Tourism Sector Perceptions of Vulnerability to Environmental Change in Glacier National Park, U.S.A.

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TOURISM SECTOR PERCEPTIONS OF VULNERABILITY TO ENVIRONMENTAL CHANGE IN GLACIER NATIONAL PARK, U.S.A

By

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Thesis

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Tourism Sector Perceptions of Vulnerability to Environmental Change in Glacier National Park, U.S.A.

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Glacier National Park, a highly visible example of climate change impacts, is also extremely important for local inhabitants that depend on park resources to generate tourism. Consequently, if those resources are altered, tourism could be adversely affected. To explore this range of climate change impacts on the human community, as well as how vulnerability is perceived and experienced, twenty-three operators in the Glacier region were interviewed. These interviews were then analyzed using content analysis, which allowed themes related to vulnerability to be detailed.

Operators identified several ways in which they experience vulnerability to climate change, particularly through wildfire, extreme weather, and heavy snowpack. In particular, access to Going to the Sun Road and media sensationalism were key factors identified. A few operators thought the longer summer season might benefit them. Operators are adapting to these impacts by undertaking “green” business practices, diversifying their businesses, and shifting marketing away from Going to the Sun Road. Results indicate that vulnerability is experienced differently among the operators depending on how they leverage resources. Additionally, social factors and multi-scalar processes are significant determinants of adaptation in this study area.
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CHAPTER 1 - INTRODUCTION

Glacier National Park (GNP), located in the Rocky Mountains of northwest Montana, U.S.A., has become synonymous with climate change in recent years. The park’s glaciers have visibly receded, the alpine areas have grown visibly smaller, and the region is experiencing longer, hotter summers and less winter snowfall. Among the more obvious changes to the local environment, and the glaciers themselves, a major component of the park’s natural heritage, may be extinct by 2030 (Hall and Fagre, 2003). The park is also one of the most well-known protected areas for tourism in the United States.

While climate change has potential ramifications for all the components of a local community, the effects of climate change on the tourism industry are especially noteworthy because tourism often relies on the natural resources that climate change alters (Scott, 2003). In Montana, tourism accounts for 13% of the state Gross Domestic Product (Grau, 2010). GNP is one of the largest attractions in Montana, drawing over two million visitors annually (Saunders and Easley, 2010). Because of the unique natural features and ecosystem present in GNP, tourism is predominantly nature-based and the industry is consequently reliant on the perception of a wild, healthy landscape as a tourist attraction.

Flathead and Glacier counties, which flank GNP, have been identified as recreation-dependent counties (Johnson and Beale, 2002). Many individuals and communities on both sides of the park are oriented around its wilderness, with this relationship between park resources and local economy having developed over the last one hundred years. These stakeholders constitute the regional tourism
community, a collection of businesses and individuals who directly service tourists to GNP. Local enterprises, constrained by the historically harsh climate, have just four to five months each summer to raise revenues. Given the changes occurring on the landscape, the tourism industry based around GNP is likely to experience consequences from these changes.

Vulnerability assessments help direct policy in understanding risk and undertaking adaptation measures (Sterr et al, 2003). Understanding a sector’s vulnerability to climate change hinges on the awareness and attitudes of stakeholders, as well as their adaptive capacity (Lama, 2010). Vulnerability to climate change is a composite of three factors: (i) exposure, or the physical threat itself, (ii) sensitivity, the social and political processes that affect how and why certain people are impacted, and (iii) adaptive capacity, the ability of stakeholders to reduce or overcome their exposures and sensitivities (Turner et al., 2003). The International Panel on Climate Change (IPCC) recommends a vulnerability analysis in exploring how a region, industry, or group is affected by climate change (IPCC, 2007a).

An assessment of the perspective of tourism stakeholders toward climate change in the GNP area has not been undertaken to this point. This thesis will address this knowledge gap by exploring the perspectives of local tourism stakeholders toward environmental change to assess how they may be vulnerable. An understanding of supply-side perspectives in the local tourism industry will reveal a better understanding of the vulnerability the industry faces in the broader GNP region by examining how environmental changes affect business operations.
as well as the perceived threat of climate change by tourism service providers and how they adapt.

1.1 Research Questions

Three primary research questions have been developed to examine the implications of ongoing ecosystem shifts in GNP for the tourism sector. These three questions are:

- How does the physical environment affect tourism operations in GNP?
- What impacts do tourism-dependent businesses believe climate change entails and what do they perceive their own vulnerabilities to be?
- How do tourism-dependent businesses around GNP respond to these perceptions through adaptation?

1.2 Thesis Outline

Chapter 2 consists of a literature review to provide theoretical background on the concept of vulnerability. Specifically, the chapter elaborates the factors and processes that render people vulnerable, as well as how adaptation is employed to reduce vulnerability. In addition, climate, climate change, and tourism are defined and the relationship between climate change and tourism is explored in greater detail.

Chapter 3 describes the GNP region. The local tourism industry is described, and climate change in the park is detailed to provide background on what the potential physical impacts of climate change will entail.
Chapter 4 outlines the methodology used in this study. The structure of the qualitative study is explained. The sampling, interview, and coding procedures employed are also described.

Chapter 5 describes the resulting themes that emerged from the interview data. Themes that explore the interviewees’ physical exposure, sensitivities, adaptive choices, and policy concerns are explored.

Chapter 6 analyzes the themes from Chapter 5 through the research questions probed in this thesis. In addition, the existing literature in Chapter 2 is returned to for context.

Chapter 7 summarizes the findings of this thesis and explores the potential implications for the study. Limitations and further research that could add to this project are explored.
CHAPTER 2 – BACKGROUND

This chapter presents a review of the existing literature and provides background on climate change, tourism, and the relationship between the two. In addition, how climate change impacts the tourism industry is reviewed. The concept of vulnerability, its conceptual origins, and the applicability to climate change impact studies as applied to the tourism sector are discussed. Next, the role of perception in shaping the social construction of vulnerability is explored. Finally, adaptation to climate change within the tourism industry is discussed.

2.1 Defining Climate, Climate Change, and Tourism

Terminology such as climate and weather, or tourism and recreation, are sometimes used interchangeably. To most accurately represent the relationships between these concepts, it is important to provide precise definitions in order to understand the components and variables involved in each.

2.1.1 Climate and Weather

Climate, consisting of measurements of precipitation, temperature, humidity, and other atmospheric conditions, is distinct from weather though it is based upon the same variables (De Freitas, 2001). Weather is understood as the condition of these three variables in a given location over a short-term period, such as days or weeks. Climate is the accretion of these conditions over longer periods of time, and represents the average conditions for the region over many years. In addition to representing average conditions, climate in a region can also
be composed of specific weather events that have a higher probability of occurring there than in other places. Finally, climate can exist on multiple scales, from global to regional to local such as specific valleys or hillsides that have their own localized conditions (De Freitas, 2001).

### 2.1.2 Climate Change

Climate change involves alterations in climate at both the local and global levels over time. While a natural phenomenon throughout the earth’s history, climate change has been influenced by human activities since the Industrial Revolution. Fossil fuel combustion, as well as large-scale alterations of natural land cover, has caused an increase in the atmospheric concentration of greenhouse gases such as carbon dioxide (IPCC 2001). The IPCC (2001) reported that average global temperatures have increased over the past hundred years by 2°C, with the most intense warming occurring during the last quarter-century. In addition, many regions at high altitude or high latitude are experiencing above average warming (Scott, 2003). In addition to global and local climate alterations, physical resources and ecosystems are likely to be affected by climate change.

### 2.1.3 Tourism and Recreation

Tourism has been defined by the World Tourism Organization (WTO) (1995, 1) as “the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure,
business and other purposes.” This definition is based on tourist activity and does not identify particular businesses that constitute tourism because tourism is a broad term that occurs very differently in different places (WTO, 1995). On the other hand, recreation is defined as the activities that people participate in while engaged in tourism (De Freitas, 2001). Thus the two concepts are codependent but not synonymous. Nature-based tourism is a major sector of the tourism industry worldwide and especially reliant on the physical environment and climate due to the nature of recreation usually involved (Eagles, 2002).

2.2 Relating Climate, Climate Change, and Tourism

The relationship between tourism and climate has been studied largely with the intention of exploring the types and range of impacts climate conditions can have on the industry. Tourism is believed to be dependent on climate, particularly through the length of outdoor recreation seasons and the quality of recreational activities (De Freitas, 2001). This is because climate and climate change affect the nature of the physical landscape upon which tourism in a given location relies (Scott et al., 2007). The World Tourism Organization (Cabrini et al., 2009) explained that tourism is affected by climate in several ways:

- Tourism can be affected by the length and quality of the seasons.
- Operator profitability can be affected if climate extremes require a tourism operation to change its behavior and infrastructure; and
- Climate largely determines the makeup of ecosystems that attract tourists and also creates conditions that can deter them.
These relationships have the potential to be altered as climate change is altering climate locally. Changes in seasonality or climatic variables like precipitation can influence the form of tourism in a location, while ecosystem change can modify the physical resources available to tourism. Finally, tourists decisions can be influenced by the anticipated climate conditions at the destination. Loomis and Crespi (1999) categorized the effects of climate change on tourism into direct and indirect impacts.

### 2.2.1 Direct Impacts of Climate Change on Tourism

Direct impacts on the tourism industry are manifested as the influences of climatic conditions on the attractiveness of a location for certain types of tourism activities and when they can occur. Since climate defines both the season length and quality for tourism activities, seasonality is an extremely important aspect of tourism (Butler, 2001). In addition to being defined by climatic constraints, seasonality is also established by the attitudes of tourists. Lise and Tol (2002) examined the influence of temperature on vacationer comfort, and determined that tourists have preferred vacation activities and will travel to a location with a climate suitable for these. Climate change is a potential threat to a tourism industry structured around seasonality. Winter-based tourism, which depends on consistent snowfall and low temperatures throughout winter, is an illuminating example of how seasonality changes could affect tourism (Smith, 1993). On the other hand, changes in seasonality could benefit certain types of tourism. Harrison et al (1999) speculated that longer, drier summers would be beneficial to
tourism in Scotland, which is currently limited by the short summer season, because warmer temperatures would lengthen the period of time in which summer recreation is attractive to tourists.

Climate also affects tourism operations and subsequent economic well-being through physical hazards. Becken (2005) explained that for Fiji where the tourism infrastructure is low-lying, vulnerability to flooding and sea level rise is widespread. For Mediterranean tourism, the likely increase in extreme heat waves could increase health risks for tourists and ultimately reduce the attractiveness of the area (Amelung and Viner, 2006). This example is illustrative of how the operating costs of a tourism business can be altered due to climatic variations because the timing and intensity of outdoor recreation affects the type of infrastructure and staffing necessary. Climate and weather extremes, in which temperature or precipitation is anomalous or more severe than normal conditions, can interrupt business activity, cause changes in infrastructure, and increase insurance costs (Simpson et al., 2008). Longer term shifts in climate can force temporary resource closures and affect water supplies (Cabrini et al., 2009). Depending on the region and the structure of the tourism community, direct impacts of climate change may have both positive and negative consequences for the industry (Cabrini et al., 2009).

2.2.2 Indirect Impacts of Climate Change

In addition, climate is a determinant of ecosystem dynamics. Climate change can influence the physical environment by causing shifts in the
distribution of wildlife, plant species, and glacial extent. Climate change will alter ecosystem resources that tourism utilizes, which in turn indirectly affects tourism profitability and viability. Changes to regional ecosystems and the effects they have on tourism are categorized as indirect impacts, since these types of impacts are derived from climate and climate change but are not the direct effects of climate on the tourism industry itself. Since the quality of the natural environment is extremely important for tourism that is based on natural resources, any landscape changes could result in reduced attractiveness of a region for tourism (Scott, 2003). Extreme temperatures coupled with reduced precipitation will change ecosystem dynamics by increasing wildfire potential. Flannigan et al. (2005) projected that Canada will experience a 74% to 118% increase in fire area in the next hundred years. In addition, changes in biodiversity and an increase in natural hazards can influence landscape aesthetic (Simpson et al., 2008). The oft-cited decline of the polar bear (*Ursus Maritimus*) in Arctic regions is a classic example of this phenomenon, with the species potentially disappearing altogether from Wapusk National Park, established to protect and provide polar bear viewing opportunities (Dawson et al., 2008).

While direct climate change impacts often have both positive and negative impacts on the industry, such as a longer summer season, indirect impacts tend to be largely negative. For example, the 1988 Yellowstone fire caused the summer season to end four weeks earlier than normal, resulting in a yearly visitation reduction of 15% and an economic loss of $60 million regionally (Scott et al., 2007). Wildfires in Colorado during the summer of 2002 caused visitation to drop
by 40% in areas, destroyed infrastructure, and caused river outfitters to lose 40% of their normal business (Scott, 2003). Drought conditions causing a 2.1% drop in water levels at Lake Mead, Nevada and a 5.4% drop at Lake Powell, Utah resulted in decreased recreational use and a loss of $32.1 million in visitor spending (Morehouse et al., 2007).

