson 2010: 1028). In terms of public policy debates on climate change, geographers have been specifically concerned with the lack of national policies that address climate change and the emergence of urban and regional climate change initiatives (Benson 2010: 1025). These initiatives created new modes of environmental governance in the US and altered the ways in which geographers understand networks, stakeholder interactions, and governance (Bulkeley 2005; Benson 2010: 1031). According to Benson, these new modes of environmental governance "evidence the need for geographers to enter into public debates on climate change governance and engage in a reconceptualization of the nature of sovereignty" (2010: 1025). Geographers recognize that local and regional scale circumstances "affect and reflect larger-scale processes" (National Research Council 2010: 13). The NRC report also notes "geographical sciences frequently focus on the circumstances and comparative characteristics of individual places and regions, and then seek to

develop broader generalizations by exploring what is general and what is particular about human-environment processes observed in those places" (National Research Council 2010: 13).

This thesis studies how actors and institutions respond to climate change and the processes that produce decisions, interactions, and outcomes at the regional and place-specific level. In this thesis, I apply the geographical perspectives on climate change discussed above to the Climate Change Scenario Planning project (CCSP) for Alaska's National Parks. This thesis also aims to contribute to the development of understandings of climate change noted by Harden (2012: 743-744):

> *We find our understanding of atmospheric chemistry and atmospheric processes and our ability to monitor and detect change to be relatively well developed, whereas the ability to explain and anticipate the processes that lead to actions (or inactions) by individuals and societies remains less developed.*

This thesis seeks to explain the processes that led to actions by Alaska's National Parks in response to climate change.

The Role of Risk and Uncertainty in Climate Change Decision-Making

Participants in climate change decision-making may hold very different views regarding future climate change (Lempert and Schlesinger 2000). It is difficult to communicate about climate change in a way that inspires people to take actions and make tangible decisions. (Morton et al. 2011: 108). While the scientific community overwhelmingly agrees that climate change is occurring, the media and Internet present various competing discourses about the cause, extent, and response to climate change (Whitmarsh 2011: 690). Additionally, while more people believe that climate change is human-induced, there is also a growing belief that the media is over-reporting climate-change related issues and that scientists are exaggerating the

problem. From 2003 to 2008, the belief that climate change claims are exaggerated has doubled (Whitmarsh 2011: 698). This skepticism even influences the perceptions of those who accept that human-induced climate change is occurring. According to Morton et al., "despite scientific consensus over the existence of human-caused climate change (IPCC 2007), there remains considerable uncertainty over the precise extent, time-scale, and consequences of climate change" (2011: 108). These beliefs regarding climate change remain difficult to change as Whitmarsh points out that "beliefs about climate change are fundamentally linked to existing values and worldviews" (2011: 697).

Additionally, climate change is an intangible issue, because it is psychologically distant from most individuals (Morton et al. 2011: 108). Some individuals respond to climate change with apathy, believing that they have little control over global environmental problems (Grothmann and Patt 2005: 203). The management of the uncertainty of climate change amongst the general population has emerged as a key issue in climate change communication. Perceptions of climate change risk also have an impact on climate change decision-making. The perception of risk and uncertainty is a cognitive barrier throughout the climate change decision-making process (Grothmann and Patt 2005: 209). According to Grothmann and Patt (2005: 202), "the relative risk perception expresses the perceived probability of being exposed to climate change impacts and to the appraisal of how harmful these impacts would be to things an actor values."

In addition to uncertainty and the perception of risk the framing and communication of information to participants also influences climate change decision-making. Van Landeghem and Vanmaele note that, "the format in which information about uncertainty is presented is extremely important" (2002: 779). Morton et al. concluded that while uncertainty was a factor in the willingness to respond to climate change, a greater response factor was when a participants felt

as though, “they personally have the capacity to act effectively” to avoid negative outcomes (2011: 104). Whitmarsh notes that, “fear-based communication is likely to undermine efforts to engage the public with climate change and motivate individuals to change their behaviors. Fear can induce apathy or paralysis if not presented with an action strategy (and assumed self-efficacy) to reduce the risk” (Spence et al. 2008; Whitmarsh 2011: 699). The combination of uncertainty and pessimism regarding the future increased apathy amongst participants (Morton et al. 2011; Whitmarsh 2011). This led Morton et al. to conclude that, “the negative effect of uncertainty is not inevitable. Re-framing climate change messages away from (possible) losses might make it easier for people to feel capable and willing to act in the face of uncertainty” (Morton et al. 2011: 109). Thus, climate change response may be more effective if climate change is framed as uncertain but not necessarily as unresponsive to human changes, both positive and negative.

As threatening as climate change is the intangibility of the issue leads to a lack of response to possible hazards like floods, landslides, or storms (van Aalst et al. 2008: 169). Instead, everyday problems take precedence. “The challenge of linking risk management to the day-to-day development process is crucial for adaptation to climate change, where the problem consists of the *trends* in temperature, precipitation, seasonality, intensity and so on, coupled with the problem of hazards that are possibly becoming more *extreme* and/or *frequent”* (Whitmarsh 2011: 698).

In order to link climate change to participant’s daily lives, a bottom-up approach to climate change planning may be applied. Such an approach emphasizes reducing risk at the local level and helping those who are most likely to be affected (van Aalst et al. 2008: 165). Similarly, scenario planning may be used to help participants utilize their imaginations when considering a

highly uncertain future (Lempert and Schlesinger 2000). The scenario planning process also allows participants to address other concerns, in addition to climate change, that they feel may be important to consider for the future. Lempert and Schlesinger acknowledge that,

> *Scenario-planners regard scenarios as a handful of plausible stories about the future designed to illustrate the alternative consequences of key uncertainties. These scenarios are intended to help groups of decision-makers…internalize the fact that the future may be quite different from a simple extrapolation of the present. Motivated by these scenarios, decision-makers can better craft policies that hedge against the risks they face* (2000: 398).

Many planning methods fail to account for the considerable uncertainty of climate change and the future itself. Robust planning, proposed in 2002 by Van Landeghem and Vanmaele, aims to recognize and explore uncertainty and variability in operations management. The robust planning model is depicted in Figure 9. Van Landeghem and Vanmaele note, "Robust planning achieves more effective outcomes with less re-planning (2002: 782). Lempert and Schlesinger state robust strategies are "insensitive to uncertainty about the future" (2000: 391). Robust strategies perform well compared to alternatives even in the context of surprises or extreme events. They also help to establish consensus among stakeholders who may have differing views on what the future will be like. Rather than an "optimal" plan for one assumed future, "a robust plan provides a "near-optimal" solution, which stays valid over a range of variable values at a predictable but higher cost (Van Landeghem and Vanmaele 2002: 773).

Robust planning and scenario planning are related but different. Scenario planning considers multiple and very different futures and outcomes for each scenario, whereas robust planning considers random outcomes of one scenario (Van Landeghem and Vanmaele 2002: 773). Van Landeghem and Vanmaele propose embedding robust planning into scenario planning

(2002: 773). The application of both scenario and robust planning allows for preparations for alternative scenarios with the most plausible scenario as the most likely plan (Van Landeghem and Vanmaele 2002: 776). The combination of scenario and robust planning create the potential to effectively plan for the uncertain and variable future, especially in consideration of climate change.

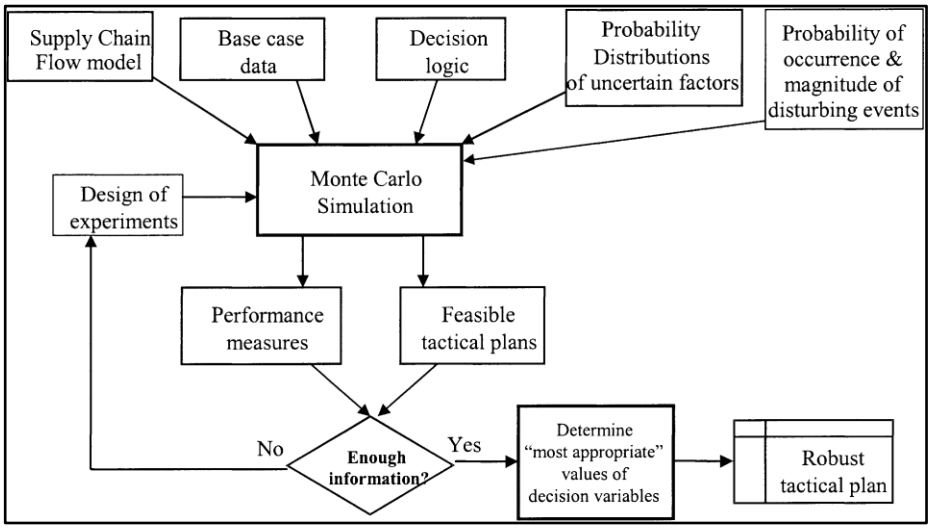

Figure 9 Van Landeghem and Vanmaele's robust planning model (2002: 775).

Environmental Decision-Making in the United States

Environmental governance and decision-making consists of a set of regulatory processes, mechanisms, and organizations through which the state, market, and actors influence environmental actions and outcomes (Lemos and Agrawal 2006: 298). Modern environmental decision-making can be traced back to a paper written in 1895 by Frederick W. Taylor titled, "*A Piece-Rate System*." Taylor emphasized the increase of productivity through measurement, the elimination of waste and duplication, and the constant search for the 'one best way' in management (Brunner et al. 2005: 9). This form of management became known as the "Taylor

System." In 1910, the "Taylor System" and related forms of management were termed "scientific management" in the hearings of the Interstate Commerce Commission (ICC) because the main principles of the process rely on measurement and scientific data (Brunner et al. 2005: 11-12). The ICC hearings of 1910 were about railroad price increases, and the attorneys Morris L. Cooke and Louis Brandeis chose the adjective "scientific" to promote their opinion that the ideals of "scientific management" were an alternative to the power and influence of the railroad barons (Nelson 1980: 122-3). "Scientific management" became the core of Progressive-era thinking, which required that objective public decisions replace previous ineffective systems and sometimes corrupt patronage (Nelson 1995: 42).

Progressive conservationists in Theodore Roosevelt's cabinet pushed for "scientific management" in natural resources policy because it focused on efficiency and decision-making based on technology through a single-centralized authority (Brunner et al. 2005: 12). Theodore Roosevelt's Progressive cabinet wanted to move environmental decision-making away from economic interests. The desire for objective, science-based decisions likely arose from the rapid degradation of US natural resources such as forests in the late 19th Century (Nelson 1995: 44). Theodore Roosevelt and his cabinet focused on using technical and scientific methods as the sole decision-base as "an attempt to supplant conflict with a 'scientific' approach" (Brunner et al. 2005: 12). US natural resources policy adopted "scientific management," emphasizing the following three goals: utilize the latest scientific knowledge, base decisions on technology and efficiency, and rely on a single-centralized authority to make optimal decisions (Brunner et al. 2005: 12).

The concept of "scientific management" remained largely unchallenged in environmental decision-making for the first half of the 20th Century. Then, in the 1960s, public sentiment changed drastically and US natural resources policy transitioned from conservationism towards

environmentalism (Ross 2000; Haycox 2002: 2). This transition coincided with rapid social change in the US, which resulted in many social movements, including the environmental movement (Ross 2000). The US environmental movement gained power and influence in the 1960s. Throughout the 1960s, Americans began to regard the environment as a vital public resource (Ross 2000: xvi). This aided in a transition from the commodification of natural resources under a multiple-use policy towards mandated assessments of environmental impacts that sought to guarantee clean air and water and to protect endangered species (Haycox 2002: 2).

As the environmental movement grew, it drew from a widespread feeling that large institutions, including government and business, had lost touch with the needs of society (Ross 2000: xvii). This led to a desire for increased accountability and transparency in government, public access to information, and public participation in environmental management and decision-making (Ross 2000: xvii). These desires resulted in community-based initiatives that challenged the reliance on a single-centralized authority to make unbiased environmental decisions—the third goal of Taylor's "scientific management" as presented in Theodore Roosevelt's natural resources policies of the early 20th Century (Brunner et al. 2005: 12). Additionally, as increasing numbers of US citizens attended and graduated from college, educated stakeholders wanted a say in the environmental decision-making process (Ross 2000). They opposed "scientific management" because it did not offer room for participation from outside groups in the decision-making process and because it relied on a top-down form of management (Brunner and Lynch 2010).

The environmental movement in the 1960s and 1970s demanded increased participation in environmental decision-making, which resulted in a new form of environmental management known as adaptive management. Adaptive management takes an interdisciplinary approach to environmental governance by integrating science, policy, and decision-making systems (Brunner

et al. 2005). It also recognizes that social, economic, and governmental factors are needed for successful implementation of decisions (Gunderson and Light 2006: 324-325).

Adaptive management builds on collaborative decision-making with the goal of advancing the common interest (Brunner et al. 2005: 278). The adaptive governance process relies on experimentation to drive the process to make a plan of action that will be carried out, evaluated, and then adjusted (Brunner et al. 2005: 25). Adaptive management recognizes that politics, community needs, and policy influence decision-making (Brunner et al. 2005: 21). The involvement of stakeholders in the decision-making process is central to the principles of adaptive management. The emphasis of public learning engages stakeholders in the adaptive management process. Adaptive governance also emphasizes the inclusion of local knowledge, or knowledge that is gained by resource users over time (Ozawa 2005: 194).The emphasis on engagement gives stakeholders a voice in the decision-making process and also allows for managers to increase their effect by engaging and teaching stakeholders (Brunner et al. 2005).

Adaptive management emerged during 1970s-1980s in the US as environmental issues were becoming more complex due to increasing diversity of resource users, increasingly multi-faceted environmental problems, and higher degrees of uncertainty. Social change in the US led to greater demand for outdoor recreation and living close to nature, which complicated environmental problems and demands (Ross 2000: xvi). Additionally, environmental pollution was more visible on television, and events such as the 1969 Santa Barbara oil spill made pollution issues more acute to US citizens (Ross 2000: xvi).

The CCSP focuses on the ability of the land to adapt to current and future conditions rather than a return to “historical accuracy.” Adaptive management recognizes that uncertainty is inherent in natural resource management and attempts to minimize those uncertainties over time

by using the principles of the scientific method. An adaptive governance approach to public land management regards public lands less as wilderness reserves with strict boundaries, and more as places that preserve history, nature, and culture (Phillips 2003). Adaptive environmental governance results in a broader, more inclusive approach to public land management (Adger et al. 2002). This approach promotes interactions between institutions and actors at multiple levels that are excluded in the "scientific management" framework.

Adaptive environmental governance creates a hybrid form of governance that includes social, economic, and government stakeholders in the decision-making process. These forms of hybrid governance are depicted in Figure 10. In this figure, "social" refers to communities and community representatives, "economic" refers to market actors, and "government" refers to state agencies (Lemos and Agrawal 2006: 311). The CCSP workshops involve stakeholders from other federal agencies, Alaskan communities, and Alaska Native villages. The involvement of these social and government stakeholders creates a co-management form of environmental governance (Bulkeley 2005; Lemos and Agrawal 2006).

The CCSP uses an adaptive management approach, varying significantly from the more traditional "scientific management" framework. Figure 11 depicts the adaptive management model used by the CCSP, which is experiment-based and scenario driven. A problem is identified and assessed in step 1, and a strategy for solving the problem is designed and implemented in steps 2 and 3. The problem is then re-assessed and evaluated in steps 4 and 5. Finally, implementation strategies are created to better address the problem. The CCSP promotes this adaptive management model as a way to respond to climate change in the Alaska Region of the National Park Service (NPS).

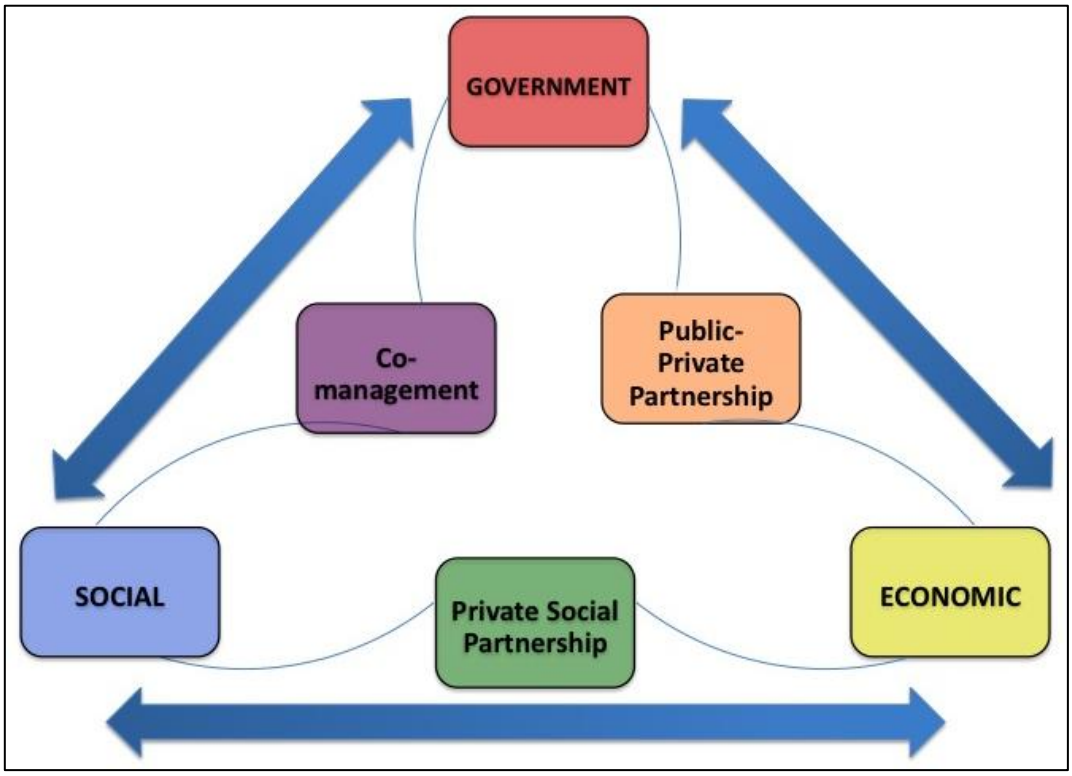

Figure 10 Hybrid modes of governance. Image created by the author.

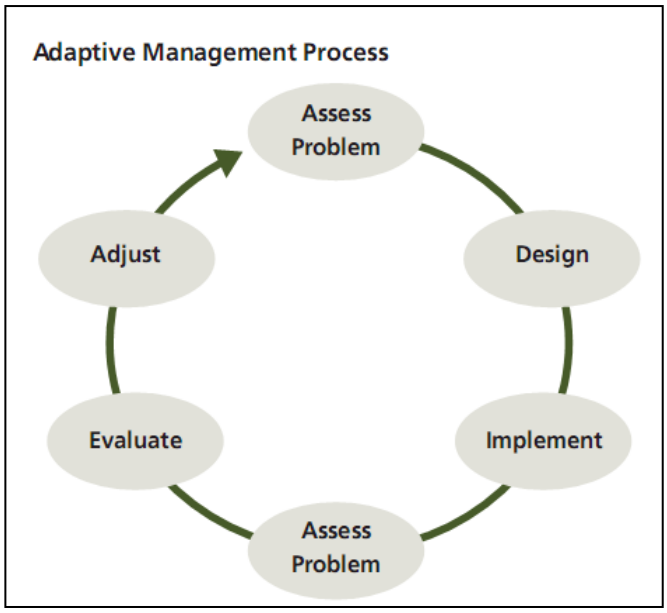

Figure 11 The Adaptive Management model the CCSP uses. Image sourced from CCSP workshop data (Climate change scenarios for Southeast Alaska summary 2012).

Climate Change Governance in the Context of the Alaska Region of the NPS

Since 2001, the NPS has received orders from the US Secretary of the Interior to consider climate change in its planning and management activities. The primary mission of the Department of the Interior (DOI) is to manage the natural and cultural resources of the US (U.S. Department of Interior, 2012). The DOI manages one-fifth of the total land in the US (U.S. Department of Interior, 2012). The NPS is housed under the DOI, a Cabinet-level federal agency that also oversees the operation of the Fish and Wildlife Service; the US Geological Survey; the Office of Surface Mining, Reclamation, and Enforcement; and the Bureaus of: Indian Affairs, Land Management, Ocean Energy Management, Reclamation, and Safety and Environmental Enforcement. All of the above federal agencies must comply with DOI Secretarial Orders.

In 2001, then Secretary of the DOI, Bruce Babbitt, signed Secretarial Order 3226, "Evaluating Climate Change Impacts in Management Planning." This order required each agency within the DOI to "consider and analyze potential climate change impacts" for long-range planning and management plans, for setting priorities for research and investigations, and for making major decisions regarding the potential utilization of resources (Ellenwood 2012: 959). This order was amended by then Secretary Dirk Kempthorne in January 2009, and reinstated in September of 2009 by the current Secretary of the Interior, Ken Salazar (Amended Secretarial Order 3226 is in Appendix B). Secretarial Order 3226 focused on research and the reduction of greenhouse gas emissions within the DOI.