As a result of these factors, climate has an influence in when and where recreational activities take place. Climate change, by directly altering climatic factors and indirectly altering ecosystem resources that tourism depends on, has potential implications for the tourism industry. Ultimately, the degree to which a tourism community is affected by climate change will depend on how climate change is manifested in the local area, how tourists respond to the changes, and the ability of the tourism community to cope with these changes (Scott, 2003).

2.3 Climate Change and Vulnerability

The frameworks utilized by many climate impact studies have their origins in the concept of vulnerability. Because vulnerability has roots in several different fields, it is difficult to give a specific definition since the loss being experienced and who is being affected differ on a case-by-case basis (Cutter, 1996). Broadly defined, vulnerability is a potential for loss or damage (Eakin and Luers, 2006). It can also be defined as “the degree to which an individual, group, region or system is susceptible to and is unable to cope with adverse effects of climate change” (McCarthy et al., 2001, 89) Yet other definitions explain vulnerability as “the ability or inability of individuals or social groupings to
respond to, in the sense of cope with, recover from or adapt to, any external stress placed on their livelihoods and well-being” (Kelly and Adger, 2000, 328) and “the capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard” (Blaikie et al., 1994, 9). The first two definitions are more focused on the impact itself, while the latter two view vulnerability as socially constructed. In the context of climate change, vulnerability is usually thought of as a way to evaluate the level of risk certain individuals, social groups, and communities face, as well as specific resources or regions that have the potential to be harmed (Eakin and Walser, 2008).

### 2.3.1 The Risk-Hazard Approach

The concept of vulnerability has its origins in the risk-hazard perspective, which views a hazard as a physical event requiring modification of the physical environment by humans to minimize damage (Burton et al., 1978). Specifically, vulnerability in this perspective was developed as a way to look at how exposed people are to natural hazards. How exposed certain populations are is considered to be a function of where the hazard is prone to occur in relation to human land use, the magnitude of the hazard, and the frequency with which it occurs (Eakin and Walser, 2008). As a result, vulnerability can be assessed using quantifiable metrics such as lives lost, area flooded, and crop yield decline. Thus undertaking a vulnerability assessment using the risk-hazard approach is useful in defining a likely threat and gauging potential damage from extreme natural events (Cutter, 1996).
Within the climate change impact literature, the risk-hazard approach has been used to focus on the single stress of climate change as the natural hazard (Keskitalo, 2008). Vulnerability is used in this context to estimate the impacts of climate change on various economic sectors. This approach qualifies vulnerability to climate change as an existing condition that is the end point of the analysis (O’Brien et al., 2004). Vulnerability is the result of analyzing climate change impacts, subtracting the potential adaptations from the impacts, and focusing on the difference. The less capable adaptive capacity is of overcoming the impacts, the more vulnerable the system is. End-point vulnerability is manifest in the IPCC (2001, 27) definition: “the degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change including climate variability and extremes.” McCarthy (2001) augmented this definition, defining vulnerability as the degree of sensitivity and the potential to adapt to climate change’s negative impacts. The difference between the IPCC definition and the traditional risk-hazard approach is that hazard thought defines vulnerability in terms of probability, while the IPCC defines vulnerability as a function of certain variables (Adger et al., 2004).

2.3.2 Social Vulnerability

While the risk-hazard approach to vulnerability has been adopted in many studies, an alternative conceptual paradigm has also emerged. Research grounded in the political economy perspective explores food security and attempts to identify areas and social groups more at risk to famine, using vulnerability in a
social constructivist context. Termed social vulnerability, this definition emphasizes not only hazard exposure itself but focuses on how people react to the hazard, thus defining vulnerability as a result of social processes (Cutter, 1996). Qualitative indicators are used alongside quantifiable ones, such as coping capacity, institutional strengths and weaknesses, social capital, and resource availability (Eakin and Walser, 2008). Thus, vulnerability measures the attributes of the exposed people and not the hazard itself. In this model vulnerability is fundamentally a human condition.

While climate change impact studies often focus on the physical threat itself, to fully understand the ramifications of the threat it is necessary to examine how society will respond (Kelly and Adger, 2000). Recognizing this, some analyses include social vulnerability indicators to explain how and why certain people or regions are more vulnerable. Unlike the risk-hazard approach, the social approach treats vulnerability as a much more dynamic process that includes both livelihood disruptions from climate change and the coping mechanisms of the vulnerable populations. Viewing vulnerability as dynamic creates a feedback loop between vulnerability and adaptation, where the characteristics of both are constantly changing (Eakin and Walser, 2008). Historical, cultural, and economic factors all can have effects on the ability to cope with a disturbance and alter the outcome of the interaction. In addition, exposure to a hazard is socially determined through where people choose to live and how they create their communities and lifestyles (Adger et al., 2004). As such, vulnerability thus is the result of many different factors and processes which influence or shape
adaptations. The aim of using social vulnerability in climate change assessments is to move the focus beyond technological adaptations and discuss other methods for adapting to climate change impacts. If underlying social patterns are not included in the analysis, there is a risk of vulnerability being severely underestimated (O’Brien et al., 2004).

2.3.3 Place-Based Vulnerability

While the risk-hazard definition of vulnerability has generally predominated, elements of both approaches are often included in climate change vulnerability analyses. A method of approach for a general vulnerability analysis proposed by Cutter (1996) is termed place-based vulnerability. This framework combines elements of both biophysical vulnerability and social vulnerability but recognizes the importance of local geography that influences which indicators of vulnerability should be used. Drawing from biophysical vulnerability, risk is determined by the probabilistic occurrence of an event compared with adaptation and mitigation measures. Risk is then filtered through social indicators, such as awareness of risk and socioeconomic status, to determine vulnerability. In climate change-human impact studies, this dynamic view of vulnerability now is the predominate approach (Eakin and Luers, 2006).

In this context vulnerability involves both livelihood disruption and adaptations, and thus is focused on economic factors and adverse climate impacts (Kelly and Adger, 2000). Richardson (2007) studied tourism in Belize, contextualizing vulnerability as an economic concept, and was able to question
stakeholders about their operation vulnerability, climate-related impacts, their comprehension of climate change, and capacity for response. Turner et al. (2003) suggested that vulnerability in this context can encompass exposure, sensitivity, and resilience to a threat, with sensitivity representing measures of social vulnerability. Exposure and sensitivity increase a population’s vulnerability, while adaptive capacity decreases it. Some of the variables that consequently can be measured include biophysical vulnerability indices such as proximity to threat, frequency, and magnitude, and social factors such as threat to infrastructure, socioeconomic wellbeing, and temporal dimensions (Cutter, 1996). This focus on “environmental change through time and space” makes the concept of vulnerability a predictive tool, helping to bring into focus how current vulnerability will change in the future (Eakin and Leurs, 2006).

2.4 The Role of Perception

How climate change and associated ecosystem shifts will alter the form of a tourism community is largely dependent on how stakeholders perceive and respond to change. Stakeholders in the community include both the tourism operators and the tourists who travel to the area and participate in recreational activities. Consequently, most studies examine either the supply-side or demand-side stakeholders. Understanding how these stakeholders perceive and experience climate change is critical in assessing the sensitivity and adaptive capacity of the tourism community.
2.4.1 Social Construction of Perception

While the physical environment and hazards are obvious components of stakeholder vulnerability, many researchers have argued that the way in which they are experienced is also fundamentally influenced by social construction. The paradigm of social constructivism can be understood as emphasizing the importance of social context in interpreting events (Kim, 2001). Specifically, individuals and social groups create and attribute meanings to people, things, and ideas through their social interactions with each other and with the natural environment. These meanings are shaped and evolve over time as individuals are exposed to new information and activities (Kim, 2001). There are many examples of concepts that are socially constructed, such as concepts of money and wealth, as well as citizenship (Boghossian, 2001). The common thread among these social constructs is that all of them are given their parameters by society and that they would not exist without society's creation of them. In addition, social constructs could be constructed differently if society had chosen to do so.

In the context of climate change vulnerability, much depends on how the public, or those who will be affected by climate change, construct their own risk. The construction of risk perception can compel or constrain populations to take action, thus indicating that perception influences more than just awareness levels (Leiserowitz). Perception serves largely as a precondition for adaptation to occur, and thus the response of vulnerable populations can mitigate or amplify risk (Bordl, 1998). This occurs because adaptation to climate change is largely viewed as a two-step process. First, individuals must perceive that the climate is
changing. Second, they must determine that it requires them to change their behavior to adapt to the changing conditions. Thus the implication is that only individuals who perceive changes will consider adaptation options (Maddison, 2007).

Risk perception is viewed as a main motivator for actors (Grothman and Patt, 2005). Individuals must perceive both a probability of being exposed, as well as a level of severity. If stakeholders perceive a high probability of being severely impacted, they will be more motivated to adapt to climate change, thus strongly influencing their adaptive capacity (Blennow et al., 2012). However, it must be understood that individuals must not just experience the physical events, but that the events must be perceived as constituting climate change. Factors such as personal values, societal values, and experience can partially influence the ways in which risk is constructed. While adaptation may still take place if risk is not associated with climate change, it may lead to very different adaptation choices (Grothman and Patt, 2005).

2.4.2 Demand-Side Perspectives

One line of research has examined the response of tourists to environmental change because tourists have the freedom to choose a destination and the timing of the visit to the destination. This visitor perception is considered important for predicting climate change impacts because the perception of a healthy, protected landscape is important in attracting visitors (Scott, 2003). Most of these demand-side studies attempt to establish how visitor behavior will change as the environment changes. Models have proven useful for studying the
relationship of past visitation behavior and climate to project future visitation trends, a method known as revealed behavior analysis. This method was employed by Hyslop (2007) to study the relationship between visitation and climate conditions in fourteen national parks throughout the United States. Using the recent climate change trend as a basis, the study found that maximum temperature historically had the strongest relationship with visitation and predicted that visitation would decrease in the southern parks, while northern parks would see visitation increases outside the regular summer season.

Other research has surveyed the stated behavior of tourists. Richardson and Loomis (2005) explored visitor perceptions of climate change through the use of several hypothetical scenarios. The study found that both direct and indirect climate change effects were determining visitor responses, with visitation projected to slightly increase. Scott and Jones (2005) used modeling to reveal actual visitor behavior to climate conditions in Banff National Park, Canada. This revealed behavior was then compared with visitors’ stated behavior to a survey that asked what environmental changes would keep them from visiting. Some common responses included the loss of glaciers (32%), changes in wildlife (29%), forest fires (17%), and vegetation shifts (13%).

Scott et al. (2007) used these same methods in Waterton Lakes National Park (WLNP), Canada to illustrate that, although a warmer climate may be beneficial to tourism, the associated ecosystem changes may not. Since 84% of visits to the park occur between May and September, tourism was suspected to be influenced by climate. The study discovered that a warmer climate would
probably increase overall visitation by 6-10% in the 2020s and by 10-36% in the 2050s, especially during the shoulder season, defined as late-spring and early fall. However, a longer-term scenario with more drastic climate changes showed different results, with 37% of survey recipients stating they would visit less often. This indicates that the negative perception of environmental changes is a deterring factor to some recreation activities and extreme environmental change may ultimately outweigh the benefit of longer summers. This was further supported by only 15% of visitors saying that recreational activities attract them to the park, as opposed to 75% who said that the scenery did. In addition, a longer, more severe fire season has the potential to restrict recreation during summer, potentially negating any gains from a longer season.

There is currently a substantial overlap in WLNP and GNP visitors, with Americans constituting 37% of WLNP visitors (Parks Canada, 2008). Like GNP, many WLNP tourists are repeat visitors, with 53% having visited the park before (Parks Canada, 2008). There is activity overlap as well, with scenic driving and hiking being the most popular recreational activities (Parks Canada, 2008). Because of these factors, visitor attitudes described in Parks Canada (2008) may suggest what GNP visitors think, and the National Park Service (NPS) currently uses the study as an indicator of what GNP visitors might do (Loehman and Anderson, 2009).
2.4.3 Supply-Side Perspectives

Tourism service providers tend to be tied to infrastructure and immobile assets, giving them less capacity to minimize climate change impacts (Simpson et al., 2008). This is especially true for businesses that have capital invested in a specific location and cannot as easily relocate the business or offer services in another area (Wall, 1998). Research examining the demand side of the tourism-climate change interaction asks about vulnerability and adaptive capacity by revealing climate sensitivities and the actions being taken to cope with these risks. Simpson (2008) suggested that explaining how past climatic extremes affected operations can be useful, as this can shed light on the impacts of expected future conditions. In addition to exploring the impact of physical and ecological change, it is important to explore how people perceive climate change and how they respond to those perceptions to understand the impacts of climate change in greater depth (Lohman, 2001).