The most current DOI Secretarial Order regarding climate change is Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural

Resources," which was first signed on September 14, 2009 then amended on February 22, 2010 (Amended Secretarial Order 3289 is in Appendix C). In addition to the plans put forth in Secretarial Order 3226, Secretarial Order 3289 aims to "increase coordination of climate change response strategies within the DOI and across other federal agencies, and initiates projects related to carbon storage and reductions in greenhouse gas emissions and energy use" (Ellenwood 2012: 959). The CCSP requested funds from the Alaska Region of the NPS on November 17, 2009; two months after Secretarial Order 3289 was signed (Rice 2009). The project aligns closely with the main goals of Secretarial Order 3289, which are shown in Table 3 (United States Department of Interior, 2010).

Table 3 Goals from Secretarial Order 3289

1. Adapt water management strategies to address the possibility of shrinking water supplies and more frequent and extended droughts.
2. Wisely manage millions of acres of parks, refuges, and other public lands, and prudently exercise its shared responsibility for managing 1.7 billion acres of the US outer continental shelf.
3. Conserve and manage fish and wildlife resources including threatened and endangered species.
4. Protect cultural and archaeological resources that may be affected by climate change.
5. Address the impacts of climate change on American Indians and Alaska Natives.
6. Continue to provide state-of-the-art science to better understand the impacts of climate change and to develop science-based adaptive management strategies for natural and cultural resource managers.
7. Continue to work to quantify the amount of carbon stored in our forests, wetlands, and grasslands, identifying areas where carbon dioxide can be safely stored underground, and ways to reduce the Department's carbon footprint.

Goals are summarized from United States Department of Interior Secretarial Order 3289.

It is uncertain what this mandate will mean for the DOI and National Parks. Secretarial Order 3289 clearly calls for a coordinated response to climate change within the DOI; however it is unclear what that response will look like. Initiatives like the CCSP are formulating climate change response possibilities for National Parks and other agencies within the DOI. The

objectives and mandates of the Secretarial Order have not been implemented on a department-wide basis, and it is not certain how the DOI will accomplish the goals in every agency. The creation of the Secretarial Order is promising for promoting a coordinated response to climate change throughout the DOI; however, it remains unclear how this will develop.

Through the CCSP process, I consider how the Alaska Region of the NPS responds to climate change. Currently, National Parks must consider climate change in its long range planning activities, but no other specific benchmarks exist for National Parks in response to climate change (United States Department of Interior 2010). The CCSP workshops address most if not all of the goals in Secretarial Order 3289 (see Table 3, page 36). The CCSP project could possibly become a model for other regions within the NPS, and it could influence climate change planning and decision-making in other agencies of the DOI. While a few National Parks have started to respond to climate change, no NPS Region other than the Alaska Region has attempted a regional response (Rice 2009). The DOI has committed to a department-wide response to climate change, but it remains to be seen how this will be implemented at the regional and national level of the NPS. Understanding how the CCSP works will be important for future climate change decision-making within the NPS.

CHAPTER 3: Methodology

Qualitative methods are particularly useful for understanding the relationships and behaviors between institutions and actors, and the context within which the decision-making process takes place (Baxter and Eyles 1997). While conducting participant-observation and interviews at the Southeast Alaska Network (SEAN) and Central Alaska Network (CAKN) workshops, I investigated the roles of institutions, actors, context, and process in decision-making in order to obtain a *thick* analysis of environmental decision-making (Adger et al. 2003). Anthropologist Clifford Geertz first advocated for a thick description of culture in 1973, a concept that continues to influence social scientists. He argued that the way to advance understanding was not to agree upon a consensus, but to rather refine the debate to "increase the precision with which we vex each other" (Geertz 1973: 29). Adger et al. (2003) argue that a *thick* analysis of environmental decision-making is necessary to understand the complexity and nuances of environmental decisions. I apply the *thick* methodology for analyzing environmental decision-making proposed in Adger et al. (2003).

Thick Analysis of Environmental Decision-Making

Thick description is not a new methodology to the social sciences. The first description of a *thick* analysis is attributed to anthropologist Clifford Geertz who advocated for a *thick* description of culture in 1973, a concept that continues to influence social scientists in many disciplines. He acknowledged that all cultural analysis is intrinsically incomplete and the way to advance understanding was not to agree upon a consensus, but to rather refine the debate, to, "increase the precision with which we vex each other" (Geertz 1973: 29). In this way, a *thick* description is never complete, but an interpretation of a specific case, and a debatable one at that. Geertz used the example of winking to illustrate his point; the *thick* description of the act of

winking moves beyond the action and towards the intention of the wink and how the person receiving it construed the wink's meaning (Geertz 1973: 6). In essence, the *thick* description is the intention behind the action of the wink, and also how society or other actors interpret its meaning.

In his *thick* description methodology, Geertz intended to find a middle ground between an overly specific case study and an overly general one. Attempting to strike the right balance between making generalizations and over specifying led to what Geertz termed "generalization". Geertz's "generalization" acknowledges the similarities and differences between cases as well as the influence of context and other forces and attempts to understand and describe something in a specific way without making it incomparable to other cases (Adger et al. 2003: 1100).

Adger et al. argue that the concept of *thick* description is useful to apply to environmental decision-making analysis, especially since multiple and diverse disciplines study environmental decision-making and tend to focus on their own, discipline-specific concerns (2003: 1095-1096). This single-disciplinary focus creates difficulty when trying to compare cases between disciplines (therefore impeding debate) and leads to an emphasis on the aspects that each specific discipline tends to focus on. These approaches generally overlook the specificity and context of environmental decisions, which are intrinsically important to understanding environmental decision-making. In this way, much like Geertz called to refine the cultural debate, Adger et al. (2003) call to refine the debate of environmental decision-making with an interdisciplinary focus in an attempt to increase *the precision with which scholars can vex one another*[8] across

[8] "Anthropology, or at least interpretive anthropology, is a science whose progress is marked less by a perfection of consensus than by a refinement of debate. What gets better is the precision with which we vex each other." From Geertz, 1973, The Interpretation of Cultures: Selected Essays, New York, NY. page 29.

disciplines in regard to environmental decision-making analysis. It appears that Adger et al. (2003) hope to accomplish what Geertz desired in cultural studies:

Studies do build on other studies, not in the sense that they take up where the others leave off, but in the sense that, better informed and better conceptualized, they plunge more deeply into the same things. Every serious cultural analysis starts from a sheer beginning and ends where it manages to get before exhausting its intellectual impulse. Previously discovered facts are mobilized, previously developed concepts used, previously formulated hypotheses tried out; but the movement is not from already proven theorems to newly proven ones, it is from an awkward fumbling for the most elementary understanding to a supported claim that one has achieved that and surpassed it. A study is an advance if it is more incisive—whatever that may mean—than those that preceded it; but it less stands on their shoulders than, challenged and challenging, runs by their side.

An excerpt from page 25 of Clifford Geertz's 1973 book,
The Interpretation of Cultures: Selected Essays

Qualitative Field Work Methods

This study's main findings are based on participant observation that I conducted in February and April 2012 at the SEAN and CAKN Climate Change Scenario Planning (CCSP) workshops. Participant observation involves getting to know the people in the study and participating in their world (Kitchin and Tate 1999: 221). As a participant-observer, the researcher is expected to put her or himself "in the shoes" of the study participants and to experience events as they do. Participant observation has the potential to generate detailed information about individual and group behavior, and data about interactions between institutions and actors of multiple scales (Kitchin and Tate 1999). I also interviewed CCSP workshop participants. These interviews helped me gain a better understanding of the context of both workshops and the relationships between institutions and actors outside the CCSP workshops.

I divided the fieldwork research into three stages. First, I attended the SEAN and CAKN CCSP workshops in February and April 2012 to conduct participant-observation and interview workshop participants. Second, I conducted follow-up telephone interviews with SEAN and

CAKN workshop participants in March and May 2012. Third, I analyzed data from the SEAN and CAKN workshops and interviews and compared data from both workshops.

Attending two CCSP workshops allowed me to compare the information from each workshop and sub-region. Each CCSP workshop was tailored to fit the needs and characteristics for the sub-region where it was held. Therefore the CCSP workshops emphasized different climate change effects in southeast Alaska for the SEAN workshop and central Alaska for the CAKN workshop. The National Parks of the SEAN region are situated on Alaska's southeast inland coast and are mostly covered by rainforest and ice fields. In contrast, the CAKN National Parks are located in the much drier inland region of Alaska that is characterized by fire, permafrost, subsistence hunting, and large migrating mammals. These environmental contexts guided both workshops and shaped the institutions and actors that participated in each workshop. Observing the SEAN and CAKN workshops helped me obtain in-depth perspectives on climate change in Alaska's National Parks and triangulate my results.

I conducted participant observation for four days each in two separate CCSP workshops. I interacted with participants and facilitators of the CCSP workshops as much as possible. I conducted 12 informal interviews at the SEAN workshop and eight informal interviews at the CAKN workshop, totaling 20 informal interviews for this study. Additionally, I conducted formal interviews with 12 workshop participants. In total, I interviewed 32 workshop participants. Five formal interviews took place at the CCSP workshops, and seven were conducted via telephone after each CCSP workshop had ended. The formal interviews took between 20 and 60 minutes and focused on the participant's experiences in the CCSP workshops and the application of the planning tools to their positions. These interviews provided insights into the experiences and outcomes of the CCSP workshops. An interview guide for formal interviews is attached in Appendix D.

I asked participants to sign an informed consent form for all interviews that I conducted during the CCSP workshops and for all telephone interviews. Before conducting an interview, I handed each participant the informed consent form, I explained the objectives of the study, and I noted that participation was optional. Before a phone interview, I reminded participants of the consent form, and I briefly explained the objectives of the study. All methods for this analysis were conducted in accordance with Internal Review Board approval, which was granted in November 2011.

Each CCSP workshop included 30-40 participants from various federal public land agencies, communities, and Alaska Native villages located throughout the region. The SEAN workshop took place at the Mendenhall Glacier Visitors Center in Juneau, Alaska from February 21st to 24th 2012. The conference room, overlooking the Mendenhall Glacier, provided an apt backdrop to discuss climate change. It was a secluded location that allowed the participants to focus entirely on the CCSP workshops. The CAKN workshop took place at the Student Center at the University of Alaska-Fairbanks from April 16th to 18th 2012. The bustling campus was a distraction because participants at this workshop often left throughout the day to go to lunch or to run errands. Figures 12 and 13 are images from the National Park Service (NPS) Alaska Region website that provide examples of the contrasting environments of the SEAN and CAKN workshops.

Figure 12 SEAN workshop participants outside of the Mendenhall Glacier Visitor's Center (Alaska Regional Office 2012b).

Figure 13 CAKN workshop room at the University of Alaska-Fairbanks (Alaska Regional Office 2012a.)

I blended in well as a participant in the CCSP workshops; because many participants were just meeting each other for the first time. I introduced myself as a student from the University of Tennessee who was conducting research on the CCSP process to understand how climate change decision-making operates in Alaska's National Parks. Throughout the workshop, I acted as a participant as often as possible and was viewed as one. Each workshop provided a notebook for all participants, which I used to record my observations while I was participating. Using the notebook provided helped me blend in with the other participants. I worked to balance my dual role as participant and observer throughout the CCSP workshops, and did my best to stay engaged as a participant the entire time. When I needed more time to record my observations, I made a note of that in my notebook and wrote in more detail about it in a summary I typed up after the workshops ended each night. I took 200 pages of notes of observations from the SEAN and CAKN workshops. I recorded my observations in a holistic manner as described in Kitchin and Tate (1999: 222). Observation can utilize highly structured checklists that focus on specific patterns identified by the researcher prior to observation or focus on description of the events at hand (Kitchin and Tate 1999: 222).

I chose to conduct observations using the holistic manner to allow themes to emerge in each case throughout the observation phase. The holistic approach to observation involves the creation of two accounts: the first account is produced with information such as time, date, place, and who is there; the second account is a narrative that constructs a story of the events using descriptive details about what is happening (Kitchin and Tate 1999: 221). I utilized the holistic manner of observation throughout each workshop. I also recorded specific instances throughout the workshop that may provide insights into the climate change decision-making process. I recorded who was and was not participating in workshop activities, which participants were interacting with one another, what the perceived comfort level was with a topic that was discussed, how we engaged with a given topic, and the reactions of the participants and

facilitators to the progress of the workshop. I also took detailed notes on the scenario planning process itself and on how long it took us to work through each step in the process. I chose to take notes on these specific instances throughout the CCSP workshops based on etic themes. Etic themes are identified and assigned by the researcher (Patton 2004). The etic themes I identified were based on my research questions and the components that make up a *thick* analysis of environmental decision-making (Adger et al. 2003). The etic themes I identified prior to the CCSP workshops were: NPS and non-NPS interactions between actors and reactions to the workshop, the ability of a group to discuss climate change, and the response to adaptive management and scenario planning processes.

All participants and facilitators introduced themselves at the beginning of each workshop. I used this opportunity to introduce myself, to briefly explain my research project, and to explain that I would be conducting observations throughout the workshop. At both the SEAN and CAKN workshops, I waited until we were divided into two working groups to describe the research more in-depth and to talk about the participant observation and interview aspects of the research. I explained to the SEAN and CAKN working groups that I was conducting a study on climate change decision-making in the Alaska Region of the NPS. I briefly told each group that I would record observations from each workshop and use them as a part of my study. I explained that no individual would be personally identified in this study by name, and that some quotes may be used anonymously. I also mentioned that I would conduct interviews during and after each workshop and that in order to conduct an interview I would ask for a signed informed consent form from each participant. Finally, I mentioned that anyone could discuss questions or concerns about the project at any time throughout the workshop with me, and I left informed consent forms for interviews at the back of the room, in case someone wanted to approach me about conducting an interview.

My participation varied widely between the SEAN and CAKN workshops. I was more passive and reserved throughout the SEAN workshop, partly because I was going through the process for the first time, but mostly because the participants in the SEAN workshop were highly participatory and engaged in learning about and applying the scenario planning process. The group in the CAKN workshop was very different. Participants were more skeptical, less participatory, and more uncomfortable overall with the scenario planning process and with discussing climate change. I often heard statements like, "*I am not used to* ***this*** *type of planning"* and "*we are really just guessing here aren't we, what's the point*" (NPS employees, CAKN workshop, April 16, 2012). These reactions prompted me to participate more in the CAKN workshop. I tried to offer suggestions and synthesize notes to keep the participants engaged and to move forward. While participation is an extremely important part of the research project, it also affected the notes that I took during group meetings at the CAKN workshop. Due to my increased participation in the CAKN workshop, I made a conscious effort to take detailed notes at the end of each day.

Data Analysis

In the third and final research stage, I organized the research into four documents for analysis: 1) A summary of the SEAN workshop based on my notes and observations; 2) A summary of the interviews of the SEAN workshop participants; 3) A summary of the CAKN workshop based on my notes and observations; and 4) A summary of the interviews of CAKN workshop participants. I combined two case studies and two qualitative methods to triangulate the research results.

Triangulation enhances the validity of qualitative studies by investigating research questions through a variety of methods, sources, and perspectives (Baxter and Eyles 1997).

Triangulation utilizes multiple sources and methods in a single study (Jick 1979; Hemming 2008). The inclusion of multiple sources and methods enhances the validity of the study and strengthens arguments therein (Darbyshire et al. 2005). Triangulation searches for themes across different types of data, and also looks to identify inconsistencies between the different data types that may give further insight into the research approach and the phenomena under study (Patton 2004). Analyzing data from multiple sources and two separate case studies allowed me to identify emergent patterns between the different data sources.

After summarizing the data, I reviewed the SEAN and CAKN documents separately. In this initial review, I avoided making connections to other data in an attempt to analyze each document in its purest form (Patton 2004). I read through the SEAN documents and recorded my initial observations. Then, I read the SEAN documents again, identifying key words, themes, and phrases that occurred within the document. Thereafter, I read through the CAKN documents in the same way. After the initial reviews of the documents were complete, I reviewed the SEAN and CAKN documents together. During this review, I identified similarities and differences between the two workshops and particularly compelling moments in each case study.

Coding Data: Emic and Etic Themes

Next, I coded the data using emic and etic themes. Emic themes emerge from the participants themselves whereas the researcher identifies etic themes (Patton 2004). This approach allows the researcher to identify themes and allows themes to emerge from the participants themselves (Patton 2004: 268). The themes I identified relate directly to my research questions. I specifically looked for interactions between institutions and actors; environmental, social, and political factors that influenced the CCSP process; and similarities and differences

between the processes and outcomes of each workshop. I identified these themes based on the proposed methodology for a *thick* analysis of environmental decision-making in Adger et al. (2003). Adger et al. argue that environmental decision-making must be analyzed from a *thick* perspective, since any environmental decision is likely to be the product of a particular configuration of institutions, context, and processes and therefore demands that these aspects are understood and incorporated into environmental decision-making analyses (Adger et al. 2003: 1097). After multiple reviews of the data, and coding the documents, I synthesized my research into a 50-page document that summarized the preliminary findings of the SEAN and CAKN workshops. Thereafter, I placed the perspectives from the two CCSP workshops in the larger framework of climate change governance and decision-making.

Site Selection, Positionality, and Lessons Learned

I became interested in the CCSP project in the Alaska Region of the NPS in June 2011 after my first semester as a graduate student in Geography at the University of Tennessee. I had reconnected with my former supervisor, Dave Schirokauer, from Klondike Gold Rush National Historical Park in Skagway, Alaska and we were discussing climate change planning (or lack thereof) within the NPS. After 45 minutes, and just before we ended the conversation he said,

> *Well, Kassie, I'm not exactly sure if this is what you are looking for, but there is this big project the Alaska Region is working on. It has something to do with climate change and scenario planning, but honestly I have no idea how serious they are or if it got defunded for 2011. I can send you the budget proposal and the Climate Change Response Strategy for 2010-2014.*

With that one conversation, my thesis project was born.

I choose the CCSP project for three reasons: First, it was the only documented multi-year region-wide project that focused on climate change decision-making at any regional level in the

NPS; Second, thanks to my prior working relationship in the Alaska Region of the NPS, I had a preliminary understanding of the effects of climate change in the region and how they affected public land management in the region; Third, climate change is affecting the state of Alaska in more frequent and intense ways than the contiguous United States (US) (Rice 2009), making the CCSP a compelling case that may offer insights into future climate change planning for other geographical regions. These three reasons made the CCSP a particularly compelling case study; however, other aspects of the CCSP uncovered challenges to the research. First and foremost, the divide between the state government and the federal government in environmental decision-making in Alaska is apparent and longstanding. Second, the large role of Alaska Natives in decision-making creates an interesting case but it is not necessarily an easily transferable study. Third, climate change decision-making in the US fails to create binding decisions. These issues underline the complexities of the CCSP as a case study, but also create opportunities to better understand longstanding conflicts, the inclusion of indigenous participants, and the inability to make binding decisions in climate change governance in Alaska and the greater US.

Once I chose the CCSP project, I worked with Dave to contact the coordinators of the project, Bob Winfree and Bud Rice of the Alaska Region of the NPS. They invited me to the SEAN workshop. Each workshop was organized for only 30-40 invited participants, so I was very happy to be invited. In addition to my previous work experience in this region, several former co-workers would be attending the SEAN workshop, enabling me to establish good rapport with participants. In fall of 2011, Dave informed me that he was offered a job in Denali National Park and Preserve, and he would attend the CAKN workshop instead of the SEAN workshop. When he asked if I wanted to switch to the CAKN CCSP workshop, I asked if I could be invited to both workshops to investigate two case studies and he agreed.

While my prior relationship with the Alaska Region of the NPS enabled me to carry out this research project, it also greatly influenced my positionality in the field. I believe that it is necessary to analyze the positions of myself as the researcher, even if I am not completely aware of all my positions and subjectivities (Rose 1997). I attempt to understand my positionality as noted below.

First, I had worked for the Alaska Region of the NPS before I started this research project. As an exotic plants management intern for Klondike Gold Rush National Historical Park, I had worked in an area that was affected by climate change without knowing exactly how to consider climate change in the workplace. I felt that something in NPS planning had to change in order to adequately respond to climate change, and I assumed that most NPS personnel would agree with me. However, this was not always the case in the CCSP workshops.

Oftentimes, throughout the workshops, I felt that the CCSP participants should be more aware of the effects of climate change to their region, and should be more eager to incorporate climate change into their land management practices. I became highly aware that I felt this way in the CAKN workshop. One participant seemed very uncomfortable and un-invested in the CCSP process. She had a Ph.D. in wildlife biology and she studied Dall sheep. In my opinion, she should have been able to discuss how climate change was going to affect Dall sheep in the next 30-50 years. Instead, she reacted negatively to the planning methods in the workshop, and argued that climate change was not going to affect the wildlife in her park. Flabbergasted, I was personally insulted that someone with a Ph.D. and personal experience in the region did not acknowledge the possible effects of climate change on wildlife. Instead of trying to understand how this person tried to think about and make decisions regarding climate change, I was just annoyed with everything that she said.