Belle and Bramwell (2005) and Gaita and Both (2008) found that local stakeholders were aware of specific potential climate change-related impacts through knowledge of which environmental factors were essential for their businesses and how these resources could be damaged. Gaita and Both (2008) investigated stakeholder perceptions of climate change and tourism in Zandvoort, The Netherlands, and the Costa del Sol region of Spain. The researchers found similarities between the two tourism communities. In both locations, stakeholders were aware of the threats and were able to give examples of how climate change had affected tourism. However, Zandvoort operators tended to see climate change
as both a threat and an opportunity, which affects the types of adaptations that are considered. Belle and Bramwell (2005) also explored the preferred policy responses of stakeholders in Barbados. The operators expected climate change to cause damage to tourism infrastructure, which is located predominately in coastal areas. In addition, the operators expected damage to marine ecosystems and beach quality as well, both of which are identified as important resources for tourism. Tervo and Saarinen (2007) questioned winter tourism operators in Finland and discovered that perceptions of climate change among the operators had changed significantly over time. Many operators who had dismissed climate change were viewing it as a threat, with 95% of operators believing their product would be negatively affected.

Other studies have attempted to identify specific geographic or industry vulnerabilities. Brouder and Lundmark (2011) revealed specific areas and operations that were most vulnerable using stakeholder interviews; they examined how the perceptions and preferred responses of operators influence the risk and vulnerability of tourism industry segments. The study found that coastal stakeholders viewed themselves as being more exposed than their inland counterparts. In addition, operators tied to a specific site or venue felt more threatened by climate change than activity-based operators, which viewed themselves as able to move locations to reduce their exposure. Becken (2005) interviewed operators in Fiji and found that a lack of a common approach and cooperation to climate change was limiting adaptation among the community. While a few stakeholders had identified direct and indirect threats of climate
change and engineered successful adaptations to them, they remained isolated examples in the industry, and thus the community as a whole remained vulnerable to climate change.

2.5 Adaptation

It is important to note that tourism operators actively try to meet tourist demands and continue profitability. Thus, when environmental problems threaten the profitability of tourism, tourism operators adapt by making value-driven decisions to overcome potential losses (Belle and Bramwell, 2005). Adaptations are the actions taken in response to a vulnerability, and can be constrained by economic and political factors such as financial resources and policy, and perceptions of whether adaptation is needed or not (Belle and Bramwell, 2005). The IPCC (2007, 27) similarly defined adaptation as “the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.” Since vulnerability is place-specific, adaptation is often based on and utilizes local knowledge (Leichenko et al., 2010).

These adaptations can be both proactive and reactive by helping operators reduce their exposure and sensitivity to climate change as well as aid recovery after an event has occurred (Leichenko et al., 2010). Reactive adaptations are implemented after a climate change impact has occurred and usually consist of technological solutions or administrative shifts. Proactive adaptations are undertaken ahead of potential impacts with the intention of decreasing exposure.
to future threats. In addition, proactive adaptation can consist of positioning oneself to take advantage of the positive effects of climate change. Adaptation will likely consist of a mix of both types, and will occur at multiple scales, including individual, community, and national levels (Eakin and Walser, 2008).

Different studies have revealed a wide range of adaptive behaviors and philosophies which have different implications. Tervo and Saarinen (2007) found that the majority of interviewed winter tourism stakeholders in Finland believed they were powerless to influence their situation, thus adaptive capacity would not be improved by increasing climate change awareness. Because of this belief, these operators were not trying to adapt to climate change, despite its perceived threat. Sievänen et al. (2007) canvassed stakeholders in Finland and found that there was no exact knowledge on possible climate change impacts and therefore no adaptive behavior. In addition, these operators tended to view climate change as a long-term event and thus believed they have plenty of time to adapt, even at short notice. Lohman (2001) noted that as long as tourism operators are able to satisfy basic tourist needs, tourism in a region will be able to sufficiently adapt.

By contrast, some proactive adaptations include increasing public awareness, the protection of natural resources, and the integration of adaptation with economic development (Simpson et al., 2008). Illustrating some of these adaptations, Becken (2005) observed proactive stakeholders in Fiji implement adaptations to protect coral reefs, the major draw for these tourism operators. Their adaptations included environmental protections such as erosion mitigation, water conservation, and pollution control to maintain the integrity of these reefs.
In addition, visitor education is being used as a tool to both protect the reefs and enrich visitor experience. Gaita and Both (2008) learned that stakeholders in Zandvoort and Costa del Sol were interested in more sustainable tourism practices and activity diversification as a means of climate change adaptation. Furthermore, Belle and Bramwell (2005) found that tourism operators in Barbados view visitor education and public awareness as a useful adaptation. Behringer et al. (2001) discovered that ski industry representatives in the Swiss Alps feel that the media dramatizes climate change and thus has a greater influence than climate change itself by creating a poor image for the ski resorts. The stakeholders explained that this results in reduced visitation and reduced institutional funding. These operators also found visitor education to be an important adaptation tool in mitigating the media’s perceived impact. In addition, Koenig and Abegg (1997) detailed how two small Swiss villages dependent on skiing have diversified by bringing in theatres and music festivals, thus integrating development with adaptation. Scott (2003) noted that in the case of protected areas perceptions of a healthy natural landscape are critical to attracting tourists. Scott (2003) and Pederson et al. (2006) both speculated that given that GNP is often held up in the media as a poster child of climate change it could be turned into an educational tool for adaptation as well.

As these examples indicate, adaptations to perceived climate change impacts are specific to the climate and structure of tourism in each location, but generally the tourism industry will try to implement adaptive measures if stakeholders perceive a threat (Simpson et al., 2008). In addition, Becken (2005)
noted that, while there is not always a common adaptation strategy among operators, all operators are adapting to present climate conditions that affect them now, and in doing so they become more prepared for future climate conditions. Thus, a great part of the effect that climate change has on the industry is rooted in the mentality and actions of the industry itself (Lohmann, 2001).
CHAPTER 3 - STUDY AREA

This chapter provides a description of the general geography of GNP and surrounding communities. This includes an overview of the development of tourism in the region as well as the structure of the tourism community, including characteristics of the tourists. Next, climate change in the region will be explored, including discussions pertaining to the impacts on hydrology, vegetation, and wildlife. Finally, National Park Service policy related to climate change will be discussed.

3.1 Regional Overview

GNP straddles the Continental Divide in northwestern Montana and consists of 1,583 square miles of protected land. The park contains two sub-ranges of the Rocky Mountains—the Lewis Range and Livingston Range—over one hundred and thirty named lakes, and the sources for three major North American river systems. The park’s unique positioning at the junction of several ecosystems results in a wide variety of plant and wildlife species. Almost all of these native species are present in the park today, including all of the native predators. The park is the centerpiece of the larger Crown of the Continent ecosystem. In addition to the national park, other publicly owned land nearby includes the Bob Marshall Wilderness Area, Great Bear Wilderness Area, Flathead National Forest, and Lewis and Clark National Forest. All of these lands are managed by the National Forest Service (NFS).
Figure 1: Glacier National Park and Gateway Communities
Adjacent to GNP are Flathead County, which is west of the park, and Glacier County, which is east of the park. Glacier County also contains a portion of the Blackfeet Indian Reservation, which abuts the national park along its eastern boundary. All of the park’s gateway communities are located in these two counties, although the more populous Flathead County serves as the main entryway into the national park for tourists. The gateway communities of Flathead County include Essex, West Glacier, Coram, Hungry Horse, Polebridge, Columbia Falls, Whitefish, and Kalispell. Gateway communities in Glacier County include Saint Mary, Babb, Browning, and East Glacier, all of which are located on the Blackfeet Indian Reservation.

3.2 Tourism Development in Glacier National Park

GNP was first envisioned by the Great Northern Railway, which operated passenger service between Minneapolis and Seattle. The railway built a line through Marias Pass along the southern border of what was to be the park. At the same time, wealthy Americans from the east coast, such as George Bird Grinnell, began visiting the region in small numbers. Louis Hills, director of Great Northern, saw a potential park as a way to increase rail traffic along their passenger service.

The park plan was ratified by Congress in 1910, and Great Northern was given a series of contracts to develop the park. Great Northern advertised the park as the “American Alps” (Guthrie, 2008), and spent the first decades intensively developing GNP by installing infrastructure for tourism such as roads,
trails, and hotels. Glacier Park Lodge (1913) and the Many Glacier Hotel (1915) were built during this period. In addition to the two lodges, Hill erected eight chalets throughout the park’s backcountry, which were reached by horseback from the larger hotels. During the height of Great Northern’s operations in the park, the company owned over 1,000 horses and was the largest outfit of its kind on the planet (Buchholtz, 1976).

The National Park Service (NPS) itself was instrumental in developing tourism facilities. NPS engaged in substantive trail building, enforced resource protection policy, and held educational programs. Through the park’s early history, natural resource manipulation through fire suppression and predator control were common as well. To accelerate visitation to the park, construction on Going to the Sun Road was undertaken in 1919 to build a road through the mountainous heart of the park. The road led to record visitor numbers at the park gates, with a 44% increase in visitation in 1932 (Buchholtz, 1976). To service these new tourists, auto campgrounds were constructed, while Great Northern’s influence in the park steadily decreased. Service construction peaked with the NPS’s Mission 66 plan, designed to “regenerate and modernize” all of the national parks to plan for future visitation increases (Guthrie, 2008).

Park policy underwent a significant shift in the early 1970s, placing a greater emphasis on ecosystem health and wilderness. NPS has constructed relatively few facilities since, and has closed or relocated facilities located in prime grizzly bear habitat. This policy has had an effect of pushing tourism industry growth to areas outside and adjacent to GNP, thereby encouraging
economic growth in the local communities. In particular, Flathead County has undergone a tremendous economic expansion as well as associated population growth. Today, the majority of business owners in Flathead County, including those that have only a peripheral relationship with the park, indicate that GNP plays a significant role in the viability of their businesses (Lathrop, 2006).

3.3 The Tourism Community

GNP and the adjacent Glacier and Flathead Counties are the focal points for tourism in the region. GNP is one of the primary tourism draws in Montana, with 24% of tourists citing the park as the primary reason for their visit to the state, greater than Yellowstone National Park (Christensen and Nickerson, 1996). Because the tourism industry is composed of a variety of business types, it can be difficult to define. However, all businesses in the tourism industry are related through their shared interaction with tourists (Grau, 2010).

Tourism and recreation in the park is concentrated during the summer months, with 76% of visits occurring between July and September, during which only 11% of visitors are Montanans (Miller and McCool, 1994). Visitor demographics shift during the fall shoulder season, with older tourists (+75) comprising a greater percentage of visitations (Oschell and Nickerson, 2010). The park currently draws 2.2 million visitors each year due to its glaciated mountainous landscape, extensive alpine scenery, and the opportunity to view a range of wildlife (Saunders and Easley, 2010). Since 1980 visitation to GNP has increased by 17% (Nickerson, 2003). In addition, the number of repeat visitors to
the park has increased from 41% of visitors in 1990 to 56% in 2000, which signifies strong visitor loyalty to the park (Nickerson, 2003).

Visitation tends to be concentrated along Going to the Sun Road, which crosses the mountains through the park and provides roadside access to alpine terrain. During the summer, 83% of visitors to GNP travel the alpine road (Miller and McCool, 1994). Going to the Sun Road usually opens between late May and the middle of June every year and generates roughly $1 million in revenue each day it is open (Pederson, 2006). In addition to Logan Pass, other popular locations in the park are Apgar (65%), Lake McDonald (64%), Rising Sun (67%), Saint Mary (81%), and Many Glacier (64%). The least visited area in GNP is the Polebridge area along the North Fork of the Flathead, which receives just 13% of visitors.

Visitors to GNP stay an average of four nights in the area. Among tourists in Flathead County, 60% cited GNP as the main attraction of their visit (Dillon and Praytor, 2002). Tourists in Flathead County stay most often in a hotel or motel (62%), while camping in the park’s front country campgrounds (22%) is the second most popular lodging option. Private campgrounds (21%) also receive significant amounts of tourists. The most popular activities among Flathead County tourists are wildlife viewing (53%), nature photography (44%), and hiking (43%). Fishing (15%) and rafting (9%) also receive some attention from visitors.

Of GNP’s 2.2 million visitors, about 531,000 visit the eastern front of the park in Glacier County (Christensen and Nickerson, 1996). Of the tourists that stay in Glacier County, hotels (39%) are the most popular accommodation,
followed by private campgrounds (20%) and camping in the park (15%). The most popular activities on this side of the park are wildlife viewing (66%) and nature photography (49%), viewing historic sites (34%), hiking (30%), and camping (30%). Comparisons with tourists to Flathead County indicate that tourism and recreation are fairly similar on both sides of the park, with Flathead County visitors more likely to stay in a hotel. In addition, 74% of Glacier County tourists said that GNP was the primary attraction of their visit, indicating that Flathead County is less reliant on the park for tourism than Glacier County.

It was estimated that tourists in GNP spent $160 million in 2002 (GNP, 2003). However, Saunders and Easley (2010) speculated that this amount has increased to $1 billion. These benefits are split primarily between three counties. Flathead County, which functions as the main gateway to the park and offers the closest airport, receives 1,550 direct jobs from tourism (GNP, 2003). Glacier County receives 1,010 direct jobs and a $27 million economic boost (Christensen and Nickerson, 1996). Lake County, through which many visitors travel before entering Flathead County, receives 640 direct jobs (GNP, 2003).

3.4 Climate Change and Impacts in Glacier National Park

In GNP climate change and the associated ecosystem alterations are being extensively monitored. The weather station with long-term records in the park, located at West Glacier, has indicated that the average temperature from 2000-2009 was 2.0° F warmer than the 1950-1979 average (USGCRP, 2007). This is more than double the global average temperature increase in the same period, and
this is demonstrated in the increase in extreme hot days (>90° F) during the summer and a decrease in extreme cold winter days (<0° F) (Saunders and Easley, 2010). In addition, the highest temperature increases have been concentrated during February and March, a critical period for snowpack growth (Caprio et al., 2009). Under global climate models temperatures are expected to continue rising 1.6°-5.2° F by 2060 (Mote et al., 2008).

GNP is also becoming more arid. Yearly precipitation between 1985 and 2009 has decreased by 7%. This precipitation loss is concentrated during the already dry summer months (Pederson et al., submitted). This drying trend coupled with hotter temperatures is producing changes to the park’s hydrological system. The number of glaciers in the park has decreased from one hundred and fifty in 1850 to just twenty-five named glaciers as of 2010 (NRMSC, 2010). The last glaciers in the park are currently projected to be gone by 2030 (Hall and Fagre, 2003). In addition, snowpack levels across the Rocky Mountains declined 15-30% from 1950-1997 (Mote et al., 2005). Simulations show that by 2089, snowpack will begin melting forty-one days earlier than in 1950 (Boisvenue and Running, 2010). The loss of year-round glaciers and snowpack would have profound consequences for hydrology in the park as stream temperature would increase and stream volume would decrease in the summer. Temperature increases have already moved peak stream flow up to four weeks earlier than flows during 1950-1980 (Stewart et al., 2004), while Flathead River summer flows decreased by 3.7% each decade from 1978-2007 (Mulhfeld et al., submitted). Predictions for the Oldman River, north of GNP, show a future 15%
<table>
<thead>
<tr>
<th>Glacier Name</th>
<th>1966 Area (m²)</th>
<th>2005 Area (m²)</th>
<th>% Area Change</th>
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<tbody>
<tr>
<td>Blackfoot Glacier</td>
<td>2,334,983</td>
<td>1,787,640</td>
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</tr>
<tr>
<td>Harrison Glacier</td>
<td>2,073,099</td>
<td>1,888,919</td>
<td>-8.90%</td>
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<td>Kintla Glacier</td>
<td>1,728,828</td>
<td>1,136,551</td>
<td>-34.30%</td>
</tr>
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<td>Agassiz Glacier</td>
<td>1,589,174</td>
<td>1,039,077</td>
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<td>Jackson Glacier</td>
<td>1,541,217</td>
<td>1,012,444</td>
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<td>Pumpelly Glacier</td>
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<td>Sperry Glacier</td>
<td>1,339,244</td>
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<td>Rainbow Glacier</td>
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<td>1,164,060</td>
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<td>Grinnell Glacier</td>
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<td>Vulture Glacier</td>
<td>649,267</td>
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<td>Weasel Collar Glacier</td>
<td>592,420</td>
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<td>Ahern Glacier</td>
<td>589,053</td>
<td>511,824</td>
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<td>Chaney Glacier</td>
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<td>Logan Glacier</td>
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<td>Dixon Glacier</td>
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<td>Two Ocean Glacier</td>
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</tr>
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<td>Sexton Glacier</td>
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<td>Ipasha Glacier</td>
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<td>Miche Wabun Glacier</td>
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<td>Piegan Glacier</td>
<td>280,107</td>
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<td>Carter Glacier</td>
<td>273,834</td>
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<tr>
<td>Swiftcurrent Glacier</td>
<td>261,410</td>
<td>223,519</td>
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</tr>
<tr>
<td>Shepard Glacier</td>
<td>250,609</td>
<td>110,254</td>
<td>-56.00%</td>
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<tr>
<td>Boulder Glacier</td>
<td>230,913</td>
<td>55,159</td>
<td>-76.10%</td>
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<tr>
<td>Salamander Glacier</td>
<td>225,621</td>
<td>172,916</td>
<td>-23.40%</td>
</tr>
<tr>
<td>Siyeh Glacier</td>
<td>215,420</td>
<td>56,698</td>
<td>-73.70%</td>
</tr>
<tr>
<td>Red Eagle Glacier</td>
<td>206,576</td>
<td>97,149</td>
<td>-53.00%</td>
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<td>Herbst Glacier</td>
<td>170,162</td>
<td>53,550</td>
<td>-68.50%</td>
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<td>Harris Glacier</td>
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<td>34,526</td>
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<tr>
<td>Lupfer Glacier</td>
<td>138,523</td>
<td>67,369</td>
<td>-51.40%</td>
</tr>
<tr>
<td>Baby Glacier</td>
<td>117,111</td>
<td>77,510</td>
<td>-33.80%</td>
</tr>
<tr>
<td>N. Swiftcurrent Glacier</td>
<td>116,651</td>
<td>79,117</td>
<td>-32.20%</td>
</tr>
<tr>
<td>Hudson Glacier</td>
<td>101,288</td>
<td>34,197</td>
<td>-66.20%</td>
</tr>
<tr>
<td>Gem Glacier</td>
<td>29,135</td>
<td>20,379</td>
<td>-30.10%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>23,091,801</strong></td>
<td><strong>16,314,915</strong></td>
<td><strong>-29.35%</strong></td>
</tr>
</tbody>
</table>

*Figure 2: GNP remaining glaciers and total area*

*Note: Red text indicates extinct glacier*

*Source: NRMSC, USGS*
decrease in summer flows from 2005-2055 (Shepard et al., 2010).

These changes in weather and hydrology have implications for the park’s wildlife. Certain species that rely on specific conditions could be pushed out of the park entirely. The lynx (*Lynx Canadensis*) and wolverine (*Gulo Gulo*) are at the southern end of their range and rely on spring snow for denning and hunting. If these conditions become rarer, especially at lower elevations, these species could be restricted to island habitats, threatening their survival in the park (Saunders and Easley, 2010). Notable alpine species such as bighorn sheep (*Ovis Canadensis*) and mountain goats (*Oreamnos Americanus*) may be at risk of habitat decline as the timberline rises (CDRLC, 2007). New species that currently cannot survive in GNP are likely to move into the region as well, leading to increased competition for resources and additional stresses on the native species (Saunders and Easley, 2010). Models predicting changes in plant communities have shown that GNP’s altered ecosystems would be viable for 45 species of mammals currently unknown there (Burns et al., 2003). These new species would likely compete for resources with the native wildlife, which are a major tourism draw (Saunders and Easley, 2010). Grizzly bears may be forced to travel further or enter hibernation later, potentially causing more conflict with humans (Haroldson et al., 2002). As river chemistry changes, native species like westslope cutthroat trout (*Oncorhynchus Clarki Lewisi*) and the endangered bull trout (*Salvelinus Confluentus*) may see population declines as they are highly sensitive to any increased temperature (Williams, 2009).
Figure 3: Jackson Glacier, before and after
Extensive changes in native plant communities are occurring as well, with ecosystems pushing upward in response to temperature. Hall and Fagre (2003) have projected how forest cover is declining as grasslands become more common at lower elevations. Meanwhile, repeat photography over the last one hundred years shows evidence that alpine meadows are yielding to forest cover (Klasner and Fagre, 2002). Alpine areas may decline severely as they have no higher areas to move into like the forests below (Saunders and Easley, 2010). Additionally, forest productivity may decline due to stress from temperature and drought. The potential for mountain pine beetle (*Dendroctonus Ponderosae*) outbreaks are increasing as trees become stressed during drier and longer summers (Bentz, 2007). Longer, warmer summers also allow the beetles to enter higher elevation forests and reproduce quicker (Bentz, 2007). In addition to insect infestations, these same conditions are likely to increase the frequency and magnitude of wildfires in the park (USGCRP, 2007). Fire season is seventy-eight days longer than the 1970-1985 season, and the number of large fires has increased by a multiple of four (Westerling et al., 2006). In addition, much of the increase in burned acreage is occurring in forests above 5,500 feet, where snowpack historically kept fire to a minimum (Westerling et al., 2006). While fire is natural and healthy for the ecosystem, it heavily impacts tourism. During August 2003, when 10% of GNP burned, visitation fell by 50% (NPS, 2003).
Figure 4: Alpine treeline at Hidden Lake, before and after
3.5 Climate Change Policy

As a result of the changes outlined above, GNP is becoming a highly cited example of the visible impacts of climate change in the media. In response to these threats, the NPS is initiating pioneering tactics to mitigate emissions and climate change impacts in the park, with the intent of becoming a sustainability model for protected areas. GNP was one of the first national parks to conduct a carbon footprint analysis, finding that the overwhelming majority of carbon dioxide emissions in the park (82%) come from vehicular traffic (ICF, 2004). In 2003 GNP was named a “climate friendly” park by the NPS and the Environmental Protection Agency (Scott, 2012).

The park has also adopted the NPS Green Parks Plan, designed to reduce carbon emissions in the park by 35% by 2020 (Scott, 2012). GNP published a management plan in 2006 to implement the Green Parks Plan. The park intends for future construction to be energy-efficient by following the Leadership in Energy and Environmental Design (LEED) guidelines, as well as the retrofitting of existing buildings (GNP, 2006). The park believes that these “green” structures will promote behavioral shifts in visitors as well. To help reduce emissions from vehicle traffic, GNP has developed a public shuttle system. The park plans to extend the shuttle project by partnering with surrounding communities as well (GNP, 2006). Other initiatives include waste management and visitor education. The park also hopes to cooperate with concessionaires within and outside the park by sharing best practices as a way to implement these structural and behavioral changes and bring environmental sustainability to the region’s tourism industry.
CHAPTER 4 - METHODOLOGY

This chapter will describe the methodology and qualitative techniques that have been used to assess tourism operator vulnerability. The interviewing procedure, stakeholder identification, and sampling techniques will be described. Finally, the coding procedures will be described.

This study utilizes a qualitative approach to explore the perceived impacts and adaptations of tourism stakeholders and the ways in which they are socially constructed. Climate change vulnerability studies have typically used in-depth interviews surveys and questionnaires or a combination of both methods (Lama, 2010). This study emphasizes in-depth interviewing techniques with open-ended questions because this study’s approach in assessing the social construction of perception is to allow operators to describe how they are vulnerable, and to define trends to which they are vulnerable.

Quantitative representation is not the goal in this study. As stated by Smit and Wandel (2006, 289), the goal is “not to produce a scoring or rating of a particular community’s current or future vulnerability. Rather, the aim is to attain information on the nature of vulnerability and its components and determinants.”

4.1 Sampling Procedures

Since the nature and structure of the tourism industry can be very different depending on the location, Grau (2010) has outlined the tourism industry in Montana and classified businesses into categories that comprise tourism. In addition, tourism can be further divided into businesses that are “characteristic”
“connected” (CEC, 2010). Characteristic businesses tend to be tied to a specific location through infrastructure or marketing, and directly interact with tourists. These businesses derive significant monetary benefits from this interaction and would not exist in their present form without tourism. Connected businesses, on the other hand, are more indirectly involved in tourism services, usually through manufacturing and transportation, and thus have little contact with tourists themselves. Because they are not directly tied to the GNP region, these industries were considered outside the scope of this research project and were not sampled.