Eventually, I began to think critically about her opposition to considering climate change in land management. Quite possibly, she had received her Ph.D. without any consideration of climate change or its possible effects on Dall sheep. Perhaps this could make someone feel unprepared to discuss climate change and even uncomfortable with the topic. A few other participants in the SEAN and CAKN workshops seemed opposed to considering climate change in land management practices. One notably mentioned that he assumed that climate change was going to be dealt with, *"after I retire"* (US Forest Service employee, CAKN workshop, April 17, 2012). It appeared that the participants who experienced difficulties incorporating climate change in land management felt like they had to radically change their perspectives on land management practices. I have never really had to rethink my land management perspective before, and I never considered what that might feel like. Once I confronted my bias, I began to develop an understanding for how overwhelming and unsettling it might be to have to account for something that one had never considered before. This could be especially unsettling because climate change and its effects can be highly uncertain and variable.

My role as a researcher was influenced by my position as an American white female (McIntosh 2002). I consider how these aspects of my identity may have affected this research next. The participants in the CCSP workshops were predominately white (at least that is how I perceived the majority of the participants), with the exception of the Alaska Native participants in attendance. The SEAN workshop had five Alaska Native participants, while the CAKN workshop had only one. During the SEAN workshop in February, I purposely participated in a group with more Alaska Native stakeholders to include their perspectives in my analysis. I also shared a room with an environmental planner who was an Alaska Native with Arctic and southeastern heritage. We developed a bond and became friends quickly. We ate lunch and dinner together throughout the workshop and I recently received a pair of earrings that she had

made for me. She introduced me to the other Alaska Natives at the workshop which established rapport with them. I also established rapport with an Alaska Native of similar age. We both had experience in community development, and knew several people in Skagway, Alaska. These relationships resulted in in-depth interviews and increased credibility with the other Alaska Native participants at the SEAN workshop.

My relationship with the Alaska Native stakeholder in the CAKN workshop could not have been more different. First, there was only one Alaska Native participant at the CAKN workshop. She rarely spoke throughout the workshop. Still, I tried to connect with her but failed. We were in the same working group and I sat next to her when I could, though she often left during the workshop for long periods of time. She did not seem interested in communicating with anyone at the workshop. Finally, on the third day of the workshop, I tried to talk to her during a break. I thought that she might be more interested in talking with me if we were not in a big group. The conversation was very short. I tried to make conversation about the workshop, but only received one-word answers. After making a couple of attempts during the workshop and breaks, I stopped trying to connect with the participant. Towards the end of the CAKN workshop another participant told me that the Alaska Native woman works within the region on a hunting and subsistence planning board and her relationship with the NPS had soured previously. Still, I was disappointed that I was not able to obtain her insights on the CCSP or how climate change was affecting her community.

I also reflected on my ability to gain legitimacy throughout both CCSP workshops. I was very nervous when I attended the SEAN workshop in February. I was intimidated by the expertise of the participants involved, and worried that I would be unable to digest the information in the workshop while trying to conduct my observations and interviews. Also, I was concerned that I would be the only non-Alaskan, or the only one not working directly on the

issues at the workshop, and I thought that would be isolating. Because of this nervousness, I came to the SEAN workshop prepared and ready to participate. I had read the supplementary material suggested for participants and participated in both pre-workshop webinars, in addition to reading information from the previous CCSP workshops.

Two former co-workers and my former superintendent from Klondike Gold Rush National Historical Park attended the SEAN workshop. My two former co-workers offered invaluable insights throughout the workshop. In every CCSP, participants create two working groups that work together on the scenario planning process. When we divided into two groups in the SEAN workshop, I joined the group opposite of my two former co-workers and asked them to take notes on the proceedings of their group for me. One of them took particularly detailed notes, which helped when I interviewed some participants from that working group, and both provided me with detailed information on their group's proceedings. These relationships helped me obtain a wealth of information from the SEAN workshop. Additionally, during the after-hours of the SEAN workshop, I talked with many workshop participants about their opinions and insights into the CCSP workshops and how they dealt with climate change at work. After the SEAN workshop, I thought that the CAKN workshop would be similarly rewarding, particularly with the help of my former supervisor, Dave.

I arrived at the CAKN workshop not as nervous; and, since it was the middle of the school year, not quite as prepared. I had less time to prepare and I had already gone through the CCSP process once. Additionally, I did not know much about the CAKN issues; I did not understand fire and permafrost the way I understood the issues associated with the SEAN workshop, like exotic plants, glacial melt, and increased precipitation and stream flow. I assumed that my credibility and connection to Dave would help me overcome these issues. However, as crucial as Dave was in helping me gain access to the CCSP workshops, he provided little assistance in

connecting me with the participants at the CAKN workshop. Dave had recently started a new position as the Physical Scientist at Denali National Park and Preserve, and the CAKN workshop was a good networking opportunity for him. The lack of a connection to the Denali Group affected my access to some participants, as I assumed that Dave would help establish relationships with participants from his new place of work. The groups in the CAKN workshop were divided based on park affiliation and I purposely chose the opposite of Dave, counting on his connections. The combination of my quieter, more reserved group, and the low interaction with the other group made communication with participants difficult throughout the CAKN workshop. I did my best to attend the after-hours activities but participants from my group rarely attended, and the Denali National Park and Preserve group (hereafter referred to as the Denali Group) was concerned about an upcoming meeting. They stayed focused on that issue and did not communicate much with others at the CAKN workshop.

I did my best to turn this obstacle into an opportunity. Since I had attended the SEAN workshop, I had already had the chance to establish rapport with some of the facilitators, and they increasingly opened up to me about the plans, intentions, and goals of the CCSP. Also, since the CAKN workshop was the last of six, the facilitators seemed more relaxed and comfortable in their roles. I talked with the facilitators and the Scenarios Network for Alaska and Arctic Planning (SNAP) personnel when I experienced difficulties connecting with workshop participants at the CAKN workshop. I found that it was easy to discuss the successes and shortfalls of the CCSP with the facilitators as I tried to understand the CCSP as a *process*, not merely a planning tool. Though I regret my lack of connection with the Denali Group, it enabled me to gain valuable insights from the facilitators of the CCSP, and I made the best of the situation.

CHAPTER 4: Participation in Climate Change Planning

"By including stakeholders in the process, we recognize that things do not end at boundaries and that we need to work together to properly manage the environment." –CCSP workshop facilitator

The Climate Change Scenario Planning (CCSP) workshops teach Alaska National Park personnel about adaptive management and scenario planning for climate change decision-making. Stakeholder involvement in the decision-making process is central to the goals of adaptive management (Brunner et al. 2005). By including diverse actors early in the decision-making process, the CCSP fosters shared investment and understanding of climate change between participants. The involvement of outside actors advances the common interest of the CCSP to enact change outside the boundaries of the Alaska National Parks.

This chapter explores what institutions and actors were involved in the CCSP workshops and how their participation influenced climate change planning at the workshops. First, I consider how the institutional culture of the National Park Service (NPS) affected the CCSP workshop design. Next, I focus on the participation of non-NPS institutions and actors, and I discuss their influence in each workshop. Finally, I discuss what institutions and actors were not involved in the CCSP workshops, and possible reasons for their absence.

The Influence of the National Park Service Institutional Culture

The NPS had a large influence on the CCSP workshops because, as the host institution, it was heavily involved in the creation and coordination of the CCSP. The influence of the NPS set the tone for workshop discussions. The NPS, like any institution, has a culture and value system that influences decision-making and governance (Pahl-Wostl et al. 2008; Inderberg 2011). Some aspects of an institutional culture within the NPS align with actively responding to climate

change, while other aspects are in conflict with this goal. I discuss the notion of preservation within the NPS, and how this notion affects NPS climate change decision-making next.

On the first day of both the Southeast Alaska Network (SEAN) and Central Alaska Network (CAKN) workshops, a facilitator from the Scenarios Network for Alaska and Arctic Planning Program (SNAP) asked one question that would guide the participants through the scenario planning process: *"How can National Park managers best preserve the natural and cultural resources and values within their jurisdiction in the face of climate change, particularly in the next 50-100 years?"* When this question was posed at the SEAN workshop, a National Park superintendent commented that **preservation** may no longer be an adequate goal, and that we likely will be **adapting** to climate change. This comment hung in the room for a while.

No one denied that this statement was accurate. However, preservation has been the primary goal of the NPS since the organization was established in 1916. NPS managers view land management in the context of the NPS Organic Act of 1916 (hereafter referred to as the Organic Act) and each National Park's founding legislation. First, the Organic Act established the NPS and stated in its legislation that it would preserve "unimpaired" the nation's treasures (United States Organic Act of 1916).[9] The Organic Act explicitly states preservation as a goal of the NPS and uses the term "unimpaired," implying that the land should not be altered. Second, in order for a National Park to be created, legislation designating the National Park must be passed by an Act of Congress. National Parks use their founding legislation as a guiding document to create their land management goals and plans. Every National Park has its own legislation that explicitly states why the United States (US) Congress has voted to preserve the land for the

[9] A few National Parks existed prior to the creation of the NPS.

enjoyment of all US citizens and visitors. The legislation for Denali National Park and Preserve dictated that the land would no longer be available for mining or resource extraction, and that the National Park would be established as a game refuge where no game will be killed (Denali National Park and Preserve's legislation is included in Appendix E).[10] Other National Park's founding legislations are more explicit about what should be preserved and prioritized. For example, Glacier Bay National Park and Preserve was partially set aside for "a unique opportunity for the scientific study of glacial behavior and of resulting movements and development of flora and fauna and of certain valuable relics of ancient interglacial forests" (National Park Service 2012). The Organic Act and each National Park's enabling legislation reinforce the return of the land to an "unimpaired" state. Historically, this meant using a historical benchmark as the ideal land management goal for the landscape. However, in the context of climate change, humans have already affected the state of every National Park. The superintendent's statement that the NPS needs to adapt instead of preserve the land in the face of climate change represents a shift in wilderness values within the NPS. This statement reflects a transition from a traditional "scientific management" perspective toward an adaptive management approach that tries to ensure that the land can adapt to the effects of climate change.

The NPS has always been concerned with preserving nature and history, but adaptation may be a more apt management goal than preservation. The notion of preservation has dominated public land management goals of the 20th Century (Millar et al. 2007). Many NPS personnel were taught the principles of "scientific management," which relies on historical data as a benchmark for restoration (Brunner et al. 2005). In general, "scientific management," as

[10] Denali National Park and Preserve was originally named Mount McKinley National Park and Preserve. The name was changed in the Alaska National Interest Lands Conservation Act in 1980 (Ross 2000: 202).

operationalized within the framework of the NPS, works to restore the land to the conditions that colonizers saw when they first arrived in the Americas from the 1600s to the 1800s. For much of the 20th Century, returning the land to a pre-colonized condition was considered "pristine" and was also the ideal restorative standard for land management in the US (Folke 2007). This ideology of management has perhaps persisted longer within the NPS than other public land management agencies, due to the Organic Act and the founding legislations of National Parks, which are often rooted in "historical restoration."

The notion of returning the land to a perceived "historically accurate" state can be particularly damaging for National Parks in the face of climate change. In some National Parks, ecosystems of the past may not be ideal under future conditions, and restoration of the land to a past that cannot sustain itself may do more harm than good. The notion of "historical accuracy" still exists within the NPS but it is changing, as is illustrated by the comment of the National Park superintendent that we likely will be adapting to climate change rather than preserving the land as it once was. The focus on climate change and inclusion of adaptive management in Secretarial Order 3289 also indicate that the Department of Interior (DOI) and the NPS are moving towards change-based management systems. However, "scientific management" and returning the land to a perceived "historically accurate" state continue to influence decision-making within the NPS, and probably will for some time. According to Brunner et al.:

> *Like the last transition to scientific management a century ago, the next major transition in natural resources policy will proceed piecemeal, practice by practice, person by person, and place by place. Where science leaves many uncertainties, the policy issue is political, and multiple centers of authority and control complicate the decision-making structure…the practices of adaptive governance…take hold (2005: 34).*

Non-NPS Institutions and Actors and the Role of Facilitators in the CCSP Workshops

The CCSP prioritized the inclusion of a diverse array of stakeholders in each workshop. This priority aims to increase the range of insights by including multiple participants (Brunner et al. 2005; Brunner and Lynch 2010). The CCSP invited participants from local communities, Alaska Native villages, other federal agencies, and the state government of Alaska. The inclusion of representatives of government and social institutions creates a hybrid form of adaptive governance known as co-management (Lemos and Agrawal 2006: 319). Table 4 indicates the institutional affiliations of participants in both workshops.

Table 4 List of SEAN and CAKN Participants Based on Institutional Affiliation

SEAN Workshop Participants	CAKN Workshop Participants
Facilitators:	**Facilitators:**
NPS Alaska Regional Office (4)	NPS Alaska Regional Office (4)[11]
SNAP program (4)	SNAP program (4)
NPS Climate Change Resource Center (1)	
Participants: NPS (11)	**Participants:** NPS (24)
Community Member (2)	Community Member (2)
Other federal agency (5)	Other federal agency (3)
Alaska Native representative (5)	Alaska Native representative (1)

Facilitators of both CCSP workshops emphasized that having non-NPS participants in the workshops was vital to understanding the environmental and social effects of climate change in each region. While non-NPS participants were included in the SEAN and CAKN workshops, the number of non-NPS stakeholders and their overall participation differed in both workshops, resulting in two distinct workshops.

[11] One NPS representative was retired.

The CCSP workshops were facilitated by SNAP and Alaska Region NPS personnel. Throughout the workshop, a SNAP and NPS facilitator worked with groups in the workshops, which emphasized diversity and thinking beyond National Park planning. Facilitators often took a leadership role when it came to discussions regarding projections for climate change impacts for each region and how to organize the scenario planning process. At times, the workshops had a lecture format to provide as much information to the participants as possible. When it came to creating the scenarios and narratives, facilitators took on a more passive role letting the group take charge. They let difficulties emerge in each group and largely allowed the groups to work through them on their own. When facilitators did step in, it was largely when the groups were struggling to comprehend the scenario planning process.

Effects of Non-NPS Institutions and Actors at the SEAN Workshop

Participants in the SEAN workshop widely acknowledged that it was beneficial to include diverse voices in the CCSP. Throughout the SEAN CCSP, participants often commented that this was the first workshop they had been to with a high level of diversity early in the planning process. In addition to NPS participants from Glacier Bay National Park and Preserve, Klondike Gold Rush National Historical Park, Sitka National Historical Park, and Wrangell-St. Elias National Park and Preserve, participants also represented local municipalities and Alaska Native villages from the southeast region. It seemed that many actors were used to being invited to participate after the decision-making process reached its final stages. Including stakeholders early in the decision-making process is an important aspect of adaptive management, particularly because it creates an atmosphere of shared understanding and personal investment between stakeholders (Brunner et al. 2005).

Many non-NPS stakeholders felt that their opinions were considered and valued in the SEAN workshop. One Alaska Native participant noted that the CCSP process made her feel more comfortable discussing climate change, and the four-day workshop enabled her to contribute in a more meaningful way than if she had been simply invited to participate on a panel for a short time. She pointed out that she was often invited to the decision-making process, but did not feel like her opinion was given much weight in other workshops. Another participant also noted that she felt more invested in the process because the CCSP workshops provided tools that non-NPS participants could use in their own communities.

Facilitators made it clear that the involvement of non-NPS stakeholders helped create an in-depth understanding of how each region experienced climate change. Non-NPS actors in the SEAN workshop participated as much as NPS actors, particularly when groups discussed how communities and leadership might respond to the effects of climate change. Overall, the highly engaged participation of non-NPS actors created a dynamic workshop. The involvement of many institutions and actors in the SEAN workshop created broad goals that were created at the end of the CCSP workshops by all participants involved.

When a former NPS employee discussed the social implications of climate change on Alaska Native communities, an Alaska Native stakeholder commented that this was the first time that she had heard a non-Alaska Native accurately portray the importance of subsistence hunting to the Alaska Native community. She made it clear that this was very valuable compared to the discussions that usually occur with government agencies. The speaker had discussed the complex social networking role of subsistence in an Alaska Native community and its effects on a community when a subsistence lifestyle is impeded by environmental factors. He also focused on the institutional barriers that Alaska Native villages face when they try to protect their village or

have to relocate due to excessive flooding and/or erosion. He was a retired NPS cultural anthropologist and spoke very candidly about this situation. After the presentation, many participants commented that they developed a new level of understanding of the challenges that Alaska Native communities face in the context of climate change.[12]

During breaks, several NPS managers commented that they were unsure how they would implement the information from the CCSP to their jobs. Division chiefs tend to focus on federal mandates, due to work overload and time constraints. NPS personnel are required to consider climate change in their planning, but they lack specific benchmarks for how to do this. The lack of guidance for incorporating climate change into planning and monitoring contrasts with the guidance provided for responding to other federal mandates such as the Endangered Species Act (ESA). The DOI's Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) formulate recovery plans for endangered species, with which the NPS is required to comply under the law of the ESA (U. S. Environmental Protection Agency 2012).[13] In general, the NPS is mandated to be proactive in determining the status of a species, conserving declining species, and providing yearly information on threatened and endangered species within the National Park (United States Fish and Wildlife Service 2012). This includes reporting the population trends and the amount of money spent on recovery and monitoring of endangered species. The FWS and NMFS may also require the NPS to take certain actions to protect endangered species. No agency exists to ensure that Secretarial Order 3289 is followed, and no measures exist to punish National Parks that do

[12] This speaker was not able to attend the CAKN workshop due to medical issues. The CCSP facilitators gave his talk in the CAKN workshop, but the complexities and nuances of the situation were not as pronounced and overall the talk was not as effective. The speaker has studied these issues for years and was able to convey the reality of Alaska Native communities to the SEAN workshop.

[13] The National Marine Fisheries Service mostly handles marine and anadromous fish while the Fish and Wildlife Service manages the remaining endangered species. (U.S. Environmental Protection Agency 2012b)

not comply or reward National Parks that do comply. The lack of mandatory guidelines regarding climate change creates uncertainty in federal institutions and hinders progress on climate change governance. These barriers frustrated several NPS actors, particularly those who struggled to see how they could directly apply what they learned in the CCSP in their National Parks.

The institutional barriers mentioned above are most likely lower for non-federal actors. These actors have a greater ability to enact change at the local level than NPS actors, and may be able to adopt the concepts from the CCSP more quickly in their own communities, villages, and institutions. This inherently helps the NPS by creating educated partners and implementing its planning goals more quickly outside the NPS. Involving non-federal actors also potentially expands the reach of the CCSP to include other institutions and actors that were not involved in the workshops in climate change planning at the local level.

A visiting superintendent from outside the SEAN and CAKN regions spoke in both workshops about expanding the goals of the CCSP beyond the NPS. He noted that the actors who attended the CCSP represented an educated group that should feel comfortable communicating about climate change to their own communities. He also pointed out that some actors in Alaska may not be interested in working with the NPS but, if a non-profit or other business or community group approached them about responding to climate change, certain actors might be more inclined to participate and listen. This superintendent indicated that the NPS was aware that certain institutions and actors in Alaska would not be open to information from the NPS or the federal government and that non-federal actors at the CCSP can play an important role in disseminating the ideals of the CCSP workshops to those persons who historically do not work well with the federal government in Alaska.

It was clear to me that the institutions the visiting superintendent was referring to were the state government of Alaska, the business sector, the tourism industry, and development industries.[14] Historically, these groups have been at odds with the federal government and Alaska Natives on environmental and Alaska Native issues (Haycox 2002). The longstanding disagreements on these issues have created stalemates and principled arguments throughout Alaska's statehood (Ross 2000). The most recent arguments tend to focus on subsistence hunting rights and endangered species, though the conflicts between the state and development, and the federal government and Alaska Natives go back to land rights and conditions of statehood (Ross 2000; Haycox 2002). It appeared that both the participants and facilitators agreed that these divisions existed, and they understood that the NPS may not be the best messenger of the CCSP workshops due to the historical context outlined above that focused on distinct divisions between the federal government and business and state government interests in the state of Alaska. This sentiment was confirmed throughout many conversations with participants and facilitators. The NPS was limited in its reach due to the history of federal and state conflicts in Alaska, but the non-federal actors might be able to involve other actors in using scenario planning and adaptive management to respond to climate change.

Alaska Natives who attended the SEAN workshop were eager to implement the strategies of the CCSP in their communities. An environmental planner told me that the story-telling aspect of the CCSP would resonate well within her community. She noted that messages about climate change confused her community, and that they struggled to relate the science of climate change to what they were experiencing at the local level. She was at the workshop to learn how climate

[14] "The state", "tourism", "the business sector", and "the development industry" were referenced often in the CCSP workshops as other stakeholders who were not present.

change would affect the southeast region and what her community could do about it. She intended to conduct her own version of the CCSP workshop in her community as soon as possible. A workshop like the CCSP that emphasizes public and participatory learning would likely increase an understanding of climate change within her community, and inspire others to action.