To ensure that interviews were sampled from the entire spectrum of businesses that constitute tourism in GNP, operators were classified into two sectors, called service providers and outfitters. These two sectors were informed by Grau (2010) as well as observations by the researcher of businesses in the area. In addition, three geographic sample areas were created. Flathead County was divided into the West Glacier area and the Flathead Valley proper, and Glacier County consisted of its own sample area. Flathead County was divided up because of the size of the area, and because tourism in the Flathead Valley proper includes Flathead Lake and Whitefish Mountain Resort, while tourism in the West Glacier area tends to be more heavily based on GNP. Interviews with representatives of the two sectors were conducted in each of the three sample areas. In addition, a range of different businesses in each sector was sought out. For the service provider sector, this entailed interviewing both large and small hotels, campgrounds and RV parks, and vacation rentals. For the outfitter sector,
rafting and fishing outfitters, backcountry guides, and touring companies were interviewed.

A contact list of potential interviewees was built using the chamber of commerce business listings for Flathead County and Glacier County. Interviewees were chosen using a purposive sampling method based on the sectors and sample areas outlined above. Potential candidates were contacted by phone and asked to participate in the study. When possible, the owner of the selected operation was asked to interview. When the owner was not available, a manager was substituted. In total, twenty-three interviews were conducted with local operators; twelve interviews were performed during August 2012 in person at the operation site, and eleven interviews were performed over the phone during September 2012. Phone interviews were necessary because many operators felt too busy to interview in the midst of the tourist season, but they were available after Labor Day.

Most climate change vulnerability studies that utilize in-depth interviews use a similar amount of interviews (for example, Lama (2010); Gaita and Both, (2008); Keskalito, (2008); Sievanen, (2007)). Reflecting this, Hesse-Biber and Leavy (2006) asserted that data saturation, or the point at which no new themes are emerging during the interview process, for in-depth interviews is typically achieved with twenty to thirty interviews. For this study, interviewing ceased at twenty-three interviews for two reasons: (i) among the outfitter sector, the contact list had been exhausted, with all potential contacts either agreeing to interview or
Figure 5: Location of Outfitter Operators
Figure 6: Location of Service Provider Operators
declining to participate; and (ii) among the service providers, no new themes were emerging, thus indicating that data saturation had been reached.

4.2 Interview Procedures

A semi-structured format was used to interview tourism operators. This questioning format allows the predetermined interview questions to be addressed while still allowing the interview subject to freely and fully discuss their views on a topic (Hesse-Biber and Leavy, 2006). While this method does not allow for generalizations to the entire industry, it does allow a range of meanings to surface based on stakeholder perceptions (Smit and Wandel, 2006). Common experiences and themes can be addressed by interviewees while still allowing them to convey views and ideas that may be unexpected but significant to their overall perception of vulnerability.

The interview guide is organized into four general sections beginning with background questions to establish rapport. These questions also provide information on the interviewee’s operation, which provided context for the operator’s perceived vulnerabilities and adaptive options. The remaining three sections are structured to address the three components of vulnerability as outlined by Turner et al. (2003). The second section explores past environmental events to address the concept of exposure. Interviewees were asked to describe environmental conditions or events that impact their operation, as well as the frequency, magnitude, and extent of the impact. The third section addresses stakeholder sensitivity by focusing specifically on climate change. Sensitivity
involves the degree to which tourism is reliant on the environment for successful operations (Wall, 1998). To explore this concept, interviewees were asked how they thought climate change was changing or would change the region, and what the ramifications are for their businesses. The final section asks interviewees about the adaptations they have made or are considering as a way to gauge operator resilience. This also entailed questioning the interviewees about their access to information about climate change and how policy and regulations affect their adaptive options.

During spring 2012, the interview guide was submitted to The University of Montana Institutional Review Board, a required procedure for all research involving human participants. The process is designed to ensure ethical procedures are being followed during the research process. To ensure transparency during the interviews, all interviewees were given a research consent document. In the case of phone interviews, this information was read to the interviewee and consent was obtained verbally. All interviewees were asked for consent to be recorded as well. To ensure the anonymity of the interviewees, each one is given an identifier, and the names of the interviewees’ businesses are not referred to.

4.3 Supplementary Interviews

In addition to the operator interviews conducted for this study, supplementary interviews were performed with key stakeholders in the GNP region. They were conducted to provide context and help frame the themes
discussed by the tourism operators. In particular, these interviews are useful in looking at the operators’ perspectives in a broader sense. The supplementary interviews also provided a better understanding of regional policy and planning.

Two interviews were performed with key stakeholders representing different organizations. These organizations included the NPS and the Crown of the Continent Geotourism Council. These interviews were informal and unstructured, though they addressed many of the same concepts found in the interview guide used to interview tourism operators.

4.4 Data Analysis

All interviews were collected using an audio recording device as all of the interviewees consented to be recorded. The recorded interviews were transcribed using Microsoft Word. These transcriptions were then analyzed using content analysis to understand how the stakeholder navigates environmental impacts in the tourism industry and their potential dimensions of vulnerability. Content analysis, a method for analyzing extensive textual information, breaks transcribed data into pieces of text that can be compared (Hesse-Biber and Leavy, 2006).

A coding system was developed that identified and organized important pieces of text that inform the research questions. A coding system reduces the transcribed data and allows it to be organized into themes and concepts for analysis (Berg, 2001). This process is iterative and continuously informed data analysis. In this way the coding categories developed were constantly analyzed and checked for consistency to ensure validity (Neuendorf, 2002). Analysis
began with open coding to ensure that every potential piece of data was initially included. The coding procedure became more selective as data processing advanced as the themes relating to vulnerability became more apparent and defined.

Themes and the textual elements that define them were organized in Microsoft Word. The textual elements were generally organized under the answers given to each question from the interview guide. These answers were then coded into several themes. As data analysis progressed, some of these themes were broken down into smaller, more discrete themes or reworked entirely as the researcher’s understanding of some themes evolved throughout the coding process. A few themes emerged several different times and were found throughout different interview questions. The emergent themes from this process are presented in Chapter 5.
CHAPTER 5 - RESULTS

This chapter is organized into four sub-sections. The first section, Interviewee Descriptions, describes the interviewees, the location of their businesses, and the types of activities in which they are engaged. The second section, Tourism and the Environment, details the interviewees’ responses about their business relationship with the natural environment of GNP. The third section, Climate Change and Tourism, details the interviewees’ perceptions of climate change in GNP and its impacts on their business. The final section, Adapting to Climate Change, explores the adaptive responses of interviewees to climate change, as well as how national park policy affects adaptive capacity.

5.1 Interviewee Descriptions

This section provides some information on the characteristics of the interviewees involved in order to provide context to their responses. It also provides identifiers for all of the interviewees involved. These unique identifiers will be used to reference quotations made by interviewees, as well as protect their identity.

A total of twenty-three interviews were conducted in this study, in addition to an interview with the GNP superintendent and a representative of the Crown of the Continent Geotourism Council. Ten interviewees self-identified as being involved in the outfitting business, while the remaining thirteen provided basic tourism services, primarily lodging. The identifiers used for the interviewees were based on geographic location. Codes were composed of one of three
regional identifiers and a number representing a specific interview for that area. The three possible regional identifiers were FV (Flathead Valley), WG (West Glacier area), and EG (East Glacier area). Six interviewees operated out of the Flathead Valley, made up of Whitefish, Kalispell, and Columbia Falls. Eight interviewees operated in the West Glacier area, composed of West Glacier, Essex, Polebridge, and the Highway 2 corridor east of Columbia Falls. Nine interviewees were located in the East Glacier area, composed of East Glacier, Browning, St Mary, and Babb. Twelve interviews were conducted face-to-face during the 2012 summer season, while the remaining eleven interviews were acquired by phone during later dates.

The interviewees were engaged in a variety of activities. These are organized in the Table with the business’ primary activity listed first and followed by any supplemental activities. In some cases, interviewees operated in both the outfitting and tourism services categories. In these cases, the business is listed under the category in which the interviewee identified as the main operation of the business.

Outfitters are engaged in a range of activities including whitewater rafting, guided fishing, guided hiking, and touring. West Glacier outfitters are primarily engaged in whitewater rafting, though two outfitters supplement rafting with other outdoor activities, particularly fishing, and operate small-scale lodging. Flathead Valley operators are varied in their activities, with the main activities of the four different outfitters being guided fishing, boat touring, horseback riding, and cycling. The East Glacier outfitters that were interviewed were mostly involved
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<th>Identifiers</th>
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in guiding, such as bus tours, helicopter flights, and guided fishing and hiking. Some of the interviewees, in particular FV2, FV3, EG1, and EG3 have concessions from the NPS to operate within the park. Other outfitters tend to work with the NFS or local land management agencies such as Flathead County or the Blackfeet Tribal Reservation.

Interviewees involved in tourism services mostly provide lodging for tourists in the form of large and small hotels, campgrounds or RV parks, and cabin rentals, although one interviewee ran a bed & breakfast. Some of the smaller-scale operations consisted of multiple lodging types as well. Larger hotels and lodges often offered food service and retail as well. While outfitters tend to operate over a more general area, the tourism operators interviewed are more tied to a specific site and its infrastructure.

5.2 Tourism and the Environment

Interviewees were asked to explain their relationship as a business that has connections to or is tied to the natural environment of GNP. Their answers provided insight on the range and types of impacts they experience from the natural environment when operating tourism services in and around GNP. These results indicate the exposure of the tourism community to environmental hazards. Generally, operators expressed a high degree of interaction with the park’s natural environment. Seven of the operators felt like they deal with some impact from the natural environment on a yearly basis. Impacts relating to the Going to the Sun Road are most common because the road is often subject to extreme
conditions. Just one interviewee felt like he/she was not impacted much by the natural environment.

5.2.1 Forest Fires

The cyclical occurrence of forest fires were unanimously mentioned as something that profoundly impacts business. The park region is prone to seasonal fire, especially the western side of the park in the North Fork area. Wildfire in GNP tends to occur later in the summer, especially in July and August, when extended periods of high temperature coupled with only small amounts of rainfall produce arid conditions and place severe stress on forest communities. As this time of year is also peak tourism season, fire can cause significant reductions in income as tourists choose to leave the area early or not to come at all. Fires in the park can result in the evacuation of communities as well, cutting off revenue streams altogether. One operator recalled having been shut down for three weeks during the 2003 fires in West Glacier. Another remembered being evacuated from the St Mary area for five days. One operator expanded on this type of incident:

You never make up the loss. Because we’re only open in the summer, like when the fires came through in ’06, you’re shut down for a month, you don’t make that up. (EG5)

Ten operators specified that a major reason that fire has such negative impacts is because it impairs resource quality and thus negatively affects the tourist recreation experience. In particular, the fire produces extremely smoky conditions that obscure views and make outdoor physical activity a health hazard, as simply breathing becomes more difficult. This is especially a concern for the
elderly or people with preexisting conditions. Another operator described this phenomenon and its repercussions:

If we have a bad fire season, whether they are near or far, it’s bringing the smoke in. You get campers in here that can’t take the smoke, they got to get out. They cancel reservations and ask for refunds. That can be kind of bad and really affect your season. (WG8)

Another operator emphasized that it is not just fires in GNP that impact tourism; fires as far away as Idaho can bring in residual smoke that impairs recreation quality. In addition, September fires cause a mass exodus from the park because the clientele at that time of year mostly consists of the retired community, many of whom have health conditions.

Once a fire has been contained, conditions do not necessarily improve for the tourism community. Several operators explained that contained fires still produce a lot of smoke, and as a result nobody wants to spend time in the area. In addition, the recently burned area is viewed as unsafe and tourists tend to avoid it. As a result, four of the interviewees explained that fires in the park kill the remainder of the summer season as potential tourists cancel. As one operator put it:

In 2003 a whole bunch of fires were near, and I think it was mid-July when it started, and that was pretty much it for the season. Once the smoke gets in here and you can’t see the mountains and you can’t hardly breathe everybody leaves. They cancel their reservations. (WG5)

In addition to impaired resource quality, a dominant theme among the outfitters is concern over accessibility to the park. Six outfitters and a total of nine interviewees felt that fire in the park restricted access, causing less revenue. Mandated evacuations and closures limit the area for activities such as mountain
biking and hiking, as well as causing road closures if a fire is too close. This occurred most recently in 2006, when the Red Eagle fire caused the closure of the eastern portion of the Going to the Sun Road for several days. Interviewee EG3 also explained that during a fire there are temporary flight restrictions over the park, and this in combination with heavy smoke severely limits flight tours.

All of the operators in the West Glacier area noted the 2003 fires as an example of this phenomenon. Even when evacuation procedures were not in place, the burned area along the North Fork Flathead River made water recreation unsafe along certain portions. One operator described these conditions:

    In 2003 we had tons of fire and that limited us as far as where we could go. Portions of the river were closed down that we couldn’t raft through because the fire was right alongside the river. (WG1)

However, this dynamic can have benefits. One operator noticed that people avoiding West Glacier during the 2003 fire season caused an increase in visitation to the eastern side of the park.