Alaska Natives are directly affected by climate change, particularly in the Arctic where changes are most evident. For many Alaska Natives, Alaska's unique ecology is essential to their economic, social, cultural, and spiritual lives (Krakoff 2008: 15). According to Secretarial Order 3289, "Climate change may disproportionately affect tribes and their lands because they are heavily dependent on their natural resources for economic and cultural identity" (United States Department of Interior 2010). Many northern and western Alaska Native communities face severe climate change-related effects including changes in ice-cover, snowfall, season length, and temperature (Brunner and Lynch 2010). These changes have already affected the hunting and fishing seasons; the vulnerability of coastal villages to storms, wind, and erosion; and winter transportation networks within and between villages (Krakoff 2008: 15; Brunner and Lynch 2010).

Many northwestern coastal Alaska Native communities currently face worse than usual flooding, storms, and erosion. These "worse than usual" events in the Arctic have been related to a warming climate since as early as the 1960s (Brunner and Lynch 2010: 127).[15] The US Army Corps of Engineers has identified 178 Alaska communities that are threatened by erosion and has

[15] "In an article published in 1967, Hume and Schalk considered the great storm of 1963 in the context of a global warming future: "If, as has been suggested, the climate is becoming warmer as a result of the addition of carbon dioxide to the atmosphere, the likelihood of an open ocean and strong winds coinciding to produce such a storm is constantly increasing. Another such storm can be expected…" (Brunner and Lynch 2010: 127).

listed 26 of these as "Priority Action Communities." Many of these communities are Alaska Native villages (U.S. Environmental Protection Agency 2012a). In 2003, the US Government Accountability Office surveyed nine Alaska Native villages and found that four of the nine were in imminent danger from flooding and erosion (U.S. Government Accountability Office 2003: 2). Figures 14 and 15 show some of the effects of flooding and erosion on the Alaska Native villages of Shismaref and Newtok. These remote small villages often fail to qualify for federal assistance for flood and erosion controls because the expected costs of the projects are prohibitive (U.S. Government Accountability Office 2003: 2). Many northwestern Alaska Native communities are continually threatened with losing their villages to the sea due to erosion and storms; portions of villages have already eroded into the sea or have been cut off from the rest of the village due to flooding (Brunner and Lynch 2010). These climate change effects are not as great in southeast Alaska, but they have had a profound effect on the ways in which all Alaska Natives perceive climate change.

The ability of Alaska Natives to respond to climate change has been hindered by a lack of institutional leadership from the state and federal governments (Brunner and Lynch 2010). This reality is most strongly felt in northwestern Alaska, where entire communities may need to move to adapt to the changing climate. The need to relocate entire communities is imminent, but no state or federal agency is equipped to move an entire Alaska Native village (Brunner and Lynch 2010: 182). For many communities, moving is a last resort because it greatly erodes social subsistence networks.[16] Northwestern Alaska Native communities have faced difficulties

[16] Excerpt from a speech given at the SEAN CCSP by a retired cultural anthropologist for the Alaska Region of the NPS on the impacts to Alaska Native subsistence network facing relocation (SEAN CCSP workshop, February 2012).

Figure 14 Flood in Alaska Native village of Newtok. Image sourced from Alaska Department of Environmental Conservation.

Figure 15 House in the Alaska Native village of Shismaref (Alaska Conservation Foundation 2010).

working with state and federal agencies. No agency is equipped to handle relocation in response to climate change, nor are the agencies cooperating with each other to accomplish relocation in a timely manner (Brunner and Lynch 2010). The Federal Emergency Management Agency helps villages only after a disaster strikes, and other agencies can assist with certain aspects of relocation, but no single agency is equipped for a proactive response to the predicted effects of climate change on the northwestern coastal communities of Alaska (Brunner and Lynch 2010). This has left many Alaska Native communities wondering how to respond to climate change.

The Environmental Protection Agency recently initiated a program for environmental planning for Native American communities, the Indian Environmental General Assistance Program (IGAP). This program provides grants for Native American tribes and Alaska Native villages to build or improve on environmental programs. IGAP focuses on the following environmental planning areas: capacity building, managing solid and hazardous waste or recycling programs, planning tribal responses to the environmental impacts of climate change, renewable energy planning, resource extraction, protecting subsistence resources, environmental education, developing tribal consultation policy, and collaborating with the Regional Tribal Operations Committee (U.S. Environmental Protection Agency Region 10 2010: 5). An Alaska Native environmental planner from the SEAN region combined the federal resources of the CCSP workshop and the IGAP program to develop a climate change response plan for his village; he worked within and between federal agencies to meet the needs of his community. This planner and other non-NPS actors in the southeast region have fewer institutional barriers than the NPS actors and a greater ability to proactively implement a response to climate change.

Non-NPS institutions and actors actively participated in the SEAN workshop. Facilitators noted that the SEAN workshop had the most dynamic participation from non-NPS actors of the

six CCSP workshops. At times NPS employees at the CCSP workshops felt that they could not implement the decision-making process as effectively as non-NPS actors; but for the most part, the diversity of participants created a highly participatory network of actors from multiple institutions who were eager to work with one another on the regional level. The SEAN workshop established goals, decisions, and priorities for the southeast region that were supported by all participants. The participation of actors and the decision-making process of the CAKN workshop could not have been more different from that of the SEAN workshop.

Effects of Non-NPS Institutions and Actors at the CAKN Workshop

Most participants in the CAKN workshop already knew each other and had worked with one another before the workshop began. Only three National Parks were represented in the CAKN CCSP: Denali National Park and Preserve, Wrangell-St. Elias National Park and Preserve, and Yukon-Charley Rivers National Park and Preserve. Most of the participants who attended the CAKN workshop worked for either Denali or Wrangell-St. Elias National Park and Preserve. During introductions, I noted only three stakeholders who were not employed by the federal government: a stakeholder from an Alaska Native village near Wrangell-St. Elias National Park and Preserve, a community representative from Healy, Alaska (the community closest to Denali National Park and Preserve), and a citizen who lived on an inholding within Denali National Park and Preserve.[17] Additionally, two representatives from the FWS and Forest Service were present.

The CAKN workshop remained largely focused on climate change planning within the NPS rather than taking a more regional approach like the SEAN workshop. This is likely due to

[17] An inholding is privately owned land inside the boundary of a National Park. *Merriam Webster Dictionary www.m-w.com April 28, 2012.*

the overwhelming majority of NPS participants in the CAKN workshop. The National Park focus of the CAKN workshop was reinforced when the working groups were divided according to National Park affiliations. Wrangell-St. Elias and Yukon-Charley Rivers National Park and Preserves (hereafter referred to as the Wrangell-Yukon Group) created a group with the other federal actors and the Alaska Native stakeholder, while participants from Denali National Park and Preserve (hereafter referred to as the Denali Group) made up another group that included a community member from Healy, Alaska.[18] This limited the diversity of participants within the working groups, and pushed the focus of the workshop towards climate change planning at the National Park level rather than the regional level. By the first day, the potential for collaborative decision-making with various stakeholders was eroded due to a focus on specific issues at the National Park level.

In the same way that the SEAN workshop lost its National Park focus at times, the CAKN workshop could not escape it. I was part of the Wrangell-Yukon Group and it became clear that many participants worked together on a daily basis, and sometimes not that well. I noticed frustration and divisions that pre-dated the workshop. In focusing on the National Park level, the CAKN workshop brought the politics of each National Park into the CCSP process. Some participants in the Wrangell-Yukon Group did not work well with one another. These prior relationships created a barrier between those who knew each other and those who were largely unaffiliated with the CAKN National Parks. Two of the non-NPS actors only participated when they were asked a question. The non-NPS actors who did participate voluntarily often did so by preceding their comment with a phrase like, "*I don't know if this is how you do it in your Park*

[18] The inholder from Denali left on the first day of the workshop and did not stay long enough to participate in a group.

but…" Sometimes National Park personnel would respond that they did not have to deal with that specific issue before, stifling further engagement. Overall, the National Park focus of the CAKN workshop hindered progress within the Wrangell-Yukon Group as well as the group's ability to think creatively and critically about what may or may not happen with climate change in the future.

My interviews with a few participants from the Denali Group uncovered that their experiences in the CCSP workshops were very different from those in the Wrangell-Yukon Group. Interviewees noted that the Denali Group was highly engaged in the CCSP process and felt that the CCSP gave them a chance to discuss climate change-related management obstacles that the park was about to encounter. When the CAKN workshop reconvened into a larger group, the Denali Group participants all appeared to be in agreement about group decisions. For the Denali Group, a National Park-focused CCSP worked well for the overall morale of the group, and provided some answers to management issues that they were encountering. This, however, was not the goal of the CCSP workshops. Facilitators made it clear that these workshops were developed to reach a broader understanding of climate change decisions at the regional level, beyond the planning of a singular National Park.

While it appeared that the Denali Group made better progress than the Wrangell-Yukon Group during the CAKN workshop, that group still did not take the methods and planning from the CCSP process beyond National Park planning. The discussions in the Denali Group could have occurred during a regular workweek at Denali National Park and Preserve; instead it dominated what could have been a discussion on climate change response at the regional level. Adaptive management, and therefore the CCSP, aims to engage actors in a diverse and

participatory learning environment (Brunner et al. 2005). The CAKN workshop resulted in plans for specific National Parks, but avoided collaboration and decision-making at the regional level.

Non-NPS Institutions and Actors Absent from the CCSP Workshops

The success of non-NPS institutional and actor involvement in the SEAN workshop, and the much smaller involvement of non-NPS actors in the CAKN workshop, created two very distinct CCSP workshops. The SEAN workshop was focused on a regional response to climate change, while the CAKN workshop addressed how the National Parks within the region would respond to climate change. Though both workshops invited a diverse array of participants, some institutions and actors chose not to attend the CCSP workshops, and other institutions and actors were not invited. This section discusses actors who were not involved or invited to each CCSP workshop and why.

Of all the institutions and actors that were invited to the CCSP, one entity was noticeably absent: representatives for the state government of Alaska. CCSP facilitators had invited state employees to every CCSP workshop. Only one actor from the state attended the Interior Arctic CCSP in March 2012, the newly hired Director of the Alaska Division of Wildlife Conservation. State representation was noticeably absent from all other CCSP workshops. I was able to conduct an interview with the State Director of the Alaska Division of Wildlife Conservation on October 19, 2012.

"There are just so many of them, I'm not sure I can recall the meeting you are talking about." This was his response to my question about the Interior Arctic CCSP workshop he went to. He continued, *"Part of the problem from the state's perspective is what I call the ABCs of federal climate change plans. The BLM has their Assessments, the NPS has Vitals, FWS has*

Landscape Conservation Cooperatives, USGS has their own, Forest Service is doing a Healthy Forest Initiative, and it goes on and on like that. It's frustrating they all expect us to show up and are all asking for the same data." He said that the state does not have the capacity to attend all of the meetings. *"We hoped the feds would decide on one program, and we thought that was going to be the Landscape Conservation Cooperatives (LCC)."* He was referring to a program run by the FWS. He noted that the state participated in more of the LCCs than any other federal climate change initiative. He appeared frustrated with the fragmented nature of federal climate change response in Alaska. Most of the non-NPS participants in the CCSP workshops were actors who worked at the regional, and not the state level, so they likely were not asked to participate in as many climate change initiatives as a state actor and may not suffer from the same sort of "stakeholder fatigue."

I asked him about the FWS LCC initiative and why he chose it. *"The state has thrown its hat into the LCC arena…we signed up for that on the grounds that the process would be consensus driven."* He spoke for a while about the difference between "consensus driven" and "majority rules" decision-making; in "consensus driven" everyone must agree, whereas in "majority rules" only 51% of the participants must agree. He was concerned that if things went to "majority rule" processes that the federal government would have the only say in decision-making because they would always have more votes. He wanted the state of Alaska to be able to have "*veto authority,"* he did not want the state to have anything forced on it. He also emphasized the desire to be included early on in the decision-making process: *"They write all of the strategic plans and ask you if you want to join. We want to be involved at the beginning…we want to help design it, come to the state early, and involve us early."*

He expressed a desire to be involved with federal climate change planning but only if it was more coordinated, more "consensus-based," and if it involved the state early on in the decision-making process. In fact, towards the end or our interview he noted, *"We draw the line—decisions have to be consensus driven and focused on climate change. LCCs want to talk about mining projects and private property, and I don't think they should be in a position to define how research and management objectives should occur on state and private lands."* This last point was particularly interesting. He was willing to participate in the decision-making process, but his opinion was that the federal government would use the process to push their initiatives onto state and private land management rather than come to a consensus-based agreement. Throughout the interview, he listed certain things he was willing to discuss with the federal government and certain things he considered out of their jurisdiction. His sentiments show that he, and presumably "the state," is willing to participate in climate change decision-making, but only under certain circumstances.

Historically, the state of Alaska and the federal government, particularly the NPS, have often disagreed on environmental and conservation issues (Ross 2000; Haycox 2002). Most of the time, the state has tried to keep the federal government out of its environmental and conservation policies (Haycox 2002: x-xi and 108-120). And, despite a large federal presence in the state of Alaska, a majority of the state's electorate opposes too much federal control of the state and its natural resources (Haycox 2002). At times, the state government is seen as the only entity that stands as a barrier to the federal government taking all control in Alaska. These reasons create a barrier between employees of the state and the NPS.

Representatives from tourism, economic, and other business sectors were not invited to the CCSP. This is not to say that the CCSP facilitators did not want to involve them in the

decision-making process. In the SEAN workshop several participants suggested that the CCSP should involve more actors from other institutions. Facilitators reacted positively to this suggestion, but noted that the scope of the CCSP was limited due to funding, and that they had made an attempt to include as many non-NPS actors as possible.

This chapter discussed the legacy of "historical accuracy" within the NPS and how that legacy is changing. This chapter has also outlined the involvement of institutions and actors in the CCSP workshops, and how the participation and participation of certain actors influenced each CCSP. Non-NPS participants were highly participatory in the SEAN workshop creating a more diverse and region-focused workshop. Conversely, non-NPS participants were much less participatory in the CAKN workshop, resulting in a very National Park-focused CCSP. Finally, this chapter considered the perspective of one state employee who attended the Interior Arctic CCSP workshop, and discussed the long history of environmental decision-making issues between the state and federal government in Alaska.

CHAPTER 5: Challenges to Climate Change Planning

We tell ourselves stories in order to live…we interpret what we see, select the most workable of multiple choices. –Joan Didion, from *The White Album*, 1979

The Climate Change Scenario Planning project (CCSP) was one of the most challenging workshops I have ever participated in. Throughout the workshop, most of the participants expressed that they were struggling with at least one aspect of the planning process. CCSP workshops are designed to challenge participants to help them work through their discomforts and uncertainties in a participatory learning environment. Throughout each workshop, I often heard comments like: *"It's just such a difficult thing to wrap your head around"* (Alaska Native stakeholder, SEAN workshop, February 21, 2012), *"I'm not sure I feel comfortable making-decisions about climate change"* (NPS employee, CAKN workshop, April 17, 2012), *"I don't know how to think in this way"* (NPS employee, CAKN workshop, April 18, 2012), *"I want more guidance for what exactly I'm supposed to do"* (NPS employee, CAKN workshop, April 16, 2012), and *"There is just so much to consider"* (NPS employee, SEAN workshop, February 24, 2012).

The CCSP teaches participants to interpret anticipated climate changes at the regional level to help them consider the effects that they may encounter in their region (Rice 2009). Therefore, the environmental effects and scenarios that each workshop created were place-specific and different for each CCSP. The Central Alaska Network (CAKN) workshop prioritized issues of fire, loss of permafrost, and changing animal migration times, whereas the Southeast Alaska Network (SEAN) workshop emphasized changes in the oceans and stream networks, varying times and forms of precipitation, and the effects of rapid glacier melt.

Even though the SEAN and CAKN workshops discussed different climate change effects and had varying levels of participation from non-National Park Service (NPS) institutions and actors; participants in both workshops faced similar challenges. These common challenges in the climate change decision-making process can be grouped into three categories: the lack of comfort and certainty in planning for the future and discussing climate change; the issue that planning for the future involves other factors besides climate change; and the lack of guidance and leadership in climate change governance. This chapter explores each of these challenges and places them into a socio-physical context to better understand climate change governance and decision-making in Alaska. This chapter also explores the priorities of each CCSP and how these priorities respond to the challenges of climate change decision-making.

Uncertainty about the Future and Climate Change

Both CCSP workshops were filled with experts. Many CCSP participants hold a Master's degree or higher, and some have worked for decades with public lands and the environment. Despite the high educational level of each group, many participants struggled to express their views regarding climate change. Participants often told me that they understood the basics of climate change but they did not feel confident discussing it in a group or making decisions based on what they knew. To counteract these attitudes, facilitators introduced and explained the most current knowledge and up-to-date projections of climate change, and presented information about the potential regional effects of climate change. These climate change discussions provided participants with baseline knowledge of climate change and highlighted projected climate change effects for each region.

The CCSP workshops are a participatory learning experience that teaches scenario planning and adaptive management techniques for climate change planning. Facilitators

explained at the beginning of each workshop that feelings of uncertainty and discomfort were inherent in the CCSP learning process. They explained that, in their experience, even the most educated scientists felt some level of discomfort when discussing climate change and its future. Participants were asked to think creatively, withhold judgments, take risks, and remain open to the process of the CCSP workshops (CCSP facilitator, first day of the SEAN and CAKN workshops, 2012).

During one of the more "difficult" moments at the CAKN workshop, I asked a facilitator about the apparent discomfort in the room. With a serious look on his face he said, *"Kassie, if participants are uncomfortable talking about climate change and the future at a climate change focused workshop, imagine how they feel about it in the workplace"* (CAKN workshop, April 17, 2012). He then noted that the CCSP was designed for participants to think and talk about climate change and the future while interacting with others outside of their work environment or discipline. This created an uncomfortable situation for some participants; even if they understood the basics of climate change, many were not confident discussing it. This environment created a participatory learning process that helped participants work through their insecurities and uncertainties as they discussed climate change with a diverse group of people.

The discomfort only grew when we began to speculate about future scenarios. The CCSP process emphasizes developing futures that are challenging, relevant, plausible, and divergent (Rice 2009). A CCSP facilitator explained that, for many people, considering a future with a changing climate meant thinking of the future like a forecast: it was going to be wetter and warmer. This however does not address the types of changes that we may encounter on the land, and it does not provide much insight into land management. Scenario planning challenges participants to think of futures that are plausible, not only likely. Participants take into account what is fairly certain about the future (e.g. it is getting warmer) and then consider something that

is less certain (e.g. more frequent and intense storms). By altering the more uncertain choice, and considering its effects on the landscape, participants begin to develop a variety of plausible future scenarios. The goal of the scenario planning process is not to forecast the exact future that we are going to have, but to consider the possibilities we may encounter to determine the best way to plan for these possibilities. At times, this point was lost amongst the participants; they often wanted the future scenarios to be *"right"* instead of considering whether or not they could happen.

The struggle with considering futures that were challenging, relevant, plausible, and divergent *and* wanting to choose the *"right"* future was most apparent in the Wrangell-Yukon Group in the CAKN workshop. We struggled to imagine the future in 30 to 50 years. Some comments from the group included, "*we are really just guessing here"* and "*I'm having a hard time imagining what's going to happen"* (NPS employees, CAKN workshop, April 17, 2012). Some participants seemed unwilling to imagine that the future would be much different from today. A few were reluctant to assume that some of the events we have already experienced, like changing animal migration patterns and an increase in forest fires, would become more salient. A facilitator took this opportunity to share about his first time going through the scenario planning process:

"I struggled to understand how to think of greater possibilities than what I was comfortable with in order to create challenging futures. Someone in my group had mentioned that jellyfish may make their way up to coastal Alaska in 50 years and I just did not think that was a possibility. Still we created that scenario even though it made me uncomfortable. Since that scenario planning process happened last August, jellyfish have increasingly been found in northern areas and it is expected that they will eventually make their way to the shores of Alaska. I was surprised, but it illustrated to me that the future we envision for a few decades down the line may in fact be closer than we realize, and I challenge you to think about a future that may make you uncomfortable, it could very well be the norm in 30 to 50 years." (CCSP facilitator and NPS employee, CAKN workshop, April 17, 2012)

After the facilitator's story, an Interpretive Ranger from Wrangell-St. Elias National Park and Preserve noted that Glacier Bay National Park and Preserve experienced its first muskeg (tundra bog) fire ever recorded in the park last winter.[19] He pointed out that he would have never thought that was a possibility. This participant's story sparked other narratives about changes in caribou migration times and salmon runs. Slowly, the personal accounts of climate-related changes created a deeper understanding of our task. It took us a while to understand that we did not have to be right about the future; we were to discuss what could happen, and we should push ourselves to consider the potential effects of climate change in 30 to 50 years.

Many participants eventually understood that they could think about the future in a logical way by considering the potential climate change effects, and increase or decrease the effects under different scenarios. The incremental steps of the CCSP worked for most participants, and the process began to make sense. Some participants however were still struggling with either understanding the science of climate change or how to speculate about the future. A facilitator noted that the CCSP workshops aimed to reach out to individuals who have often been left out of climate change decision-making, and that this meant that discussing climate change may be new to some participants. Specifically, the CCSP aimed to include local insights in the climate change decision-making process and invited participants from Alaska communities and Alaska Native villages to provide an understanding of climate change at the local level. One facilitator explained *"Some individuals are not motivated by science and projections, but that doesn't mean they don't have something to contribute to climate change planning"* (SNAP-affiliated CCSP facilitator, SEAN and CAKN workshops, February and April

[19] An Interpretive Ranger communicates with the public about National Parks in a variety of ways, most notably by giving tours, giving lectures, and leading children's activities.

2012).[20] To include participants with varying educational backgrounds, the CCSP workshops emphasized telling stories of the future scenarios created in each workshop. The stories created as part of CCSP workshops are meant to speak to a wide audience and provide a compelling narrative that exhibits a personal level of understanding. During the SEAN workshop, a facilitator discussed the importance of storytelling to communicate complex scientific issues and discuss the future:

"You now have 16 potential futures to consider writing a story about, and some of you may be asking, "Why write a story, what is the point?" We turn these futures into stories, into describing what the possibilities could look like, in order to consider what the impacts are on the region and assess the issues facing management. We also consider what people are doing, how they will or won't adapt, and we emphasize the use of a narrative and stories because that is what speaks to people. If you give people a bulleted list, you know that doesn't speak to everyone—a big part of what we are trying to do today is to create these futures that aren't just grids on a table but that are stories of a possible future. Some people may not want a spreadsheet, some people may not feel compelled by me telling them we will experience a 1-3 degree change in temperature; storytelling may help us communicate the anticipated changes more effectively. It helps us explain a world that we may end up in, and we want to communicate to everyone what temperature and precipitation increases may look like. We think stories will help us do that." (SNAP affiliated CCSP facilitator, SEAN Workshop, February 23, 2012)

One narrative from the CAKN workshop spoke to the group in a very compelling way. It was written by the Denali Group and performed by a Denali National Park and Preserve Interpretive Ranger. The narrative was a soliloquy titled *"Pretty Sunsets"* that was given by the Interpretive Ranger as Mother Earth who told this story:[21]

[20] This point was made multiple times in both workshops, generally by a facilitator from SNAP.
[21] Five SEAN and CAKN narratives are located in Appendix A.

Look at that sunset. Pretty ain't it?...Damn! Sometimes I wish I were not so beautiful. Sometimes people just see the beauty, but they don't really see me. Name's Gaia...People call me Mother Earth...or you can call me "The land." (Waves dismissively) Whatever...Whatever...That would sum up my life today: "Whatever"

Let me tell you: I've always tried to take care of myself. I had a lot of self-control. (Straightens up) Sure, I'd go through phases - doesn't everybody - but I kept it together. But now, I'm not so sure. I'm starting to feel out of balance. (aside) Whew, it's hot in here. Are you hot?

Used to be I felt I had plants on all the right places. Tall trees, willows, beautiful little tundra flowers of all different colors...And berries - oo-oo Baby! I was fecund! But then things started to change. It's like my soul just…dried up. All of a sudden I've got shrubs squeezing out my grasses and flowers.

And the fires! I used to lo-o-o-ve a good fire to stir the pot! But now they're happening all the time. I can't send out a lightning bolt without burning down the house. After a fire, I don't mess with putting up trees anymore. I just replace 'em with grass. Sure, a grassland is pretty...especially when you don't know what used to be there. (cough) sorry about the smoke ...(cough) I need a drink. But I am clean out of little ponds. I'd drink out of my rivers, but, have you seen my sediments loads?

Oh, what used to be there...my animals, my animals...I used to be crawling with all sorts of things: Grizzly bears, black bears, caribou, moose, sheep, wolves...They found what they needed to live, and I didn't worry about them too much. But I didn't realize how all my vegetation changes were taking a toll. First my pika...gone...then my caribou…not gone, but hard to find - almost the same thing. Then my bears - going, going...Then - oh, hello! - I got wood bison. Where'd you come from?

My timing is off. My birds show up. My insects have hatched and gone. I'm...just...off...
Oh, people come. They travel that road. They still see wildlife. They think I'm fine. But believe me: It just ain't the same. And that road: Everybody worries about that road. "Oh Gaia, don't let that permafrost go! We'll lose that road." But I ask you: What's in it for me?

I used to be decked out in blue ice and white snow. But hemlines have moved up, if you know what I mean, and I'm not too comfortable with that.

You look at me and - if you ignore those fire scars - I look pretty and green and I know what you're thinking: you want to hike all over me...That's fine, but I'm NOT the same. And no one seems to notice. Hey, Green and Gray (waves) Hey, HEY, hey! (Shrugs) Nothing...I used to feel connected with people. All of them. I fed them and they paid attention. But now there are so many...8 billion...op—8 billion and one.

Even with so many, there were a few - those special few - who still paid attention. I looked at them and they looked at me and it was like we were in love...but it was more than that: we understood each other...But this world - it's so hustling and bustling...They move away. It's like they said to me: It's over. I'm lonely...

Bright side (cough) all this smoke makes for beautiful sunsets. I look at them and feel despair. Makes me

want to climb to the highest mountain and shout: IS ANYONE OUT THERE…WHO CARES?

The CCSP emphasizes the use of storytelling to explain the potential future conditions of climate change, because people may relate to stories on a deeper level than scientific projections. Telling the story both through a narrative and through the presentation of scientific data are both important, and each one resonates with people in different ways.

The CCSP process encourages participants to consider a wide range of future scenarios to make better management decisions today. By considering multiple future scenarios, we plan for many different situations. The CCSP hopes that by imagining multiple potential futures, participants will better be able to grasp what decisions made today will have a positive effect on the future. In order to truly envision how climate change will affect us in the future, participants were asked to consider how politics and society may change over time. The next section discusses how each workshop considered what other challenges may affect climate change governance and decision-making.

Beyond Climate Change

Initially, I was confused about why we were discussing a variety of future trends in a climate change workshop, as were a few other participants. It seemed off-track to consider changing visitor needs in the National Parks, federal funding issues, and the relevance of the NPS in the future. One participant noted, *"Isn't this workshop about how we are responding to climate change, not all of this other stuff?"* (US Geological Survey employee, CAKN workshop, April 17, 2012). In fact, it was a combination of both. In order for the NPS to adequately respond to climate change, it must be ready to anticipate other changes that will affect its ability to achieve its climate change-related goals in the future.

For many participants, considering what might be valued or relevant in the future seemed counterintuitive to responding to climate change today. Some members of the CAKN group struggled with the notion of relevancy, which facilitators and other participants increasingly discussed. The CCSP stressed that the NPS would have to aim to remain relevant when priorities and values such as the desire to protect nature may be changing in the United States (US) and abroad. For example, many National Parks continue to receive an increasing number of elderly visitors who want increased access to remote areas in National Parks. National Parks must adequately plan for aging populations and promote access that serves a variety of physical abilities. Additionally, National Parks must try to please other age groups to assure continued support and visitation. One participant felt that the younger generation wanted "*fast and fantastic*" experiences at National Parks. He implied that younger generations were trying to check great experiences off a list, and noted the National Parks should try to cater to this notion, because it might encourage younger generations to visit multiple and remote National Parks (NPS employee, SEAN workshop, February 24, 2012). A few participants did not understand what public outreach, access, and building partnerships had to do with managing public land for a changing climate. This way of thinking can be attributed to legacies of "scientific management" that emphasizes top-down decision-making with little reference to other stakeholders (Brunner et al. 2005: 19 and 21). On the contrary, creating a space for public learning and understanding is essential to the adaptive management decision-making process (Brunner et al. 2005). Without public understanding of the importance of climate change response, the decision-making process is not going to be successful. Therefore, the NPS must be concerned with what its stakeholders think, what they value, and what they find important for its

future. Participants eventually understood that they had to consider what changes may occur in values and attitudes of the general public.

Participants in the SEAN workshop were particularly concerned with changing values. They worried that over time, as societal values changed, the NPS would lose its focus. One participant asked, *"Are there any values the NPS will never lose?"* (NPS employee, SEAN workshop, February 24, 2012). Another participant responded that the inability to change values meant an inability to adapt (Former NPS employee, SEAN workshop, February 24, 2012). Though National Parks existed for decades prior to 1916, the Organic Act created the NPS as an agency, and provided guidelines for its mission and core values, to "provide for the enjoyment (of the parks)…as will leave them unimpaired for the enjoyment of future generations."[23] The Organic Act simultaneously called for the use *and* preservation of National Parklands, a dichotomy that still exists (Winks 1997). While the Organic Act provides intrinsic values, it does not explain how the NPS should be managed, what "unimpaired" means, or how these values are to be interpreted (Shaw 1997: 799). The Organic Act was written narrow enough to protect wilderness and to preserve the land in its natural state; and broadly enough to adapt to changing values. The values of the NPS remain the same, but how we interpret these values changes over space and time.

The CCSP workshops encouraged participants to envision other social and political trends. For many workshop participants, it was difficult to consider future trends that may have an effect on climate change response. Some scenarios were disconcerting, while others gave

[23] The National Park Service Organic Act of 1916 states, "which purpose (of the parks) is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (National Park Service Organic Act of 1916)

participants a positive outlook on the future. Within our smaller groups, we discussed management actions that could greatly alter the formation of the NPS. This made a few participants uncomfortable. In the CAKN workshop, participants discussed a potential future trend of moving away from federal spending towards private-public partnerships. For example, within the Wrangell-Yukon Group we began to speculate whether federal funding for the NPS would remain consistent in the next 50 years. Some expressed concern that the NPS would receive much less funding in the future, and may be encouraged to partner with private entities, or rely more on revenue from permits, services, and fees. Participants speculated that the change in revenue would potentially shift National Park management away from natural and cultural resources and emphasize visitor use and the further commodification of National Parks. It would also encourage partnership and collaboration in order to achieve research and management goals. A few participants suggested collaborations with academic institutions, offering training and research programs, and providing space for field schools and other forms of outdoor classrooms. This concept worried participants from the more remote National Parks. They were particularly concerned about their ability to generate revenue from visitor fees, and their opportunity to partner with universities.

Specifically, one participant speculated that National Parks may not receive as much or any federal funding in the future, and that National Parks may have to rely on fees and permits as the main source of revenue for their operating budgets. This would have the potential to reduce even the most visited National Park's operating budgets by more than half. It would likely close many National Parks, and it made some of the participants in the group very uncomfortable, particularly participants from Yukon-Charley Rivers National Park and Preserve. This 1.7 million acre National Park borders Canada in central Alaska and receives fewer than 13,000

visitors each year (Yukon-Charley Rivers NPRES 2011).[24] One participant from the park wondered why we would even consider that some National Parks might no longer exist. "*How is this even helpful?"* she asked (NPS personnel, CAKN workshop, April 17, 2012). A group member responded that we should prepare ourselves for the worst in order to avoid these situations, that we should be aware that these possibilities are possible, and that some people would cut funding from the NPS if they had the opportunity. He also emphasized that many Alaska National Parks did not even exist 40 years ago, so it is not impossible to consider drastic changes.[25] Most of the participants appeared to agree with his opinion, though the manager from Yukon-Charley Rivers National Park and Preserve appeared visibly upset about this.

The future scenarios gave us a chance to consider how our actions today can influence and change the future management of climate change. Considering effects beyond climate change created the understanding that the future represents an opportunity for change. It also gave participants a greater understanding of how values can change policy, and of the importance of reaching out to visitors in the National Parks. It left us feeling a little more hopeful, even if we just felt slightly more prepared for the future because we considered many future scenarios. Towards the end of the workshops, it became clear that the CCSP was about more than climate change. It was also about considering multiple future scenarios and thinking about how each region was going to deal with the future within and outside the realm of climate change.

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[24] Yukon-Charley Rivers National Park and Preserve visitation rates range from 646 in 1994 to 12,784 in 2005 (Yukon-Charley Rivers NPRES 2012). In 2011 1,718 people visited Yukon-Charley Rivers National Park and Preserve down from 6,211 visitors in 2010 (Yukon-Charley Rivers NPRES 2012). In comparison, Denali National Park has received over 300,000 visitors per year since Yukon-Charley Rivers National Park and Preserve began collecting visitation data in 1982 (Denali NP and PRES 2011).

[25] The Alaska National Interest Lands Conservation Act was passed in 1980 and introduced or enlarged 13 National Parks despite opposition from state and development interests (Ross 2000: 203; Haycox 2002).

Lack of National Guidance in Climate Change Decision-Making

After developing climate change scenarios and narratives, we discussed possible management actions. At this time, the group began to understand its limited influence on decisions regarding climate change. As each group contemplated possible actions, we were confronted with institutional barriers to climate change decision-making; a lack of leadership or guidelines for climate change response; a lack of responsibility of institutions and actors to respond to or work together on climate change; and a lack of policy formation. I discuss each of these issues in greater detail below.

The final day of the SEAN workshop focused on determining priority management actions for the region. The tone was positive and the conversation was moving along rather steadily and gaining momentum when a participant shared her concern, "*I'm concerned with how to actually take this back, there are barriers in my way, and we are in this room planning like there aren't any and planning like there is support, I don't feel like I can apply all of this to my position"* (NPS employee, SEAN workshop, February 24, 2012). It was true. We were still talking about the future without discussing what we can do today. Many participants wanted to commit to big changes in their organization; however, some decisions were going to be small. A National Park superintendent spoke up: "*You are right that it is hard to think about how to apply this to your position. Sometimes it won't seem like you are doing enough, but it is incremental and it happens on the Park level. Ten years ago it was controversial to mention climate change in certain conversations, now we're asking you to, but the steps to move forward are sometimes slow and incremental"* (NPS superintendent, SEAN workshop, February 24, 2012). The participant's and superintendent's comments reflected a common concern: "*What exactly are we going to do?"*

We soon began to consider how we could apply what we had learned in the CCSP workshops to our own communities and National Parks. Workshop participants noted that while some parts of the CCSP process would be well-received, other aspects would receive less support. An Interpretive Ranger from a National Park in the SEAN Region noted that she was very excited to conduct a workshop with students at a local school. An Alaska Native participant was planning to conduct a similar workshop with a group of representatives from Alaska Native villages as soon as possible. However, participants were also concerned that the scenario-planning method of considering multiple futures would not work well with forecasted projections for climate change. A few worried that their colleagues might not be open to the scenario planning process. Some NPS participants also noted that they may not have much time to spend on climate change planning, considering all of their other mandates and responsibilities. For actors who work for the Department of Interior (DOI), including the NPS, Secretarial Order 3289 states that DOI entities must consider climate change in management plans and activities, but it does not specify to what extent or in what ways (United States Department of Interior 2010). This leaves the order open to interpretation and offers countless ways for National Parks and other institutions to adhere to the Secretarial Order. Therefore, some NPS managers may focus on other, more specific targets and mandates that require their attention.

The CCSP process taught multiple scenario planning tools and adaptive management techniques because it was meant to fit many situations. Facilitators often compared the curriculum of the CCSP to a multi-tool, because it is up to the participant to apply the appropriate tools wherever and whenever possible. As participants struggled to accept that they might only be able to partially apply the newly acquired tools, we also began to notice that certain actors and institutions were not present at the CCSP workshops. *"The state should really*

be here" said one superintendent on the final day of the SEAN workshop. He was implying that representatives for the state government of Alaska should be a part of the CCSP process. A facilitator spoke to this, *"We have invited the state to every CCSP workshop and haven't had anyone come."* Eventually, a representative for the state government of Alaska did attend a CCSP workshop, but it was in the Interior Arctic workshop that took place after the SEAN workshop. The superintendent spoke up again, *"Well tourism should really be involved next time, they have an interest in responding to climate change, and they should care about this."* A CCSP facilitator responded that the NPS had limited resources for the CCSP and chose to invite participants from local communities, Alaska Native villages, the state government, and other federal agencies. The non-NPS participants who were invited to the CCSPs—actors from Alaskan communities, Alaska Native villages, state and federal agencies represent groups that are specifically mentioned in Secretarial Order 3289. Local actors were invited to provide local knowledge to "develop science-based adaptive management strategies," Alaska Native actors were invited to "address the impact of climate change on American Indians and Alaska Natives," and state and other federal agencies were invited to "coordinate its…climate change activities with all relevant Federal Departments and agencies" (United States Department of Interior 2010). The CCSP was focused on involving institutions and actors that were specifically mentioned as entities to partner with in Secretarial Order 3289.

Throughout the course of the workshop, participants began to understand that their concerns about climate change aligned with the concerns of others in the region. They developed a better understanding of how climate change was affecting the region and how they could respond. At times, this regional approach was empowering—participants felt that they had a voice and a network in close proximity. At other times, it seemed difficult to understand why a

regional approach is necessary and how it would benefit decision-making at the state or national level. Some participants, who had previously worked on climate change at the state level, commented that it was much more difficult to come to a broad consensus when actors live far away. They preferred the diversity at the regional level because actors experienced similar climate change effects and have a shared understanding of regional issues. Also, since Alaska is such a large state, a few participants worried that climate change decisions at the state level would not make sense on a regional level.

Accepting the Challenges: Priorities for the CAKN and SEAN Regions

Each CCSP workshop culminated with a large group discussion to synthesize the workshop materials. This discussion took about half a day. During this discussion, each CCSP workshop created a set of management actions for its region to focus on. Most of these can be considered "robust" actions—actions that work reasonably well no matter what the future conditions are (Lempert and Schlesing 2000: 399). Both the CAKN and SEAN workshop identified one "satellite" action that responds to a place-specific effect of climate change: the CAKN workshop prioritized fire management and the SEAN workshop prioritized invasive species management, which included determining what species would be considered migratory due to climate shifts and what would be considered invasive.

The CAKN workshop agreed on six priorities that would help the region prepare and respond to the effects of climate change. The six priorities are:

1. Fire: How do we manage fires when they start? Should prescribed fire be used in Alaska's National Parks as a management tool?
2. Public Outreach: How can we inform the public about climate change and its effects, and how do we best show what could be done to help mitigate and adapt to climate change?

3. Access: How do we anticipate changing visitor demands? How do we handle more visitors and a longer tourist season? How do we mitigate the effects of tourists on the land?
4. Building Partnerships and Collaborations: Prioritize working with outside stakeholders and community groups to manage beyond the borders of National Parks and strengthen climate change response.
5. Monitoring: Prioritize monitoring to identify changes in the landscape. This provides accurate data to make well-informed management decisions.
6. Subsistence: Protect the subsistence lifestyle of Alaska Natives and other rural subsistence users, and protect wildlife and other natural resources.

The CAKN participants largely agreed that these six actions would help the CAKN region prepare and respond to climate change.

The last day of the SEAN workshop was devoted to best management practices and strategies that would help the NPS respond to climate change. The SEAN workshop identified seven priorities for management in the southeast Alaska region:

1. Include traditional ecological knowledge into planning.
2. Ensure that facilities are strong, energy efficient, and able to adapt to the anticipated effects of climate change.
3. Emphasize increased coordination with stakeholders from local communities and Alaska Native villages under a co-management framework.
4. Encourage cooperation with other entities at the local level.
5. Continue to focus on invasive species management and ensure that it is aligned with climate change projections.
6. Scrutinize budgets and emphasize priorities.
7. Use value-based decision-making to improve public outreach and develop education programs.

It was clear in the SEAN workshop that the non-NPS actors wanted the NPS to be more involved in regional level climate change planning. Additionally, non-NPS actors wanted to be more involved in NPS climate change planning. This portion of the SEAN workshop emphasized value-based decision-making, co-management, and multi-level planning—specifically local partnerships with the NPS and others.

Many participants felt that they needed more institutional commitment from the state or federal level to adequately plan for climate change. It was simultaneously empowering and disappointing to reach agreement in a small workshop while there was still so much to be done. Some participants felt unable to apply what they had learned to their positions, while others could not wait to conduct a scenario planning workshop with their colleagues or community. During this final discussion, several participants explained that they were interested in local-scale, co-managed, and highly participatory plans. One participant emphasized the need to strongly align climate change planning locally stating, "*we can't wait for DC to say, go ahead and do this*" (Alaska Native stakeholder, SEAN workshop, February 24, 2012). That seemed to be the theme of the final conversation—Alaska cannot wait to act, but this urgency is not prevalent in the rest of the US.

Throughout the SEAN and CAKN CCSP workshops, participants and facilitators emphasized the disproportionate burden of climate change in Alaska compared to the contiguous US. Many participants felt that the US did not do enough to respond to climate change. This contributed to resentment for a perceived lack of response to climate change in Alaska. One participant vehemently noted, *"The US won't respond to climate change until New York City becomes an island—then people will care"* (Former NPS employee, SEAN workshop, February 24, 2012). Many participants expressed similar opinions; they felt as if they were waiting for the

rest of the country to notice the effects of climate change before anything could be done about it. This line of thought, however, makes Alaska particularly vulnerable. Once the US government "decides" to take action on climate change, more densely populated areas may receive aid instead of Alaska.