    None of the operators felt that fire had any long-term impact after the season was over. Two of the operators discussed the Red Eagle fire of 2006, and explained that while the burned area is an eyesore for tourists, visitation levels seemed to return to normal in the years after the burn. This sort of major impact seems to be relatively rare for the industry in GNP; nine operators described experiencing major impacts from a fire every five to seven years.
5.2.2 Snowfall

Another major impact on the tourism industry identified by the interviewees is heavy snow, in particular on Going to the Sun Road. This was identified by ten of the operators as a major impact because the road is the main tourist draw for GNP. During years in which heavy, late spring snowfall occurs, the opening date of the road is delayed and visitation does not pick up until the road opens. One operator explained:

Last year, that would be the winter of 2010-2011, the snow was so deep up there they didn’t get the road open until July 13, and that greatly impacted our business. People just don’t show up until the road is open, pretty much. (WG5)

The record late opening of the road in the summer of 2011 was brought up by eight operators, and four asserted that 2011 was the worst season in their businesses’ history. An outfitter explained that the late opening took away all of June and the first half of July, or about thirty days of the prime operating season. Another operator elaborated on this, saying business was cut in half during the weeks leading up to the road’s opening. A third interviewee ruminated on the relationship between the tourism season and access to the road:

Our traffic shoots up proportional to what’s available in the park. And the same thing, we slow down when the park shuts that road off, because that’s people’s largest attraction. With all the heavy snow that the park received, they didn’t open up until the middle of July last year. We had our worst season in the campground’s history. (WG6)

In addition to affecting accessibility of the road, snowfall was mentioned as having several indirect impacts as well. Heavy snow that restricts access to the road also results in heavy spring runoff, and one outfitter explained that this causes the rivers to be “blown out” and not ideal for water-based recreation.
Three outfitters who are involved in rafting emphasized safety concerns when river levels are too high. Outfitters have to cancel trips or institute an age limit which causes business losses. One outfitter felt like tourists avoid rafting in high water as well because they think the rivers are dangerous. In addition to these safety concerns, one outfitter said that high water levels impact business by negatively impacting fishing on the area’s rivers.

In contrast, five interviewees noted that snowpack is important for a healthy park environment, and that low snow years can cause other problems. Four operators expressed concern over fire danger when snowpack is minimal, while five outfitters noted that low snowpack causes low water levels later in the season that negatively affect the rafting industry. One outfitter said:

Low snow usually means we have a really dry August and September. I mean, the rafting is usually done, as soon as it gets to a certain level we can only run certain sections of the river, and there are certain sections we can’t run anymore. (WG1)

Another outfitter explained that low water can force the business to expand to other river systems where they normally would not operate. In addition, the low water lengthens rafting trips and costs companies more. A West Glacier outfitter explained:

When it’s low, it takes longer to run. So it’s costing us a little more as a business because we have to have a few more people on payroll, tours are going to go longer and we just need more manpower. (WG2)

This outfitter also asserted that, because of these necessitated structural changes to the business, low water has more of an impact than high water, but does not stop business. The outfitter asserts that the Middle Fork and North Fork rivers have always had enough water to raft throughout the summer.
5.2.3 Weather Conditions

Weather conditions were mentioned by fourteen interviewees as another major impact experienced by the businesses. In particular, lengthy periods of wet weather are perceived by seven operators as affecting business. Three operators that provide lodging stated that guests would cancel their reservations and leave early during extended rainstorms. One operator that runs a campground emphasized that campers especially react to wet weather because they are more exposed to it. Four outfitters explained that, while tourists have already paid for lodging, they do not want to participate in recreational activities like rafting, fishing, and hiking if the weather is poor. As a result, these outfitters see significant drop-offs in participation during rainy periods. One outfitter asserted:

The biggest impact that we see especially with the rafting and fishing in terms of environmental issues is probably heavy rain. If we get a lot of rainy weather, people aren’t interested in rafting and fishing, and that probably kills business more than anything else. (WG3)

June 2011 was brought up by several interviewees as an example of a lengthy wet-weather period that negatively impacted business. As a result of heavy rain, the summer tourism season did not pick up as quickly as past years.

5.2.4 Media Sensationalism

Though not being an environmental impact in itself, another major theme brought up by fourteen interviewees is that the media sensationalizes the natural hazards of the region and consequently worsens the perceptions of the hazard. Eight operators felt that the media fixates on heavy snow along the Going to the
Sun Road. Since this is the primary draw for most visitors, this information can cause them to change their plans. An operator described this dynamic:

What I’ve noticed is the tourists stay down in Missoula for the night and whoever they speak to, they hear ‘don’t even bother going up there, the Sun Road isn’t open’, and that’s what we get. (WG7)

Several of these operators expressed irritation with this fixation because they felt that the park has other opportunities for recreation even when the road is inaccessible. One outfitter specifically blamed social media such as the internet for propagating this fixation, explaining that this was resulting in a more compressed tourism season during July and August.

The media was also blamed by interviewees for its portrayal of forest fires in the western United States. Several outfitters claimed that news sources are geographically nonspecific on the location of a fire, often using broad descriptions that lead potential visitors to assume GNP is experiencing fire when it is not. One outfitter specifically blames the governor, saying:

The governor says the whole state of Montana is on fire so he can get federal funding, and that kills the tourism industry. (WG2)

Another interviewee had a comedic story of sensationalism in the press during one of GNP’s fires:

Their job is to sell newspapers, and I remember a few years ago during a particularly bad fire season, I believe 2007, there was a headline for the fire in West Glacier. It said, ‘Tourists Flee Glacier Using Only Escape Route Highway 2.’ You can envision people running down the street with embers igniting their hair on fire, as they scream and frantically dash down the highway, in some bad movie. That pretty much killed our season. (EG5)
Anecdotes like these were brought up as examples of forest fire misrepresentation in the media. Three operators asserted that the point at which a forest fire begins to severely impact business is when it is first covered by the press.

5.3 Climate Change and Tourism

Interviewees were asked to discuss themes relating to climate change as well. This included what the interviewees thought was happening to park resources from climate change, how these changes were affecting business, and the level of concern. These results indicate the sensitivity of the tourism community to changes in climate.

All of the interviewees asserted that the scenery of GNP is vital for business. The interviewees unanimously consider the scenery to be the reason why tourists choose to come to GNP in the first place. Four of the outfitters elaborated that the quality of the guided experience, such as fishing or boating, is secondary to the views the tourists see while recreating. Just four of the interviewed operators felt that climate change had or would have little to no impact on their business. Seven others see climate change as a distant threat that will not have profound effects on business in the interviewees’ lifetime, and thus is more of a long-term threat.

5.3.1 Nature of Climate Change

While most of the interviewees believe that the park is undergoing environmental changes, not all of them recognized climate change as the culprit.
Six of the interviewed operators believe that the park’s current climate regime is the product of a lengthy climate cycle. One operator disagreed that the long-term data shows that GNP will become warmer and drier. Another believed that the current warming trend in GNP is temporary, and the climate will eventually stabilize. Two outfitters expressed skepticism over climate change in the park because they believe the time frame for data collection on climate has not been long enough. One argued that the national park, at just one hundred years old, only provides a small picture of the area’s long-term climate patterns. Another explained this idea in more detail:

The environment has its cycles, you know. We’ve been in a real dry warm cycle the last 15 years or whatever. The winters have been milder, but I guess I don’t foresee - looking back at old-timers and stuff, they claim a 100 year cycle, so who knows. (EG2)

These comments, as well as the opinions of the other five operators, indicate that there is uncertainty over what the future climate in GNP will be like.

5.3.2 Glaciers and Scenic Value

All of the interviewees discussed how the park’s melting glaciers could affect park scenery, and nine of the operators specifically identified the park’s shrinking glaciers as a result of climate change. Operators had both personally observed these changes over the years as well as been informed through various forms of media. For example, one outfitter recollected a park ranger joining a tour one day and discussing glacial recession. Two other operators specifically attributed a 1-2°C increase in temperature and quoted a date of 2025 at which the
glaciers will completely disappear. A third operator noticed changes in glacial
extent by looking at old photographs in the Many Glacier Hotel. He explained:

I would say it’s obvious there is less and less [ice], the glaciers are melting
off, and it’s warmer and drier than it has been, not from personal
experience but just from looking at some of the pictures from 10 years ago
and compared to the pictures now, it’s obviously receded. (WG7)

Seven of the operators expressed concern that the disappearance of the
park’s glaciers could profoundly impact the park in several ways. Three operators
believed that the loss of glaciers will lower the scenic value of the landscape,
possibly leading to reduced visitation numbers. The other four operators
speculated that, with no glaciers to regulate water flows during the warm and dry
summer months, forest fires could become a more common occurrence.

However, the majority of the interviewees did not believe that the loss of
the park’s glaciers would have any significant effects on business. Two outfitters,
both involved in water-based recreation, explained that water resources in the
park would only be marginally affected. One of these outfitters explained:

Sure the glaciers could melt all the way, we’d have no glaciers in Glacier
Park, it could happen. If it were to happen, we would still have water, just
less. Typically in low water years we’re actually fairly safe right here. It’s
the other river systems [in Montana] that end up getting closed. But never
have I seen it in a position where it was really affecting our business to
where we were turning people away because we just couldn’t get on the
water. (FV1)

The rest of these interviewees discussed glaciers as a draw for tourism.
These operators asserted that while losing the glaciers would be a loss to the
park’s heritage, it would not affect visitation to the park because the glaciers are
not a primary draw to the park. One operator said:
A lot of people have the wrong idea that that’s what they’re here to see, but they’re really here to see what the glaciers created. (WG8)

The interviewees identified several key park resources that they consider more important for tourism than the park’s glaciers. Alpine areas are considered important for tourism as they provide extensive views, especially of the park’s namesake, the glaciated mountain peaks. In addition, Going to the Sun Road and the park’s hiking trail network, both of which provide access to scenic vistas, were mentioned as important tourism resources. Several operators also brought up Glacier’s high population density of grizzly bears, and the park’s wilderness atmosphere. One outfitter explained:

I don’t think people care. They’re making this huge hype about how all the glaciers are melting. Most of my customers have probably driven through this park and never saw a glacier. They didn’t even know they could see Jackson. That’s not why they come. They don’t come to see the remaining 30. This park was misnamed in the first place; it should’ve been called Glaciated Park. You come here for Going to the Sun Road, the hiking, but having said all that, I don’t think you’re going to see decrease [in visitation] once the glaciers melt. (WG2)

In addition, six interviewees thought that the way glacial retreat in GNP was portrayed in the media has an impact on tourism as well. In particular, these operators complained that the media fixates on the disappearance of the park’s glaciers and creates the impression that the park will not be worth coming to once they are gone. One operator said that visitors give them the impression that the park will not be as attractive. Four operators thought this has created a short-term positive impact because people feel like they need to come see GNP while it still has glaciers. One operator even thought that some visitors had a sense of urgency
when touring the park. However, another operator elaborated on the long-term consequences of this phenomenon:

Everyone says the glaciers are going to be gone in a few years, so we need to get there now and see the park because after that everything is going to be dried up. I think a lot of people’s perspectives are off, and that’s going to affect us. People expect it to be different even if it doesn’t change. (WG8)

5.3.3 Shifting Seasons

A manifestation of climate change explored by operators is the idea that the region’s seasonal patterns are shifting. Three operators have observed that winter is a more compressed season, with snowfall generally arriving later in the year. Two operators observed the summer season lasting longer, while four of the operators have noticed changes to the shoulder seasons. In particular, these operators believed spring is a more compressed, rainier season than in the past. This was viewed as harmful by the operators because it reduces recreation opportunities. On the other hand, autumn is believed to be lengthening and warming, potentially increasing the operating season for these interviewees. However, eight other interviewees feel like conditions are so variable in GNP that identifying any long-term climate trends is too difficult. Two operators felt that it was too early to attribute conditions in the park to climate change. Two others explained that whenever a pattern appears to emerge, something entirely different occurs. An outfitter explained this phenomenon:

I’ve seen less snow accumulation that lasts late into the summer, up in the high country. But then, when we have a real long winter like two winters ago, we had snow in the high country right up until the weather got cold again. The Big Drift almost lasted the entire summer. So it is varied. (EG1)
Ten operators thought that the lengthening of the summer season would be beneficial to tourism. Four outfitters believed that a lengthened summer would increase revenues for them by increasing the amount of time in which water sports are feasible. In addition, two of the outfitters thought that warmer than average temperatures would entice more visitors to engage in water-based recreation. Four other operators thought that milder winters might help Going to the Sun Road open earlier in the year and keep it open longer in the fall. One operator has observed an increase in visitation recently:

Certainly the last 10 years there is a lot more traffic on the highway here and so you have to assume there is a lot more visitation to the park. The trend I’ve seen has been more and more, like last year was a bad year but other than that we’re getting more and more business each year. (WG6)

However, these same interviewees recognized a longer, warmer summer season as a double-edged sword. While this would increase the operating period for summer tourism, the same conditions were viewed as increasing the risk of forest fires in the park. The operators explained that local fires chase away tourists, and extensive burns lower the scenic value of forests. As a result, these interviewees view a longer summer season as having both positive and negative consequences.