Currently, Alaska faces a higher intensity of climate change than most places (Rice 2009). This is, perhaps, the most apparent challenge facing climate change governance in the state. The challenges experienced in the SEAN and CAKN workshops were magnified by this feeling amongst participants that Alaska must respond to climate change despite a perceived lack of interest from the rest of the US.

CHAPTER 6: Conclusion

"For in the end we will conserve only what we love. We will love only what we understand. And we will understand only what we are taught." –Baba Dioum, quote from a speech given to the International Union for Conservation of Nature, New Delhi, India, 1968

In this thesis I used two case studies to evaluate how climate change planning operates. I studied how the participation of different institutions and actors affected the Climate Change Scenario Planning (CCSP) workshops. I also considered the common challenges that the Central Alaska Network (CAKN) and Southeast Alaska Network (SEAN) workshops encountered throughout the scenario-planning process. This section explains how my research contributes to geography and climate change decision-making; it details the primary research findings, addresses the shortcomings and lessons learned during the research process, and makes recommendations for future studies.

Questions Revisited

This thesis has sought to answer: *How does climate change planning operate within the CCSP workshops for the Alaska Region of the National Park Service (NPS)?* In order to answer this question fully, I answered three sub-questions:

1. What institutions and actors were included or excluded in the CCSP workshops and how did their participation affect the workshops?

The CCSP invited multiple institutions and actors from the state government of Alaska, other federal agencies, local Alaska communities, and Alaska Native villages. The inclusion of these social and governmental actors created a co-management hybrid form of environmental governance (Lemos and Agrawal 2006: 219). No representatives from the state government attended the SEAN and CAKN CCSP workshops. One state director attended the Interior Arctic CCSP and I discussed a few challenges to state involvement in the CCSP workshops with him by

telephone. He mentioned that the state government wanted early involvement in the decision-making process and consensus-based decisions.

All other institutions invited to the CCSP workshops were in attendance, but participation varied between the CAKN and SEAN workshop. The CAKN workshop had a large majority of NPS personnel, and focused primarily on National Park planning. Participants from outside of the NPS were reserved throughout the CAKN CCSP. Contrarily, the SEAN workshop had more non-NPS participants who participated actively. The SEAN workshop was focused on the region as a whole.

Institutions and actors from the tourism and development sectors were not invited to the CCSP workshops. The CCSP facilitators would have invited tourism and development institutions had they had the resources to do so. Additionally, facilitators noted that other non-federal participants may be more able to communicate how to plan for and respond to climate change with the tourism and development sectors than the NPS would be. This issue speaks to a historical context of environmental conflict that has divided Alaska for decades, which has historically pinned the federal government and Alaska Natives against the state government and development industries (Ross 2000; Haycox 2002).

2. What environmental, social, and political factors influenced climate change planning in the CCSP workshops?

Environmental, social, and political factors influenced the invitation of institutions and actors, and also influenced why the state government of Alaska was invited but did not come. The place-specific effects of climate change also influenced who was and was not invited to each CCSP, what climate change effects were emphasized, and what management actions were considered. Participation was dynamic in the SEAN workshop, but not in the CAKN workshop.

This could be due to the relative isolation of the CAKN region, but is also linked to conflict in the CAKN region regarding subsistence hunting and wildlife protective areas. Politics, or lack thereof, also influenced the CCSP workshops. Many participants were concerned and upset at the lack of climate change coordination at the national level and felt that it was a political issue that will not be resolved in the near future.

3. How is the CCSP scenario planning and adaptive management model carried out in the workshops?

The CCSP workshop was not a typical workshop put on by the Alaska Region of the NPS. First, it utilized techniques to create scenarios about the world 30 to 50 years in the future. In general, land managers think about the future, but usually in the range of one to fifteen years. However, the scenario planning process challenged participants to project further into the future than they normally do. Second, the CCSP applied the principles of adaptive management to the workshops, creating an experiment-based atmosphere. Though adaptive management is not new to the NPS, many employees continue to work under a "scientific management" framework. Third, the CCSP included a storytelling exercise in the CCSP workshop. The storytelling was particularly important because it gave participants another way to discuss the scenarios we had just created. Additionally, the stories have the potential to speak to participants and observers in ways that scientific projections often do not. The storytelling aspect of the CCSP process helped the participants better understand the scenarios and also taught participants a new way to communicate about climate change to others. Many participants noted that they would utilize the storytelling aspect of the CCSP workshops in their local communities.

Main Findings

In this thesis, I make four arguments about climate change decision-making. First, participatory public learning enhances the inclusion of stakeholders in the climate change decision-making process. Without a shared understanding amongst participants of the environmental issues and decisions that must be made, communication suffers (Ozawa 2005). An explanation of the science of climate change creates a common understanding of a sometimes contested subject. Public learning about the effects of climate change and the scenario planning process creates the opportunity for participants to work together rather than against one another. The CCSP utilized storytelling to engage participants who had little scientific knowledge about climate change. This practice gave all actors a chance to participate regardless of their knowledge of climate change, and included social, community, and traditional ecological knowledge. This participatory public learning enhanced the inclusion of different voices, and stakeholders were able to make more informed decisions regarding climate change.

Second, the legacies of "scientific management" persist within and influence the NPS, particularly the aim to return the land to an incorrect notion of "historical accuracy." This paradigm has perhaps persisted longer within the NPS than in other public land management agencies due to the institution's emphasis on preservation. These legacies challenge climate change decision-making, because preservation may not be the best management goal for managing land in the context of climate change. The legacies of preservation and "historical accuracy" persist within the NPS, but the institutional culture is changing. By including various stakeholders in the climate change decision-making process, the NPS is reducing the influence of "historical accuracy" on the CCSP workshop. The NPS is more bound by federal mandates and institutional barriers than other non-federal actors are. Therefore, non-NPS actors may have the ability to apply the tools from the CCSP workshops to their own institutions and villages more

quickly than NPS actors. Involving diverse non-NPS actors in the decision-making process thus expands the scope of the climate change decision-making process to institutions and actors who were not involved in the CCSP. This inherently helps the NPS by implementing its planning goals outside of its own institutional structures. It also potentially expands the reach of the CCSP to include other institutions and actors who were not involved in the workshops; particularly the state government of Alaska and the tourism and development industries.

Third, the CCSP aimed to include multiple perspectives in the workshops, but did not involve all institutions and actors. Several stakeholders were left out of the SEAN and CAKN CCSP workshops even though it was considered a diverse and inclusionary workshop. In particular, state government actors were invited but did not come, and representatives for the tourism and development sectors were not invited at all. Some CCSP participants and facilitators noted that the NPS was not the best institution to communicate climate change response to tourism and development sectors. They felt non-federal actors may have more success communicating about climate change response with business interests in the state. Additionally, Secretarial Order 3289 mandates the NPS to collaborate with state and federal agencies, local communities, and Alaska Natives (United States Department of Interior 2010); therefore those stakeholders were invited to the CCSP workshops. According to the State Director I interviewed, the state is willing to work with federal agencies on climate change, but he was over-taxed by the number of different federal agency responses to climate change. He was also adamantly in favor of early involvement in the process, consensus-based decision-making, and working in areas where the state and federal government can agree; though he admitted they may not agree on much (Alaska State Director, phone interview, October 19, 2012). The response from the State Director suggests further coordination between federal agencies on climate change response would increase state involvement, but may not increase the ability to make mutually agreed upon decisions between the federal and state government in Alaska.

Fourth, participants struggled with climate change communication, particularly regarding speculating about the future and dealing with the uncertainty of climate change. The perception of risk and uncertainty are cognitive barriers that exist throughout the climate change decision-making process (Grothmann and Paytt 2005: 209) and these issues were evident in each CCSP workshop. CCSP facilitators emphasized the need for participants to work out issues of uncertainty and perception of climate change on their own, providing the tools the CCSP workshops were teaching. Some participants struggled with uncertainty while others thrived. Of the four working groups in the SEAN and CAKN CCSP workshops, one group had an especially hard time dealing with uncertainty and perception in the climate change planning process. Other groups faced similar challenges, but were better able to work through the challenges on their own.

Contributions to Geography and Climate Change Decision-Making

While most, if not all, of the global population has contributed to climate change, its effects are differentially experienced at the local and regional level. Because "the effects of climate change are place-based" (Harden 2010: 3), this research focused on place-based climate change planning. The CCSP considered how global climate change affects Alaska on the regional and local level. The location, use, and characteristics of each National Park influenced who was invited to the decision-making process, what climate change-related effects participants are likely to encounter, and what management tools are considered acceptable. My research adds to environmental governance literature by investigating collaborative climate change decision-making for public lands at the regional level. Most climate change decision-making research has focused on municipalities, regions (e.g. multi-state initiatives), or multi-national conferences, and has highlighted their interactions with other institutions at the local, regional, national, and global levels (Bulkeley 2005; Anguelovski and Carmin 2011). My research investigates region-

based climate change decision-making beyond the municipal or international level, focusing on public land agencies and Alaska Native stakeholders in a collaborative decision-making process. Additionally, the CCSP was the first regional approach to climate change decision-making within the National Park Service (NPS), which could provide insights for climate change planning for other federal agencies.

Final Thoughts

In this section, I will address several topics that I would have liked to include in the research project, lessons I have learned, and suggestions for future research. First, the study participants all agreed to participate, leaving out people who were not willing to talk about climate change. Overall, I talked with approximately 75% of the workshop participants and all of the workshop facilitators, which left out approximately ten participants from each CCSP workshop. This factor indicates that this project could be larger than a master's thesis by including all participants to obtain a more in-depth understanding of the climate change decision-making process. If this project were expanded, I would use quantitative methods to further assess the CCSP in Alaska. Specifically, I would disseminate a questionnaire to all CCSP workshop participants directly after the CCSP workshop and six months after the CCSP workshop, and then statistically analyze the results of the survey. I am particularly interested in what techniques from the CCSP workshops are being applied and where. The assessment of the CCSP workshops could be combined to include assessments of other federal agency responses to climate change in Alaska to compare and contrast the effectiveness of each initiative. I would also like to observe the evolution of climate change decision-making in the next two to five years in the Alaska Region: What kinds of networks have been established? What priorities has the region focused on? What is the relationship between the NPS, Alaska Natives, and the state government of Alaska? Has

anything drastically changed since 2012? These questions would be interesting to answer, given a longer timeline for a project.

In addition to the above suggestions, I propose the following three future research avenues in which to explore climate change planning further. First, I propose a comparative study on all of the federal agency responses to climate change. This research would focus on determining best practices for climate change decision-making in Alaska and consider what a coordinated federal response would look like in the state of Alaska. The project would involve quantitative assessments of each of the federal agency responses by issuing detailed questionnaires to past participants and statistically analyzing the results. Additionally, the research could focus on the opinions of non-federal participants in terms of desires for a coordinated climate change program. This would help to eliminate federal agency bias amongst federal actors. Non-federal stakeholders would be interviewed and asked to fill out a questionnaire regarding their experiences and desires for climate change response in Alaska. These results would then be statistically analyzed. Finally, the statistics from the federal agency analysis and the stakeholder analysis would be compared.

Second, I propose an investigation into how National Parks outside of Alaska are responding to climate change. It would be interesting to determine what factors influence responding to climate change in National Parks. Does geographical location matter, or the political affiliations of the area surrounding the National Park? Are National Parks responding to Secretarial Order 3289, in what ways, and are stronger or weaker responses grouped together in any meaningful way?

Third, I propose a comparative study focused on climate change communication. I think it would be worthwhile to consider how institutions and actors are working to communicate about climate change with one another and determine the effectiveness of the communication strategies

to multiple audiences, and for multiple reasons. Specifically, how does the inclusion of diverse perspectives and experiences influence climate change communication, and what narratives or ways of communication speak to the widest range of people? This study would involve qualitative analysis in the form of participant observations and interviews, but could also incorporate quantitative analysis into the study. The first half of the research would focus on determining potential ways to communicate about climate change and creating examples of climate change communication techniques. The second half of the research would involve a website with five to ten communication strategy videos and would invite anyone who was interested to participate in the research project. They would put in demographic information at first, then watch the videos and answer a short questionnaire after each video which would be used later for statistical analyses. Participants would be encouraged from anywhere, but specific partnerships could be made with classes at the university, high school, or even grade school level.

I have gained three major insights from studying the CCSP. First, I gained deep insights from participating in the scenario-planning process. These include but are not limited to: learning how to discuss climate change in multiple ways with diverse groups of people, learning and participating in the scenario planning process, and understanding how different actors are experiencing and responding to climate change in Alaska. Second, I developed an understanding of why we should try to communicate climate change from multiple perspectives. I came into the project thinking that everyone should understand the science behind climate change in order to propel climate change decision-making. However, I now feel that it is most important to communicate what is known about climate change in various ways in hopes that as many people as possible will come to understand the issue at hand. For example, many participants were more strongly moved by the narratives we created and noted that they could use this practice to

communicate information regarding climate change to people in their community, even if everyone did not understand the specific scientific information regarding climate change. I still believe the science of climate change is very important to comprehend, but I do not think it needs to be the only way to communicate about climate change. Third, I have gained a new respect for institutional change. Imagine trying to coordinate 10,000 people to change something that they have been doing for years, and now make that change abstract and unclear. Going through the CCSP workshops and interviewing participants made me realize how difficult institutional change can be, and that it is not as simple as creating a Secretarial Order. Institutional changes take time, and do not occur all at once.

In closing, this thesis has sought to answer research questions about the ways in which institutions and actors make decisions regarding climate change, and how the inclusion of diverse perspectives and challenges in the decision-making process shape climate change governance. I have discussed the literature on environmental decision-making and the history of land use management in the United States. I have also described the methods used to answer my research questions. My research used two workshops from the Alaska Region of the NPS's CCSP project to examine how institutions and actors plan together regarding climate change. I have shown that the participatory learning process aids climate change planning and communication, particularly when a diverse group of institutions and actors are involved. I have also used the CCSP workshops to understand the institutional barriers to climate change response in Alaska. Finally, I have presented the ways in which my thesis contributes to the literature of human-environment interactions and environmental decision-making studies.

The CCSP project teaches adaptive management and scenario planning techniques to Alaska National Park personnel and other stakeholders to plan for the uncertainties of climate change. These techniques are skills many Alaskan's already possess in order to survive the extremities of

the Alaskan wilderness. As the final CCSP workshop came to a close, participants swapped stories that embodied the harshness of Alaska from the previous winter, including a story about Dorothy Taylor, an 85 year old Alaskan woman who beat a moose away with a shovel to save her husband from attack (the article is in Appendix F). She found the shovel in the back of her husband's truck, which was always there in case the truck ever got stuck. Dorothy encountered a highly unlikely scenario but was able to plan for and react to the situation using the supplies around her and the knowledge she possessed. Her story resonated with us all as we completed the scenario planning process.

Bob Winfree closed the final Climate Change Scenario Planning workshop with these words:

> ***Think*** *about the scenario planning you do when you take a car trip in the dead of winter in Alaska. You take certain precautions to plan for specific scenarios, and you acknowledge the fact that there is a possibility the scenarios you have planned for may occur. This is what we are trying to get you to do as managers of the land—to be prepared for a range of potential futures and not just a future that is a little warmer and a little wetter than the one we have today.*

For most Alaskans, planning for multiple futures is how they survive a harsh winter. It is also why they hike with a friend, keep food out of their tent, and bring an extra few gallons of gas for their vehicle. Of course, unexpected and unplanned things will always occur, and when they do, all they can hope for is that they have prepared enough to be able to expect the unexpected. That is what the Climate Change Scenario Planning project does for its participants: it teaches them how to think about potential futures in the context of a changing climate, what the world may be like, and what obstacles they may expect to encounter. We continue to speculate what the future holds, particularly what the future will be like as the climate continues to change. While the speculation continues, I rest assured that a few Alaskans have considered a wide range of possibilities and are currently packing their trunks full of supplies, and preparing themselves and the land to be ready to expect the unexpected.

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APPENDICES

APPENDIX A: Narratives from the CAKN and SEAN CCSP Workshops

CAKN Narrative: Wrangell and Yukon-Charley Group, written by CCSP participants to the tune of *"The Times They Are a Changin"* by Bob Dylan

"The Northland is a Changin"

Come gather round people
Wherever you roam
And admit that the waters
Around you have gone
And accept it that soon
You'll be dry to the bone
If your salmon to you
Are worth savin'
Then start takin' a stand
Or the fish will be gone
For the rivers they are a changin'

Come smokejumpers and tankers
Who fight fires to no end
And watch the land change
The spruce won't come again
And don't speak too soon
While the smoke's in the wind
There's no tellin' which
Of the species will win
For the caribou now
Have no lichen to chow
For the fires they are a ragin'

Come senators, congressman
Please heed the call
Don't stand in the doorway
Don't block up the hall
For folks are on edge
And the food stores are small
There's a riot outside
And it's ragin'
Your mandates will crumble
And we'll clog up your halls
For the lawsuits they're a comin'

Come hikers and paddlers
And give us a hand
While the last of the glaciers
Are still on the land

Your sons and your daughters
Won’t see them firsthand
The old road is
Rapidly sinkin’
Your access is limited
With less frozen land
For the North it is a thawin’

Come hunters and gatherers
It’s time to unite
Across northern nations
For C and T rights
The moose and the berries
Have vanished from sight
Expenses are
Rapidly risin’
Can traditions survive
When the land doesn’t thrive?
For subsistence it is a changin’

The rivers don’t freeze
The heat is here now
The mule deer and cougars
And bison now prowl
In a land lacking wetlands
And most waterfowl
The landscape is
A rapidly changin’
And the native species
Have thrown in the towel
For phenology it is a changin’
For the climate it is a changin’

SEAN NARRATIVE: Inland Group

"Disasters Mastered" Inland group -- "Disaster Zone" nested in Big Problems Big Solutions

The year is 2030. Young Jennie, aged 16, a resident of a Southeast Alaska village, has travelled to Washington D.C. as part of the well-known Closeup program. There she is meeting with Representative B. Gladd, Senator I. M. Responsive, and Senator U. R. Adaptive. Below is her conversation with B. Gladd.

B. Gladd: I'm so pleased to be meeting a young lady from your community. The Senators and I have been hearing so much about the efforts you've been making to welcome the folks who had to evacuate when the village of [x] washed away after the last series of river floods. I hope the funding from the Relocation Bill is helping.

Jennie: Thank you, it is – although moving was so hard for a lot of people from [x]. Still, we all knew it was coming. We made plans, built homes, found ways to reconnect with distant family from [x] and to make new connections – so it's not all bad. Besides, a lot of people from [x] helped us out, in the big fire three summers ago, and in the blizzard year, when I was in fourth grade. So it's nice to be able to do something in return.

B. Gladd: Yes -- you've certainly had a lot of fires, and what with that and the pest outbreaks, we all know the forest industry can't last. Senator Adaptive and I have been talking to the village councils from your area about adaptation strategies.

Jennie: Oh, I know. I've been taking part in some of those initiatives in school, as part of the Hands-On-Learning program. I'm a tidal energy specialist now! And my cousin Susie is a hydro-power technician. Also, she's teaching me to cure bison hides. We never had bison until grasslands started coming in after the fires. It's pretty tasty. I do miss salmon, though.

B. Gladd: A hatchery is still a possibility – but only if the local people agree to it, of course. The funding could be channeled to other initiatives as well, such as the redwood plantations.

Jennie: I don't know. The Councils have been meeting to talk these ideas over. My friends and I go to the meetings – it's part of our school, and the elders like having us there. They say that if we are to plan for the future, we need the future to be in the room. I know everyone worries about jobs, and about traditions. We've had to change pretty quickly, and that can be hard on people, but we're doing it together, and that helps. There are still some good jobs. My uncle is an interpretive ranger, in the Park.

B. Gladd: You know, there were people who said the visitors would stop coming, now that the glacier has almost disappeared, but it seems like the Dynamic Change Program that Senator Responsive championed is really working.

Jennie: Yeah. Visitors used to come to see things that hadn't changed in millennia. Now they come to see things that are disappearing, and new things that are showing up – like the bison, and all the wildflowers, and our combined Geothermal and Wind plant. Pretty soon we'll start selling energy to British Colombia.

B. Gladd: That's wonderful. I was proud to sponsor the International Intertie to make that power marketable.

Jennie: It's not the same as the old ways, and sometimes I really wish things hadn't changed so fast. The older people talk a lot about everything they've lost – but they look to the future, too. I guess my people have always adapted, and always will.

SEAN NARRATIVE: Coastal Group "You Look Lost – Can We Help?"

Feb. 2030 – 4th Regional Climate Change Scenario Planning Workshop for SE AK
Juneau, AK Centennial Hall – 255 attendees (Public Welcome)
(Notes from the First Day Proceedings)

Theme for Day One: **"You Look Lost – We Can Help"**

8:00am Keynote Panel discussion: "The Next Big Thing"
Panelists: James Balog, First Director, US Department of Reason
Melinda Nelson, Honorable Governor of Alaska,
Ray Wilson, Andy Gambel, and Ed Kuntz, Village elders,

This spirited discussion outlined the current plans about to be finalized for an innovative regional distribution network serving all of SE Alaska. This multi-partner collaboration should provide transportation and delivery of food, fuel and supplies to communities through the region at lower cost and twice the frequency as present practices. A prime example of the benefits this new agency (analogous to the Homeland Security) is enabling through coordination of federal, state, local gov't, businesses and NGOs.

10:30am: Progress update – Habitat Restoration Projects
Presenters: Regional Subcommittee for Habitat Integrity

As you know, salmon fisheries and other fish stock are in decline, and in recent years, there has been significant loss in habitat structure. Amongst other things, this subcommittee has been tasked with helping the region's communities develop new economic and subsistence alternatives. We're happy to report that 90% of the backlog of young growth clearing has been accomplished as of this Spring. Project manager Seth Anderson says that all of the crews have made excellent progress. In addition to providing funding support, agencies have actively engaged the youth in these communities as active agents in increasing and maintaining browse for deer and moose populations – reaping expanded harvests. Seth, who started his career in 2010 as a YCC work leader, noted that agencies have enjoyed high retention of enrollees (many becoming permanent staff) and they are also experiencing a boom of interest in citizen science research activities associated with this project. (Looks like the CCC is alive and well for a new generation.)

Lunch

1:30pm: Special event - The 2030 "Fireside Chat for Climate"

Live Video chat presenting community and tribal leaders from communities across the region – including: Kake, Hydaberg, Klawock, Angoon, Petersburg, Wrangell, Haines, Klukwan, Gustavus, Craig, and many others.

This multimedia event was developed to discuss recent shifts occurring in the region's tourism patterns as a result of changing climate. Recent growth in the package-tour market, coupled with the new larger cruise ships serving the region, provide opportunity to collaborate on new climate-inspired strategies for eco-tourism as well as for interpretive and education products and services. The focus of discussion included a wide range of options: sharing tradition ecological knowledge and expanding opportunities for eco-tourism by villages, embracing newer technologies and mobile devices by growing our products and services around a "personalized" perspective, and addressing the need to raise awareness about the current extreme conditions with key climate-related messages about adaptation strategies and concerns. The session concluded with a region-wide multi-venue rendition of "Alaska's Flag" – the first time ever, we believe!

3:30pm: Progress update – Energy Development and "Greening" Projects

Presenters: Regional Subcommittee for Energy Conservation

Several energy-related efforts have made good progress through this partnership over the past few years. Most notably, significant strides in bringing together communities via the grid have seen completion. Funding has been secured for installation of salt water transmission cables, the Thayer Lake hydro project has been operational since 2020, and there has been a concerted effort to reduce demand while increasing availability during peak periods. All the region's national parks have completed their Climate Friendly Parks Action plans and are making progress towards their reduction targets. Several partners have invested in plug-in hybrids for their fleets, and LEED certification standards are the standards for all new construction.

Finally – The Highlight from the Evening Reception – the 10th annual "Big Black Boot" award presentation to Hoonah for excellence in reducing their community's carbon footprint. The trophy is accompanied by a generous cash incentive, so competition has been fierce for this prize – congratulations to all the nominees!

SEAN NARRATIVE: Inland Group *"Ranger Ray and the Raven"*

The novice Ranger Ray proudly dressed in his new agency uniform of the National Parks and Forests and prepared for his first day on the job. While on his walk to work he begins to ponder why some things he sees don't add up. The sights, sounds, and people surrounding the park do not seem to match what the National Geographic TV specials and IMAX movies had portrayed about Southeast Alaska. He stops to take in the surroundings and sips his coffee along the river, or what is now more like a creek. Lost in thought he was suddenly startled by a raven that fluttered close to him and landed on a branch just inches away from his shoulder. Ray looks into the Raven's eye and contemplated what the Raven and his ancestors knew about Alaska. He had an urge to ask the Raven what had happened to Southeast Alaska? Where were the famous salmon he had heard about, why did the glaciers seem smaller? Why were the evergreens trees so bare?

If only ravens could talk he thought…..and with a strange squawk he was startled again. Had the Raven heard him?

"Raven will you tell me more about what happened to Southeast Alaska and its people?"

Raven nodded and hopped excitedly.

"No one is talking about it. The other rangers at work didn't even mention the receding glaciers, the infested forest, the burning muskeg, or the missing salmon. Where did they go?"

Raven makes a motion, a sweeping away with his wing, as to say, "They are just gone."

Ranger Ray looks baffled by the response and ponders the response. How could these changes have happened and the world missed it? It is as if they were distracted with the national reorganization of natural resource agencies, deficit problems, downsizing of the federal government. The people were consumed with daily life, basic needs, and in the end they just ignored it. "But Raven what will the native cultures, fishermen, bears and whales do with so few fish? Won't the people argue about the salmon and who gets how many?" Raven nods in agreement and cocks his eye in concern.

"Who will decide? The new agencies are in chaos right now. The local governments and tribes have so much to worry about now, with the floods from the glacial dams breaking and muskeg fires."

Raven shrugs his wings as to say "Who knows?"

Ray asks, "What about the Tlingit people Raven? They cared for the land for so long and they know it so well. Can they help?"

Again Raven makes his sad sweeping motion towards the big city of Juneau. The indigenous people are suffering as well. Many have been displaced by floods, lack of salmon and limited subsistence opportunities, and some have even relocated to the cities. Tribal communities are trying to cope with a disruption of cultural practices and splintering of their families. Ray is bewildered and again thinks how this could have gone unnoticed.

Ranger Ray is dazed and wondering if people are in denial of the real causes of these changes, when suddenly he notices the time and realizes that he is almost late to board the newly developed Princess/ Holland America ferry that transports visitors to the park for a fee. "Raven I have to go, but I thank you for your ancient insight. Can we meet again?"

Raven squawks with eagerness and turns, spreads his wings and glides off in search of the now rare yellow cedars for a nap. Ranger Ray watches the black bird fly away and heads to work with a new perspective. How will he tell people what he has learned from Raven….he begins to imagine a children's book to teach the youth.

SEAN NARRATIVE: Coastal Group *"Unsatisfied Customers"*

facebook
Search
Chris Sergeant
Home
Alaska National Parks
Wall
Info
Friend Activity
Welcome
Photos
Events
Alaska National Parks
Government Organization · Anchorage, Alaska
Create a Page
Wall
Alaska National Parks · Everyone (Most Recent)
Share: Post Link
Write something...
Alaska National Parks
Glacier Bay National Park and Preserve has officially become a marine reserve!
Like · Comment · Share · Yesterday at 12:39pm
91 people like this.
View all 8 comments
16 shares
Local harvester
I hope this means we can still continue our traditional harvest...
11 hours ago · Like · 2
Interested citizen
What will the park be doing to monitor changes to the marine ecosystem?
4 hours ago · Like
Write
Interested citizen
This will be great for the salmon and halibut!
Bob Roberts
Dudes! Just bought my personal jetpack permit for a daytrip over Brady Icefield. I am totally STOKED.
Like · Comment · February 8 at 10:42am
Alaska National Parks
Careful out there, Bob... Have fun!
February 8 at 10:50am · Like
You and Alaska National Parks
Glacier Bay National Park and Preserve, National Park Service, Alaska Dispatch
Recommendations (15)
See All
Orlean C Lapinid Alaska - one of the states on my bucket list!!
Tommy Gee In 2010 Sitka National Historical Park received an ABI grant so Alutiiq elders a... See More
4
Write a recommendation...

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Alaska National Parks

Wall
Info
Friend Activity
Welcome
Photos
Events

Alaska National Parks

Create a Page

Government Organization · Anchorage, Alaska

Wall — Alaska National Parks · Everyone (Most Recent)

Alaska National Parks

The National Park Service in Alaska today announced that pending further studies that support for aquaculture in waters adjacent to parks would be withheld pending further analysis. Under this analysis, the NPS would take into consideration:
1. the purposes for which an affected unit was established,
2. the impacts of aquaculture on the additional mandates required of the federal agency,
3. and the budgetary constraints on the agency's ability to monitor aquaculture activities.

Response
What's wrong with you guys! With the collapse of the wild fisheries due to whacked out timing of the fish runs and stream flows, how do you guys expect those of us living in rural Alaska to make a living??? Between NOAA, USFWS, ADF&G, NMFS, and SOB all we get is a runaround on this issue. Please get it together and solve this issue!

Response
Now that our coastal streams either flood or go dry during the summers, we've lost our cheap hydro power. What we face now are outrageous fuel prices and few job opportunities leaving us no option but to move into town to find work. You NPSers will probably be the last ones living in rural coastal Alaska. EAT JELLYFISH AND DIE!!!!

Response
We're not happy about not being able to catch fish, not only do we lose food from our table, but we lose our century's old traditions and culture associated with sharing between family and community. We look forward to ways that we can adapt to these changes and that hope we can reconnect our family patterns.

You and Alaska National Parks
Glacier Bay National Park and Preserve, National Park Service, Alaska Dispatch

Recommendations (15) See All

Orlean C Lapinid Alaska - one of the states on my bucket list!!

Tommy Gee In 2010 Sitka National Historical Park received an ABI grant so Alutiiq elders a... See More
4

Write a recommendation...

APPENDIX B: US Department of the Interior Secretarial Order 3226
Including Amendment No. 1

ORDER NO. 3226, Amendment No. 1

SIGNATURE DATE: January 16, 2009

Subject: Climate Change and the Department of the Interior

Sec. 1 **Purpose.** This Order provides guidance to bureaus and offices within the Department of the Interior (DOI) on how to provide leadership by developing timely responses to emerging climate change issues. This Order replaces Secretarial Order No. 3226, signed on January 19, 2001, entitled "Evaluating Climate Change Impacts in Management Planning." It is intended to reaffirm efforts within DOI that are ongoing with respect to this important issue.

Sec. 2 **Background.** In 2003, 12 major industrial sectors responded to a challenge from President Bush to develop new, voluntary initiatives to reduce greenhouse gas emissions over a ten-year period. The President also created an interagency, cabinet-level committee to coordinate and prioritize Federal research on global climate science and advanced energy technologies. In 2005, the United States released a draft 10-year Strategic Plan for the U.S. components of the integrated global Earth Observation System. In addition to finding ways to prevent greenhouse gas emissions, the United States has recognized the need to focus on mitigation and adaptation activities. DOI, in partnership with States, Tribes, local governments, and private landowners, is in an excellent position to identify changes in the national landscape that may result from climate change, develop adaptation strategies for managing natural and cultural resources affected by such changes, deploy renewable energy sources, provide both geologic and terrestrial carbon sequestration alternatives, and implement energy conservation measures. In 2007, a Climate Change Task Force was created within DOI to study climate change and its effects on the responsibilities of the Department. The Task Force included three subcommittees that developed options for actions DOI should consider with respect to legal and policy issues, land and water management issues; and climate change scientific issues specifically related to DOI's responsibilities.

Sec. 3 **Authority.** This Order is issued in accordance with the authorities contained in: Reorganization Plan No. 3 of 1950, as amended, 5 U.S.C. App.; 5 U.S.C. § 301; 43 U.S.C. § 1451; and 43 U.S.C. § 1453.

Sec. 4 **Bureau and Office Planning and Management Responsibilities.** Each bureau and office of DOI shall, in a manner consistent and compatible with their respective missions:

a. Consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, and/or when making major decisions affecting DOI resources.

b. Review the Climate Change Task Force subcommittee reports posted on the U.S. Geological Survey (USGS) website on December 3, 2008, and the resulting comments submitted to the Department by the public.

c. Review the Climate Change Task Force subcommittee reports posted on the U.S. Geological Survey (USGS) website on December 3, 2008, and the resulting comments

submitted to the Department by the public. Review all existing programs, facilities, boundaries, policies, and authorities under the respective bureau or office to identify potential impacts of climate change on the bureau's or office's areas of responsibility and to recommend a set of response actions,

d. Identify to the Assistant Secretary - Policy, Management and Budget through the annual budget process all issue areas where action is needed to make budget adjustments necessary to carry out the actions identified in Section 4C.

e. Identify for the Solicitor's office all issue areas where legal analysis is needed to make the adjustments necessary to carry out the actions identified in Section 4C.

f. Ensure that any policy review conducted, or policy guidance produced, by the bureau or office that has as a major focus potential climate change impacts or climate change adaptation or mitigation, is coordinated with the Climate Change Coordinator within the Office of Environmental Policy and Compliance.

g. Use *Adaptive Management: The U.S. Department of the Interior Technical Guide*, as a framework for managing natural resources and develop, as needed, more tailored adaptive management handbooks specific to the resource responsibilities and institutional arrangements of that bureau or office.

h. Partner, consistent with existing policies, authorities, and programs, with State, local, and private bodies and individuals in support of projects and activities that contribute to the conservation of species, natural communities, and lands and waters placed at risk by changing climate conditions.

i. Provide incentives for activities to encourage the sequestration of greenhouse gas emissions, including carbon dioxide.

j. As appropriate, work with USGS on DOI's Climate Effects Network with the goal of integrating science, monitoring, and modeling information.

k. As appropriate, work with USGS on the National Climate Change and Wildlife Science Center in order to develop effective resource management adaptation strategies related to climate change impacts on fish and wildlife.

Sec. 5 **Carbon Sequestration Program.** The Bureau of Land Management, the Bureau of Indian Affairs, the National Park Service, the U.S. Fish and Wildlife Service, and the Office of Surface Mining Reclamation and Enforcement shall each, consistent and compatible with their respective missions:

a. Identify a terrestrial sequestration program for greenhouse gases, consistent with available financial and other resources, aimed at reducing greenhouse gases, including carbon dioxide;

b. Utilize existing policies and regulations, programs, and expertise to work with private landowners and greenhouse gas emitters to identify opportunities to restore habitat while helping to offset greenhouse gas emissions; and

c. In accordance with the Energy Security Act of 2007, work with the USGS to inventory and characterize lands managed or regulated, as appropriate, by the bureau for possible geological and biological greenhouse gas sequestration.

Sec. 6 **Bureau and Office Energy Conservation Responsibilities.** As a component of climate change management, each bureau and office of DOI shall report as part of the President's Management Agenda Scorecard, the steps being undertaken to implement Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management," dated January 24, 2007, which includes requirements to:

a. improve energy efficiency and reduce greenhouse gas emissions;
b. ensure that at least half of the statutorily required renewable energy consumed by that bureau or office comes from new renewable sources;
c. implement renewable energy generation projects on lands managed or occupied by the bureau or office;
d. reduce water consumption intensity;
e. acquire goods and services that consider sustainable environmental practices and utilize paper containing 30 percent post-consumer fiber content;
f. reduce the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the bureau or office; increase diversion of solid waste as appropriate; and maintain cost-effective waste prevention and recycling programs in its facilities;
g. ensure that new construction and major renovation of agency buildings comply with sustainable practice requirements;
h. ensure that bureaus or offices operating a fleet of at least 20 motor vehicles, reduce the fleet's total consumption of petroleum products, increase the total fuel consumption that is non-petroleum-based, and, when cost-effective, uses plug-in hybrid vehicles when they are commercially available;
i. ensure that the bureau or office, when acquiring electronic products to meet its requirements, uses Electronic Product Environmental Assessment Tool (EPEAT)-registered electronic products, if available;

j. purchase Energy Star compliant equipment when selecting agency computers and monitors;

k. establish and implement policies to extend the useful life of agency electronic equipment; and

l. use environmentally sound practices with respect to disposition of agency electronic equipment that has reached the end of its useful life.

Sec. 7 **Effective Date**. This Order is effective immediately and will remain in effect until its provisions are converted to the Departmental Manual or until it is amended, superseded, or revoked, whichever occurs first. In the absence of any of the foregoing actions, the provisions of this Order will terminate and be considered obsolete on December 31, 2014. The termination of this Order will not nullify implementation of the requirements and responsibilities effected herein.

/s/ DIRK KEMPTHORNE

Secretary of the Interior

SO#3226A1 1/16/09
Replaces SO#3226 1/19/01

APPENDIX C: US Department of the Interior Secretarial Order 3289
Including Amendment 1

THE SECRETARY OF THE INTERIOR
Washington

ORDER NO. 3289, Amendment No. 1 ***(Amended material italicized)***

SIGNATURE DATE: February 22, 2010
Subject: Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources

Sec. 1 **Purpose and Background**. Secretarial Order No. 3285, issued on March 11, 2009, made production and transmission of renewable energy on public lands a priority for the Department. This Order establishes a Department-wide approach for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, ocean, fish and wildlife, and cultural heritage resources that the Department manages. This Order replaces Secretarial Order No. 3226, Amendment No. 1, issued on January 16, 2009, and reinstates the provisions of Secretarial Order No. 3226, issued on January 19, 2001.

To fulfill our nation's vision for a clean energy economy, Interior is now managing America's public lands and oceans not just for balanced oil, natural gas, and coal development, but also – for the first time ever – to promote environmentally responsible renewable energy development. Sun, wind, biomass, and geothermal energy from our public and tribal lands is creating new jobs and will power millions of American homes and electric vehicles.

The Department is also taking the lead in protecting our country's water, land, fish and wildlife, and cultural heritage and tribal lands and resources from the dramatic effects of climate change that are already occurring – from the Arctic to the Everglades. The realities of climate change require us to change how we manage the land, water, fish and wildlife, and cultural heritage and tribal lands and resources we oversee. For example:

• New water management imperatives associated with climate change may require restoration of natural systems and construction of new infrastructure to reduce new flood risks or to capture early run-off.
• Strategies to address sea level rise may require acquisition of upland habitat and creation of wetlands and other natural filters and barriers to protect against sea level rise and storm surges. It may be necessary to relocate certain iconic and culturally historic structures.
• Shifting wildlife and habitat populations may require investments in new wildlife corridors.
• New invasions of exotic species and new wildland fire threats due to longer fire seasons
and more severe droughts will require innovation and more effective ways of managing the Department's resources.

2 The Department of the Interior, with its 67,000 employees and scientific and resource management expertise, is responsible for helping protect the nation from the impacts of climate change. In particular the Department must:

• Adapt its water management strategies to address the possibility of shrinking water supplies and more frequent and extended droughts to continue to supply drinking water to more than 31 million people and irrigation water to 140,000 farmers.

• Wisely manage millions of acres of parks, refuges and other public lands, and prudently exercise its shared responsibility for managing the 1.7 billion acres of the U.S. outer continental shelf.

• Conserve and manage fish and wildlife resources, including over 800 native migratory bird species and nearly 2,000 federally listed threatened and endangered species.

• Protect cultural and archaeological resources and iconic structures that may be affected by climate change.

• Address the impacts of climate change on American Indians and Alaska Natives, for whom the Department holds trust responsibilities on behalf of the Federal government.

• Continue to provide state-of-the art science to better understand the impacts of climate change and to develop science-based adaptive management strategies for natural and cultural resource managers.

• Continue its work to quantify the amount of carbon stored in our forests, wetlands, and grasslands, identifying areas where carbon dioxide can be safely stored underground, and ways to reduce the Department's carbon footprint.

Sec. 2 **Authority**. This Order is issued under the authority of Section 2 of Reorganization Plan No. 3 of 1950 (64 Stat. 1262), as amended.