5.3.4 Extreme Events

Interviewees expressed concern that climate change would cause environmental hazards to become more extreme in the future. Interviewees used words such as “flashier” and “biblical” to describe how ordinary events could
increase in magnitude, causing greater harm to the tourism industry. Five operators expressed fears that low water conditions would be exacerbated by climate change. Three outfitters thought the river systems will change, putting pressure on water resources and shortening the window for water-based recreation. One asserted that water levels in the park were the lowest they had seen during summer 2012. Another explained:

Precipitation levels aren’t decreasing and the snowmelt isn’t decreasing. We had 2 huge snowpack years. I don’t think we have to worry about, at least based on the patterns now; it’s more of the heat factor, the dryness. You can have all the rain and snow you want, but you get 10 days of 90+ degree weather in July, by the end of July it’ll be like this year. (WG2)

At the opposite extreme, several operators cited the recent heavy spring snowfalls and the previous rainy month of June as an example of how excessive moisture causes road closures, mudslides, and reduced access to the park. One outfitter discussed how moisture extremes affect business:

Our season is so short, If the changes are resulting in a freak storm or really dry summer, and you lose 3 weeks of operation because the trails are too wet to be on or it’s too dry and the fire danger is too high or whatever, when you only have 16 weeks to operate, that’s a pretty huge chunk. (FV3)

Another outfitter commented on the relationship between warmer temperatures and more extreme weather:

A few years ago in December, up on Logan Pass, we had what they call a pineapple express. It was a warm pressure system that came from Hawaii, but by the time it got to Glacier it was a couple of degrees above freezing and it brought like 5 inches of rain down and washed out Going to the Sun Road, and that affected us that year. We had to put a temporary bridge in, and a couple of degrees colder it would’ve been snow and it would’ve added to the snowpack and wouldn’t have washed out. And just that one storm that had so much moisture in it, by a few degrees it was either rain or snow. (EG1)
5.4 Adapting to Climate Change

Interviewees discussed the ways in which they could mitigate the negative impacts of the natural environment as well as the climate change-related concerns they expressed. These answers show the range of responses the interviewees undertake to mitigate these vulnerabilities. These results indicate the tourism community’s adaptive capacity.

Ten operators felt that they were at the mercy of whatever conditions prevail in the park, and thus were powerless to mitigate anything negative. Two of these operators were unsure what kind of adaptations they could make to mitigate their vulnerabilities. Two others asserted that their business is at the mercy of the tourists’ perception of events in GNP and felt powerless to influence this. In addition, five operators felt they do not have enough information about climate change and how they can adapt. Two operators felt that there was too much information on climate change and that the subject was too politicized. The remaining operators felt they had enough information, or that they could readily obtain it if they felt it was necessary.

5.4.1 Diversification and Flexibility

A prominent adaptation technique exhibited by interviewees engaged in outfitting is business diversification. This strategy involves both offering several different activities for tourists and spreading the business out geographically. Both of these solutions help outfitters to limit their vulnerability to a given natural event.
Seven of the outfitters are currently engaged in this type of adaptation. All seven operate in several different areas at once. One outfitter explained how this benefited their business during the 2003 fire season:

What happened here, it pushed other people to other locations. So our East Glacier location was the best season they ever had because they were the only location that was fully open and wasn’t affected by any fires in this area. So although we’re in a relatively small area, it’s large enough to where we were able to make up some of that lost time and money. (FV2)

Another outfitter, engaged in water-based recreation, reminisced about their solution to the same West Glacier fire:

When we had the fires, we literally moved, because we couldn’t float up here, so we moved our whole base of operation down to Columbia Falls. We did a whole different stretch of water, and we’re fortunate because that’s another thing we can do. When we have high water, we don’t run trips on the Middle Fork but we can get some nice whitewater on the North Fork so we can just switch rivers. (WG2)

Four of these outfitters thought they could go further in the future by getting involved in different types of activities. One water-based outfitter built a lodge in 2010 as a way to expand into the lodging market that is less reliant on river conditions. One outfitter explained this diversification strategy:

We try to diversify as much as we can in terms of the activities we offer and the different ways you can experience nature up here. On any given year, the rivers might be too high, or the forests might have something going on, so that’s why we have a lot of different activities people can do so we’re not pigeonholed into a particular category that may not be profitable that year. (FV3)

The lone tourism services operator who was exploring diversification as an adaptation strategy, WG6, has built small lodges to provide another form of lodging instead of just camping facilities with the goal of being less vulnerable to inclement weather.
The operators explained that diversification coupled with a conservative business plan helps them be flexible in dealing with natural events. Several outfitters explained some of the ways this can be done, such as putting tourists in kayaks when water levels are too low for rafting, and turning guides into entertainers when conditions are less than ideal. When specifically discussing climate change, ten interviewees that were a mix of both outfitters and service providers thought staying flexible would be important in the future. Some common phrases used by the interviewees included “roll with the punches,” “small-scale,” and avoiding overextending the business when conditions are good.

One outfitter put it this way:

One thing about us here is we can stay flexible with the small scale. I run a small outfit, this is it, so I can definitely cut back if I have to. We can probably take a 15% drop-off and still do okay. We used to have busier Junes and so we’ve had to staff. It’s to the point I’m thinking of opening a week plus later next year because we’ll do more in a day in July than we’ll do in a week in early June. (WG2)

Another outfitter explained this dynamic:

It’s hard because environmental change can be totally drastic, so one year it’s like, you have to be prepared for fire, and another year you have to be prepared for snow. So it really is kind of hard to say how to prepare for all that, except to just be prepared in a little bit of everything. On a business level, sure I’m kind of worried, but you know, right now we’re a seasonal business, so we just kind of live year to year and kind of go with it, because no matter how much you plan and how much you market, something kind of just spans you every year as far as what’s really going to happen. A smaller business like we are, I feel like maybe we could adapt a little more easily because it’s just us. If we want to start something new, or be open or be closed, or move, if we need to do any of that, we can do it fairly easily. (WG1)
5.4.2 Marketing Shifts

Another adaptive option some of the interviewees have undertaken is a shift in marketing to try and influence public perception about conditions in GNP. Ten operators mentioned a variety of ways in which they attempt to create appeal for recreation in the park. In particular, these operators try to emphasize the recreational opportunities that can still be done in spite of restricted access to major attractions such as Logan Pass. Decreasing tourism’s dependence on Going to the Sun Road is the major goal. One outfitter mentioned using Facebook as a tool during spring 2011 when Going to the Sun Road was closed into July because of heavy snowfall as a way to show people what they could still see in the park, while another wants to start using internet media. Two others said that they try to emphasize how big and varied the park is to customers so that they are aware of other recreation opportunities in case part of the park is not accessible. Two outfitters use the park’s history as a main point of their tours, and one has park naturalists present during some tours.

In addition, two operators talked about their experiences working with statewide tourism organizations to provide more accurate information for visitors. These operators explained that being wording-sensitive is important. One provided an example of their experience working with Glacier Country, a local tourism advocacy group:

The first few years you saw headlines like, ‘Fire Rages Through Northwest Montana’. Well, that affects all of northwest Montana, people change their plans. With an advocate like Glacier Country they can see, ‘Fire Rages in the Avalanche Basin Area. 99.9% of Glacier is Free of Fires’, and encourages you to go to other areas. So using accurate and proper descriptions of what is occurring. A smart and informed customer
is someone who will make smart and informed decisions rather than a knee-jerk reaction. So it all comes down to putting the proper information out there and letting the visitor decide what they want to do. (EG4)

In addition, five of the interviewees saw the negative publicity of climate change as an opportunity to create future tourism in GNP. Specifically, these operators want to turn the park into a learning opportunity using exhibits, programs, and infrastructure. One outfitter already incorporates climate change into tour speeches, while another wants to center the Jackson Glacier Overlook exhibits around climate change. One outfitter explained why this could increase tourism:

I think there will still be a draw for people to come see the park especially if exposure increases due to climate changes. I think people want to come and see how the park changed. ‘We came to the park 20 years ago, so let’s see it now.’ (FV4)

5.4.3 Sustainability

Several operators, especially those who operate within the GNP boundary, are making efforts to emphasize sustainability in their business model. These efforts included a variety of strategies designed to both reduce greenhouse gas emissions and reduce business impact on park resources. Four operators described ways in which they are attempting to cut down their carbon footprint. One operator is making efforts to buy locally grown food products. Operator EG9 described that he is recycling, attempting to buy products made from recycled materials, monitoring water use, and testing fuel efficient vehicles for tours. Outfitter FV2 has made the greatest changes in this arena:

We’ve changed a lot of things recently in terms of us using more energy efficient ways to run our business. From biodiesel in our tour boats to the
four stroke motors to recycling. We recycle fluids, oils, and antifreeze, all the stuff we deal with. We’re trying to become a carbon neutral company. We just started environmental audit forms where we’re tracking each location on pounds of waste or recycling, just trying to keep track of how our company is doing. We’re getting more kayaks and canoes and getting them [tourists] off the boats. There is no need to have all these motor boats out here. If that’s the only thing available, that’s what they’ll take. (FV2)

This outfitter further explained that these adjustments have multiple positive impacts on business because they both reduce operating costs and can be used as a marketing tool for tourists:

People come and use it or understand it, and they respect it. Especially with the four strokes, you say it only burns two gallons of gas in five hours, and they are thrilled. That’s great for our business because we hardly use any fuel. So yeah, they pay for themselves pretty quick, within a season we can pay for most of these charges, no problem. (FV2)

At the time of the interview, outfitter FV2 was hoping to someday use recycled vegetable oil from the park lodges and restaurants as fuel for their tour boats as well.

Five other operators considered other steps to try and minimize their impact on the park in other ways. Two outfitters practice low-impact activities on rafting and fishing trips to avoid ecological disturbance, including cleaning up rivers as they float. The remaining three operators thought there is an opportunity to reduce automobile traffic in the park by increasing public transit, which would simultaneously decrease visitor impact and improve the wilderness qualities of the park. Two operators thought a shuttle service to connect campgrounds and hotels along Highway 2 with West Glacier would be beneficial:

Part of the change we need to make is to shuttle in from outside the park. That would help involve the local businesses too, because you could park here, catch the buses. Instead of taking down more trees, move some of
that outside the park. I think it would be tremendously helpful, and it would even bring in tourists, and it would take the impact off the park, the things you would have to do to modernize the park. I mean, come on, you don’t want more asphalt in the park. (WG8)

5.3.4 The Role of Government

Interviewees were asked how the NPS and its policies factor into their adaptive capacity, and the interviewees provided a mixture of positive and negative consequences that they attribute to the National Park Service.