Sec. 3 **Coordinating the Department's Response to Climate Change Impacts on Our Resources**. ***The Climate Change Response Council within the Office of the Secretary is renamed the Energy and Climate Change Council (Council)***. ***The Council*** will execute a coordinated Department-wide strategy to address ***renewable energy efforts and*** to increase scientific understanding of and development of effective adaptive management tools ***to address*** the impacts of climate change on our natural and cultural resources. The ***Energy and Climate Change Council*** will be composed of the Secretary (Chair), Deputy Secretary (Vice-Chair), Counselor to the Secretary (Vice-Chair), Assistant Secretaries, Bureau Directors and the Solicitor. The Council will help coordinate activities within and among the Department's agencies and bureaus to develop and implement an integrated strategy for responding to ***renewable energy efforts and*** climate change impacts involving the resources managed by the Department. The Department's ***Energy and Climate Change Council*** will also coordinate its ***energy and*** climate change activities with all relevant Federal Departments and agencies including, but not limited to, the Council on Environmental Quality, the Office of Energy and Climate Change, the Office of Science and Technology Policy, the National Science and Technology Council, the Department of Agriculture, the Department of Commerce, the Department of Defense, and the Environmental Protection Agency

3 The ***Energy and Climate Change Council*** will implement Department-specific ***energy activities as described in Secretarial Order # 3285 (Amendment No. 1), and implement*** climate change activities through the following mechanisms:

a. Climate Change Planning Requirements. Each bureau and office of the Department must consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under the Department's purview. These requirements were set forth in Secretary's Orders No. 3226 and 3285, and remain in effect. The organizational changes made by this Order will enable the bureaus and agencies to fulfill these planning requirements.

b. ***DOI Climate Science Centers***. Management decisions made in response to climate change impacts must be informed by science and require that scientists work in tandem with those managers who are confronting climate change impacts and evaluating options to respond to such impacts. Pursuant to P.L. 110-161, the United States Geological Survey (USGS) has been developing regional science centers to provide climate change impact data and analysis geared to the needs of fish and wildlife managers as they develop adaptation strategies in response to climate change. These centers are currently known as "regional hubs" of the National Climate Change and Wildlife Science Center, and are being developed in close collaboration with Interior agencies and other federal, state, university, and non-governmental partners.
The Energy and Climate Change Council will work with USGS and other Department bureaus to rename these regional science centers as ***DOI Climate Science Centers (Centers)*** and broaden their mandate to encompass other climate-change-related impacts on Departmental resources. These eight Centers will synthesize and integrate climate change impact data and develop tools that the Department's managers and partners can use when managing the Department's land, water, fish and wildlife, and cultural heritage resources.
c. Landscape Conservation Cooperatives. Given the broad impacts of climate change, management responses to such impacts must be coordinated on a landscape-level basis. For example, wildlife migration and related needs for new wildlife corridors, the spread of invasive species and wildfire risks, typically will extend beyond the borders of National Wildlife Refuges, BLM lands, or National Parks. Additionally, some bureau responsibilities (e.g., Fish and Wildlife Service migratory bird and threatened and endangered species responsibilities) extend nationally and globally. Because of the unprecedented scope of affected landscapes, Interior bureaus and agencies must work together, and with other federal, state, tribal and local governments, and private landowner partners, to develop landscape-level strategies for understanding and responding to climate change impacts. Interior bureaus and agencies, guided by the ***Energy and Climate Change Council***, will work to stimulate the development of a network of collaborative "Landscape Conservation Cooperatives." These cooperatives, which already have been formed in some regions, will work interactively with the relevant ***DOI Climate Science Center(s)*** and help coordinate adaptation efforts in the region.

Sec. 4 **Additional Departmental Action to Mitigate Climate Change**. In accordance with Secretarial Order No. 3285, the Department has prioritized development of renewable energy on public lands and offshore waters to reduce our dependence on foreign oil and to reduce greenhouse gas pollution. This Order establishes two additional projects to mitigate climate change: the DOI Carbon Storage Project, and the DOI Carbon Footprint Project. Additional mitigation projects will be encouraged and supported by the ***Energy and Climate Change Council***.

a. The DOI Carbon Storage Project. This project is being implemented under P.L. 110-140, "The Energy Independence and Security Act of 2007," which gives the Department statutory responsibility to develop carbon sequestration methodologies for geological (i.e., underground) and biological (e.g., forests and rangelands) carbon storage. The USGS has the lead in administering the Carbon Storage Project, but will work closely with other bureaus and agencies in the Department and external partners to enhance carbon storage in geologic formations and in plants and soils in a manner consistent with the Department's responsibility to provide comprehensive, long-term stewardship of its resources. The DOI Carbon Storage Project is vital for successful domestic and global geological and biological carbon sequestration efforts.

b. The DOI Carbon Footprint Project. The project will develop a unified greenhouse gas emission reduction program, including setting a baseline and reduction goal for the Department's greenhouse gas emissions and energy use. The Assistant Secretary for Policy, Management and Budget will have the lead in administering the DOI Carbon Footprint Project, with the cooperation of all of the Department's agencies and bureaus.

Sec. 5 **American Indians and Alaska Natives**. Climate change may disproportionately affect tribes and their lands because they are heavily dependent on their natural resources for economic and cultural identity. As the Department has the primary trust responsibility for the Federal government for American Indians, Alaska Natives, and tribal lands and resources, the Department will ensure consistent and in-depth government-to-government consultation with tribes and Alaska Natives on the Department's climate change initiatives. Tribal values are critical to determining what is to be protected, why, and how to protect the interests of their communities. The Department will support the use of the best available science, including traditional ecological knowledge, in formulating policy pertaining to climate change. The Department will also support substantive participation by tribes in deliberations on climate-related mechanisms, agreements, rules, and regulations.

Sec. 6 **Implementation**. The Deputy Secretary is responsible for ensuring implementation of all aspects of this Order. This responsibility may be delegated as appropriate. This Order does not alter or affect any existing duty or authority of individual bureaus.

Sec. 7 **Effective Date**. This Order is effective immediately and will remain in effect until its provisions are converted to the Departmental Manual or until it is amended, superseded, or revoked, whichever occurs first.

/s/ Ken Salazar Secretary of the Interior5

SO#3289A1 2/22/10

APPENDIX D: List of Questions Utilized During Interviews

Park Personnel Interview Outline

What made you decide to come to the workshop?

What is your opinion of the CCSP?

Do you think it is a good thing? Do you support the initiative?

Did you learn anything new from the workshop?

> How are you going to bring this back to your community?
>
> What could have been done better? What was done really well?

What is the main take home point of the workshop?

Do you think the CCSP workshops are making progress in getting Alaska's National Parks prepared for climate change?

> Is this necessary in your opinion? If yes, what do you think is helping progress?
>
> What is hindering progress?

How much did you participate in the workshop?

Was having outside stakeholders at the workshop important to you?

> Should stakeholders have been more or less involved?

Did you form new relationships with people at the workshop?

Will these relationships help you do your job better?

Have you learned anything from interacting with other stakeholders and park personnel?

Is it important to involve stakeholders in workshops like this? Why or why not?

Is climate change a factor in your job?

What does responding to climate change in your position look like?

What have you learned from the CCSP?

> Will it change your management practices in any way? If no, why not?
>
> If yes, how so?

Can you communicate the issues of climate change to the broader community?

> Is this a necessary aspect of your job? Is it an important part of your job?

Stakeholder Interview Outline

What made you decide to come to the workshop?

What is your opinion of the CCSP?

Do you think it is a good thing? Do you support the initiative?

Did you learn anything new from the workshop?

- How are you going to bring this back to your community?
- What could have been done better? What was done really well?

What is the main take home point of the workshop?

Do you think the CCSP workshops are making progress in getting Alaska's National Parks prepared for climate change?

- Is this necessary in your opinion? If yes, what do you think is helping progress?
- What is hindering progress?

How much did you participate in the workshop?

- Did you work or communicate with new people?

Was important to involve stakeholders, like yourself in the workshop?

- Would you have preferred more or less involvement? How so?
- Did you feel included in the workshops?
  - What aspects did you feel particularly included in?
  - What aspects did you feel excluded from?

Did you form new relationships with people at the workshop?

- Will these relationships help you or your community in any way?

Have you learned anything from interacting with other stakeholders and park personnel?

Is climate change a factor in your life?

- What does responding to climate change for you and your community look like?

What have you learned from the CCSP?

- Will it change anything you do? If no, why not? If yes, how so?

APPENDIX E: Founding Legislation for Denali National Park and Preserve
(Formerly known as Mount McKinley National Park)

that is one hundred and twenty rods south and running east and west and parallel with the section line between sections eight and seventeen in township eleven south, range ten west of the Willamette meridian, crosses said stream, be, and is hereby, declared to be a nonnavigable stream.

Approved, February 26, 1917.

February 26, 1917.
[S. 5450.]
[Public, No. 352.]

CHAP. 120.—An Act To provide for an additional judge in the State of Texas.

Texas western judicial district.
Additional judge for.
Vol. 36, p. 1087, amended.
Residence.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States, by and with the advice and consent of the Senate, shall appoint an additional judge of the district court of the United States for the Western District of Texas, who shall possess the same powers, perform the same duties, and receive the same compensation and allowance as the present judge of said district, and whose official place of residence shall be maintained at El Paso until otherwise provided by law.

Approved, February 26, 1917.

February 26, 1917.
[S. 5716.]
[Public, No. 353.]

CHAP. 121.—An Act To establish the Mount McKinley National Park, in the Territory of Alaska.

Mount McKinley National Park, Alaska, established.
Description.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the tract of land in the Territory of Alaska particularly described by and included within the metes and bounds, to wit: Beginning at a point as shown on Plate III, reconnoissance map of the Mount McKinley region, Alaska, prepared in the Geological Survey, edition of nineteen hundred and eleven, said point being at the summit of a hill between two forks of the headwaters of the Toklat River, approximate latitude sixty-three degrees forty-seven minutes, longitude one hundred and fifty degrees twenty minutes; thence south six degrees twenty minutes west nineteen miles; thence south sixty-eight degrees west sixty miles; thence in a southeasterly direction approximately twenty-eight miles to the summit of Mount Russell; thence in a northeasterly direction approximately eighty-nine miles to a point twenty-five miles due south of a point due east of the point of beginning; thence due north twenty-five miles to said point; thence due west twenty-eight and one-half miles to the point of beginning, is hereby reserved and withdrawn from settlement, occupancy, or disposal under the laws of the United States, and said tract is dedicated and set apart as a public park for the benefit and enjoyment of the people, under the name of the Mount McKinley National Park.

Existing entries, etc., not impaired.

SEC. 2. That nothing herein contained shall affect any valid existing claim, location, or entry under the land laws of the United States, whether for homestead, mineral, right of way, or any other purpose whatsoever, or shall affect the rights of any such claimant, locator, or entryman to the full use and enjoyment of his land.

Rights of way.
Vol. 31, p. 790.

SEC. 3. That whenever consistent with the primary purposes of the park, the Act of February fifteenth, nineteen hundred and one, applicable to the location of rights of way in certain national parks and national forests for irrigation and other purposes, shall be and remain applicable to the lands included within the park.

Mineral land laws not affected.

SEC. 4. Nothing in this Act shall in any way modify or effect the mineral land laws now applicable to the lands in the said park.

Regulations of control, etc.

SEC. 5. That the said park shall be under the executive control of the Secretary of the Interior, and it shall be the duty of the said

executive authority, as soon as practicable, to make and publish such rules and regulations not inconsistent with the laws of the United States as the said authority may deem necessary or proper for the care, protection, management, and improvement of the same, the said regulations being primarily aimed at the freest use of the said park for recreation purposes by the public and for the preservation of animals, birds, and fish and for the preservation of the natural curiosities and scenic beauties thereof.

Game refuge established.

Sec. 6. That the said park shall be, and is hereby, established as a game refuge, and no person shall kill any game in said park except under an order from the Secretary of the Interior for the protection of persons or to protect or prevent the extermination of other animals or birds: *Provided*, That prospectors and miners engaged in prospecting or mining in said park may take and kill therein so much game or birds as may be needed for their actual necessities when short of food; but in no case shall animals or birds be killed in said park for sale or removal therefrom, or wantonly.

Proviso. Killing for food permitted.

Leases for accommodations for visitors.

Sec. 7. That the said Secretary of the Interior may, in his discretion, execute leases to parcels of ground not exceeding twenty acres in extent for periods not to exceed twenty years whenever such ground is necessary for the erection of establishments for the accommodation of visitors; may grant such other necessary privileges and concessions as he deems wise for the accommodation of visitors; and may likewise arrange for the removal of such mature or dead or down timber as he may deem necessary and advisable for the protection and improvement of the park: *Provided*, That no appropriation for the maintenance of said park in excess of $10,000 annually shall be made unless the same shall have first been expressly authorized by law.

Proviso. Limit on appropriations.

Punishment for violations.

Sec. 8. That any person found guilty of violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and shall be subjected to a fine of not more than $500 or imprisonment not exceeding six months, or both, and be adjudged to pay all costs of the proceedings.

Approved, February 26, 1917.

February 26, 1917. [S. 7644.]

[Public, No. 354.]

CHAP. 122.—An Act To create a new division of the northern judicial district of Texas, and to provide for terms of court at Wichita Falls, Texas, and for a clerk for said court, and for other purposes.

Texas northern judicial district. New division created. Vol. 36, p. 1125, amended.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the counties of Archer, Baylor, Clay, Cottle, Foard, Montague, King, Knox, Wichita, Wilbarger, and Young shall constitute a division of the northern judicial district of Texas.

Terms at Wichita Falls.

Sec. 2. That terms of the district court of the United States for the said northern district of Texas shall be held twice each year at the city of Wichita Falls, in Wichita County, on the fourth Monday in March and the third Monday in November. The clerk of the court for the northern district of Texas shall maintain an office in charge of himself or a deputy at Wichita Falls, which shall be kept open at all times for the transaction of the business of the court: *Provided*, That suitable accommodations for holding court at Wichita Falls shall be provided by the county or municipal authorities without expense to the United States.

Proviso. Court rooms.

Approved, February 26, 1917.

APPENDIX F: Alaska woman, 85, uses shovel to scare off moose attacking husband

by Lisa Demer / Anchorage Daily News Jan 23, 2012

Dorothea Taylor describes her effort to stop a moose that was stomping her husband, George Murphy, right, Monday, Jan. 22, 2012, from Providence Alaska Medical Center in Anchorage, Alaska. An agitated moose on Friday ran down and stomped Murphy, a well-known Bush pilot from Willow, but he was saved when his wife, who is 5 feet tall and weighs 97 pounds, grabbed a shovel from their pickup truck and whacked the big animal until it backed off. (AP Photo/Anchorage Daily News, Bill Roth)

George Murphy talks about Friday's moose attack from his hospital bed at Providence Alaska Medical Center in Anchorage, Alaska, as his wife Dorthea Taylor looks on Monday, Jan. 22, 2012. An agitated moose on Friday ran down and stomped Murphy, a well-known Bush pilot from Willow, but he was saved when Dorthea, who is 5 feet tall and weighs 97 pounds, grabbed a shovel from their pickup truck and whacked the big animal until it backed off. (AP Photo/Anchorage Daily News, Bill Roth)

ANCHORAGE, Alaska - An agitated moose ran down and stomped a well-known bush pilot from Willow, but he was saved when his wife grabbed a shovel from their pickup truck and whacked the big animal until it backed off.

George Murphy, 82, and his wife, Dorothea Taylor, 85, told the story of their recent moose encounter Sunday afternoon from Murphy's hospital room in Anchorage, where he is recovering from gashes to his head and left leg as well as seven broken ribs. He was in good condition Monday, a hospital spokeswoman said.

The couple was at the Willow Airport around 10:30 a.m. Friday running their golden retrievers as they do almost every day. They drive along the access road in their truck and let the dogs, Fellar and King Tut, run on ahead.

When it came time to round up the dogs, Murphy told Taylor she could wait in the truck.

"Sometimes both of us go and walk the old dog back," Taylor said. Fellar is 12 and moves slow. Tut, his son, is 3 and can run like the dickens. "But this time it was 30 below and just too darn cold out there."

Murphy was hiking back to the truck with Fellar when he saw the moose up the road.

"He was way off. Jeez, he spotted me and he started to come right after me. So I was trying to get to the truck. But I didn't make it," Murphy told the Anchorage Daily News (http://bit.ly/yahDtF).

At the airport, there were no trees to duck behind. Murphy dove into the deep snow for protection. And the moose came at him.

"He started to stomp. Then he turned around and stomped again. And there was nothing I could do. I was afraid he was going to kill me."

Murphy, a retired state construction engineer, flew for the Iditarod Trail Sled Dog Race nearly three decades, stopping only a couple of years ago. He once was the chief pilot for the race. He's well known among mushers and pilots as well as the news crews he carried to cover the race.

He and Taylor, a retired teacher, are both familiar with wild animals. They filled their freezer with moose and caribou until they gave up hunting a couple of years back.

From inside the truck, Taylor heard the dogs barking in alarm and jumped out to investigate. At 5 feet tall and 97 pounds, she is tiny but tough. Years ago, she shot and killed a trophy size brown bear on Kodiak Island. The mount is on the wall of the home they built on eight acres in Willow.

She saw the moose rear up and strike at something on the ground with its front hooves. She didn't know that her husband was down or that the moose was stomping him. She couldn't see him in the snow.

Tut was at the moose's rear, barking and trying to nip its back legs. Fellar was standing near the moose's front, barking like crazy too.

"I thought he was trying to kill Fellar, the old dog," Taylor said.

Still unaware of the danger her husband was in, she yelled for him to come help her with the dogs.

On instinct, she ran to where the action was. "And the moose started after me."

Taylor raced back to the truck but instead of jumping in for safety, she released the tailgate to look for something she could use. She grabbed a big grain shovel that they keep on hand to dig out if the truck gets stuck.

She walked back to the moose, making a racket with the shovel on the road, where the snow was hard-packed. She kept shouting for her husband to get over there and help.

Taylor took a swing at the moose and it backed off a little, but then it reared up and stomped its target again. It didn't let up.

"So I kept hitting it some more," Taylor said. She swung mainly at the rump but said she got in at least one good lick to the head. She knew she was too close but what could she do? Finally, the moose turned away.

"When it turned and started to go off slowly, I hit it with everything I had," she said. Tut, the younger dog, took over

and chased the moose away.

"Then I saw it wasn't Fellar the moose was after at all. He was striking over the top of Fellar, to get George."

Her husband was conscious and said he may have broken ribs. That was the least of it, she thought. Blood was spurting out of a deep crack in his head. The snow was crimson. She grabbed his Iditarod baseball cap, which had fallen off, and used it to try to stop the flow the blood.

She couldn't get her husband up so she got the dogs in the truck and then ran for help.

The Willow volunteer fire department got there and stabilized Murphy. He was rushed by medical helicopter to Providence Alaska Medical Center.

'AT THE END OF THEIR ROPE'

It's hard to say what set the moose off. If it was a cow, there was no calf around that might have explained its behavior. Maybe a snowmachine harassed it. Maybe the dogs spooked it. It might just have been stressed from an especially harsh winter, with extreme cold temperatures and heavy snow.

"They don't actually have a heckuva lot to eat," Murphy said.

"And they don't have enough stamina," Taylor said.

"They're just at the end of their rope," Murphy said. "They'll just strike out at anything."

He is not upset with the moose. Neither is his wife. They don't want anyone to try to kill it. No one could be sure they got the right one, anyway.

How long did the attack last?

"Forever," Taylor said.

"Too long," Murphy added. Every time he thought it was over, the moose struck again. It had a scary look in its eyes.

Just as Taylor didn't know her husband was under attack, he didn't know his wife was fighting off the moose. Now that he's heard the story, he's sure it would have killed him without her quick action. Her effort was amazing, he said.

"Jeez, that was a pretty hard thing for anyone to do, to walk up on a moose like that. Heck, all she had was a shovel."

"Well, we've helped each other out of problems before. This just happened to be the latest," Taylor said.

Murphy spent hours in the emergency department and then a night and day in intensive care. They don't know how many stitches he got but the main gash to his head is at least 6 inches long. He has a big wound on his left leg, too. He can walk on his own and says he feels pretty good. He is officially in fair condition. Many pilots have popped in to see him or send wishes. He hopes to go home soon.

When he awoke in the ICU Saturday morning, he first thought the whole thing was one bad dream. Then he noticed the hospital ceiling and knew he wasn't home.

They still plan to run their dogs at the airport. "I'll probably have a revolver," Taylor said. Then she stopped herself. She doesn't want to needlessly kill a wild animal. She'll have to think more on that.

"We still like to have the moose around," Murphy said.

Still, next time he won't go as far from the truck.

Read more here: http://www.adn.com/2012/01/22/2277726/wife-stops-moose-stomping-with.html#storylink=cpy

VITA

Kathleen Hauser grew up in western Wisconsin, and attended the University of Wisconsin from 2004 to 2008. She graduated in 2008 with Bachelor of Arts degrees in Geography and Sociology. While at the University of Wisconsin, Kathleen worked at the Multicultural Student Coalition and established, expanded, and co-facilitated *Sociology 496: Intercultural Dialogues* with a group of fellow undergraduate students. After graduating in 2008, Kathleen moved to Middlesboro, Kentucky to intern for Cumberland Gap National Historical Park. In December of 2008, she became the executive director of Discover Downtown Middlesboro, a downtown revitalization non-profit in Middlesboro, Kentucky. In the spring of 2010, Kathleen moved to Skagway, Alaska to work as an Exotic Plants Management Intern for Klondike Gold Rush National Historical Park, where she first experienced the effects of climate change on public lands.

Kathleen began the Master's program in Geography at the University of Tennessee in January of 2011, studying with Dr. Micheline van Riemsdijk. She earned a minor in Environmental Policy, and her major coursework focused on environmental decision-making and human-environment interactions. She also spent time during the summers of 2011 and 2012 interning at Oak Ridge National Laboratory in the Geographic Information Sciences and Technology Group. She was awarded the Science Alliance Fellowship for recognition of advanced scholarship in the sciences in January 2012, the Stewart K. McCroskey Scholarship to research the Climate Change Scenario Planning Project in Alaska in February 2012, the Outstanding Teaching Assistant Award during the spring 2012 semester, and the W.K. McClure Scholarship for the Study of World Affairs to research climate change decision-making in Kakadu National Park in Australia in August 2012. Kathleen will present a paper on her thesis in the Master's Honors Competition at the Southeastern Division of the Association of American Geographers Annual Meeting in November 2012. She continues to be fascinated with climate change decision-making and public lands and intends to include them both in her long-term goals.