Six of the outfitters expressed dissatisfaction with the access that they have as businesses to park resources. In particular, since NPS requires a license to operate within the park boundaries, these outfitters complained that their ability to change the geographic scope of their operation or to offer new activities is limited. One outfitter said:

You got to be licensed to do a tour within the park. They’re limiting opportunities for somebody else to come along and maybe have a better idea or a different thing. Like the tour buses, there probably needs to be a certain limit but right now it’s pretty much exclusive if you like the tour buses. There are only two companies I know of in Glacier Park, and that’s it. If I had better ideas and I showed up there, there is no way I could do anything. You can’t guide, they got one guide as far as I know that does backpacks and horse trips into the park. I don’t see any opportunities for somebody starting up, doing anything in the park. (EG3)

Another outfitter explained:

We’re very limited to what we’re allowed to use. There’s a certain set of commercially approved trails, and that’s all we get. In order to use different trails, I don’t know what they would have to do, but it’s always been kind of a non-starter in terms of even asking about it. (FV3)

In addition to these concerns, seven interviewees felt that the park service cooperates poorly with local businesses. Two operators feel that the park service has less incentive to open Going to the Sun Road earlier in the years than local
businesses. Two others felt that the park’s fire policies were harmful to businesses as well. Outfitter FV2, who has made the greatest effort among the interviewees at becoming sustainable, felt that the park was pushing sustainability but not making much of an effort themselves. An operator explained the lack of communication between the park and local businesses:

I know the National Park used to send rangers out here to share information, just get people more interested in going up there, to stay longer, experience those things, they don’t do that anymore. As an organization, I don’t think the park has been very helpful with businesses up here. I think if they could increase their participation, they would actually get increased visitation. They’d get increased awareness of the effects [of climate change] if that’s what they want. (WG5)

Despite these perceived shortcomings, seven interviewees also recognized the positive impacts that the NPS has on their businesses. Two operators lauded the park’s portrayal of climate change and its cooperation with businesses in portraying that message and educating visitors about how to lessen their impacts. Another operator felt that the park does a good job of striking a balance between protection and access:

I think there has been years they’ve done things that possibly could have hurt us, in terms of press releases about things that hurt us, but they have really made a lot of steps of doing that better and understanding the effect of their actions on the area. (EG8)

In addition, one operator felt that the park service does a good job of keeping them informed of dangers and threats to the park and providing up-to-date and accurate information on forest fires. Several operators also acknowledged that initiatives such as road repair, which might cause stress now, will benefit tourism in the long run. The park also shares best practices learned in other national parks around the country that operators can incorporate into their
business plans. An operator offered some insight on the relationship between their business and the national park service:

Their mission is of course different from my mission. We live in a certain synergy. Their mission is to protect the resources and the assets in the Glacier Park ecosystem, and people’s needs are supposed to be secondary, and it’s important to realize that while you might not agree, for instance, snowmobiling has never been allowed and I might see a financial opportunity there, but the harm of financial gain in the short term might affect long after I’m gone the visitor experience in Glacier, and it also will impact the natural inhabitants with noise, pollution, air quality degradation. I can seize the opportunities that that presents for me, and realize that I don’t need to change those things, I should just strengthen my business around those protections. (EG4)
CHAPTER 6 – DISCUSSION

This chapter discusses the results presented in Chapter 5, particularly in the context of the literature review from Chapter 2. Specifically, the themes and concepts addressed by the operators in the previous chapter are discussed in terms of the research questions explored by this study. The research questions addressed the following:

- How does the physical environment affect tourism operations in Glacier National Park?
- What impacts do tourism-dependent businesses believe climate change entails and what do they perceive their own vulnerabilities to be?
- How do tourism-dependent businesses around GNP respond to these perceptions through adaptation?

In addition, the themes from Chapter 5 are also explored.

6.1 The Tourism-Environment Relationship

WTO (2009) characterized the effects of the natural environment on the tourism industry as falling into three distinct categories. These categories consist of the effects of seasonality, weather and climate extremes, and the effects of climate on the nature of ecosystems. In a vulnerability context, these effects are representative of the risk-hazard approach to vulnerability. In this paradigm, vulnerability defines physical threats and a community’s level of risk (Cutter, 1996).
The operators interviewed in this study tended to conceptualize their relationship with environmental resources in GNP in this context. The operators cited different types of exposure that fell into all three categories described above. For example, the milder conditions during the summer months are the primary enabler of tourism in the area, showing the dominant effect of seasonality. In addition, the operators explored the effects of resource quality in talking about negative events such as forest fire and snowpack levels. Furthermore, the outfitters explained that varying snowpack, rainfall, and temperature all effect how they can do business. These comments, notably absent among the service provider segment of the operators, seems to indicate that exposure is experienced differently by the operators depending on their use of the park’s resources.

However, while the operators’ descriptions show that physical hazards are an important part of their vulnerability, the way they are experienced, and even the type of exposure faced, are augmented significantly by social conditions in the tourism community. The fact that outfitters felt much more exposed to natural hazards than service providers illustrates that the way in which operators choose to utilize park resources has a significant effect as well. Several outfitters recognized that tourists only engage in outdoor recreation when conditions are most favorable for those activities, a phenomenon described by Lise and Tol (2002). When climate change is considered, the long-term trend of decreasing precipitation and increasing temperature may increase weather extremes and reduce the number of days in which ideal conditions are present, making outfitters more sensitive to extreme weather conditions.
In addition, the structure of park tourism largely determines the way in which tourists experience the park. Since Going to the Sun Road is the major attraction for visitors, the operators see themselves as increasingly sensitive to conditions along the route. Poor weather, or any conditions that restrict access to this resource, have an overly negative effect on outfitters, while similar conditions in other parts of the park have little impact on the operators. Many of the operators have observed an increased incidence of late-spring heavy snowfall, which delays the road’s opening and shortens the operating season. At the time of this writing, the results of sequestration at the national level have the potential to worsen this dilemma, as a decrease in funding to the NPS is likely to further delay road openings in future years (Scott, 2013).

Augmenting this is the role the media plays, a phenomenon cited by many operators as both enabling and reducing visitation. The operators provided examples of how the media’s interpretation of events alters visitation independently of actual conditions. In particular, the media’s fixation with the park’s melting glaciers, as well as the dramatization of forest fire events, acts as a filter through which potential visitors are able to make decisions about where they want to travel. As Behringer (2001) found, this dramatization reduces visitation and revenue by driving tourists to other locations.

These examples illustrate the interesting interplay between physical impacts and the human perceptions of these impacts. As several operators asserted, climate change could result in visitation changes even if the overall
scenery of the park is not altered much, because tourists will be expecting it to be drastically different.

6.2 Climate Change Vulnerability

As climate change continues to manifest in the alteration of the park’s climate and environment, operators will likely be forced to deal with new normal conditions during the operating season. As a whole, the operators had a sophisticated understanding of climate change in GNP and how various park resources interact to produce various conditions. Operators recognized that average temperatures were increasing, especially in the shoulder season, less snow was falling in winter, late-spring heavy snowfall was becoming increasingly common, the shrinking of alpine areas, and that there is widespread melting of glaciers. They often connected these events with other observed changes. For example, they recognized that a loss of ice and snow was resulting in lower stream flows in late summer, and that when combined with warmer temperatures, fire was more likely. In addition, the operators drew from both their observed experiences and from scientific resources, often distributed by NPS, to forecast climate change. Notably, the operators rarely mentioned changes in wildlife, though they recognized it as a primary draw to the park, and just one operator was concerned over more pine beetle outbreaks.

It is important to note that these forecasted conditions are situations that the operators deal with in the present, though they are projected to become more common. However, as is the case with operators’ varying relationship with the
park environment in the present, there are differing levels of vulnerability to future climate change among operators. There are several significant factors at play that help explain this difference.

The majority of service providers express little concern over the disappearance of the park’s glaciers, citing a variety of reasons. For one, the glaciers are mostly inaccessible to the average visitor, and only a few can be seen from a distance when driving through the park. The glaciers were not considered to be a primary draw either, unlike resources such as wildlife and a wilderness atmosphere. Rather, the overall quality of the region’s scenery is what drives the service providers’ businesses, and these operators generally feel more threatened by the negative media attention to the situation. Furthermore, service providers located in the Flathead Valley proper may be even less reliant on park resources since they are able to tap into other destinations in the area, including Flathead Lake and Whitefish Mountain.

In contrast, outfitters in all three study areas rely on the indirect benefits glaciers provide in a way that service providers do not. Glaciers help to regulate stream flows throughout the summer, an important trend for outfitters based around water recreation. If stream levels regularly become too low during summer, outfitters are faced with reduced access and area closures, effectively cutting off the end of their season. Low water conditions also dry out surrounding ecosystems, which makes forests more prone to fire. While forest fire is largely a negative experience for all operators, outfitters can be disproportionately affected as burned areas may result in reduced access to trails they utilize. In addition,
some operators expressed that many people aren’t interested in entering these areas for both aesthetic and safety reasons.

For outfitters that guide within the national park boundary, there may not be the opportunity to find a new trail or area to operate in. Some outfitters experienced these conditions and noted that they are permitted by NPS to enter only specific sites and to guide a limited number of people, regardless of conditions there. As a result, these outfitters are generally unable to move their business to a more suitable location inside the national park on a temporary basis. However, there appears to be a tradeoff, since these outfitters usually hold one of just a few contracts allowing operation inside GNP. This is in contrast to the majority of outfitters, who operate outside the park. These operators, negotiating primarily with NFS, are able to shift their operation easier, but are unable to directly leverage the park itself.

Another factor at play is the changing seasonality of GNP and how it affects different operations. From the service provider standpoint, longer summers would be largely beneficial for business as they would allow the summer tourism season to be extended, especially in autumn. The potential for more frequent, high intensity fire is a concern among these operators, but is largely viewed as a tradeoff that would manifest on a year to year basis, with fires harming business some years and the longer seasons increasing it in others. Among the outfitters, the outlook is less beneficial. This is likely because outfitters are much more reliant on specific environmental conditions to generate recreation, rather than the overall scenic value of the park at any given time.
Thus, while the only indirect impact service providers seem to be at risk for is fire, the state of outfitters’ businesses will likely be defined by several different conditions. Furthermore, an extended shoulder season may not be warm enough for water-based outfitters, while extremely hot days during July and August could decrease participation in other forms of recreation such as hiking.

These perspectives are illuminating when compared with Scott’s et al. (2007) study that explored potential visitor patterns under scenarios of warming in WLNP. Both WLNP and GNP experience significant overlap in both the types of recreational activities enjoyed and the tourists themselves, who travel regularly between the two parks. Surveys among a range of park visitors indicated that climate change would extend the summer season, resulting in overall increased visitation. However, certain forms of recreation are likely to suffer due to a combination of resource changes and negative perceptions of climate change. This was expressed in interviews by the outfitter segment, but not the service provider segment. Additionally, Scott et al (2007) discovered that visitors usually identified scenery as being the most important attractor (75%) and opposed to recreation opportunities (15%). This goes a long way in helping to explain why seem less concerned by climate change, and outfitters appear to experience more nuanced vulnerabilities.

6.3 Vulnerability and Adaptation

In order to cope with this combination of physical and social impacts that manifest themselves through climate change, operators have undertaken a range
of adaptations designed to reduce these impacts and to shift how they access park resources. These adaptations included diversification, marketing shifts, and sustainability initiatives. In a few cases some community-level coordination is being discussed. However, Becken (2005) noted that vulnerability can exist at different scales. Some of the experiences of the operators indicate that, while the community as a whole is adapting, there are still some individuals who remain highly vulnerable.

There are some interesting processes factoring into the adaptations chosen by the operators. As Leichenko (2010) explained, adaptation is usually place-specific, largely determined by local knowledge and the experiences of stakeholders. In the case of the operators in and around GNP, the adaptations chosen address both the natural hazards associated with climate change as well as visitor perceptions and resource utilization. The examples illustrated by the operators indicate that, while climate change is a major driver for adaptation, it is influenced by other processes as well.

This is observed through the integration of adaptation with development exhibited by many of the outfitters, which allows them to alter the way they utilize park resources. Specifically, this reduces their dependence on specific variables, especially by shifting business to accommodate visitors. At the same time, adaptations such as sustainability initiatives and increasing public awareness represent attempts to combat the perceived media influence and better inform visitor perceptions, which are vulnerabilities only indirectly associated with climate change. Eakin and Walser (2008) explained that adaptation can be both
reactive and proactive, and both types of adaptation are evident through these examples.

The majority of the adaptations discussed in Chapter 5 are taking place at the individual scale. Despite this, there is clear evidence that adaptation is a multi-scalar process influenced by larger entities. In particular, NPS plays a significant role in enabling and restricting adaptation. While park policy serves to limit potential adaptations and exacerbate vulnerability through resource closures and the need to acquire permits, it also strengthens adaptation. For those operations within the park especially, NPS has served as a unified voice for sustainability and seems to be a major driver for this adaptation.

To see this process in action, one only needs to observe that almost every operator undertaking sustainability initiatives operate within park boundaries. It is likely that this is driven by the GNP Green Parks Policy, designed to reduce carbon emissions by 35% by 2020 (Scott, 2012). High carbon footprints among operators is largely incompatible with the park’s wilderness image, and as detailed by Scott (2003), visitor perceptions of a healthy landscape is critical in attracting tourism. Moreover, NPS helps drive adaptation by implementing climate change education programs and by sharing best practices from other national parks with operators in GNP.

For businesses outside the park, the situation is somewhat different. The benefits experienced by the park operators listed above are only peripherally experienced by outside operators, who tend to rely on diversification strategies and different marketing shifts. Rather than the emphasis on climate change
education, these operators are choosing to provide more accurate information to visitors about park conditions, and to encourage use of other parts of the park instead of Going to the Sun Road. Some businesses along the Highway 2 corridor hope to partner with NPS and extend public shuttle service to accommodations along the route, though this is a largely hypothetical scenario that is not being seriously discussed yet. Other operators rely on the Glacier Country tourism board, a statewide organization that helps direct tourists and provides more accurate information regarding conditions in the area.

Finally, a few operators who claimed that climate change was a cycle are notably taking few or no adaptations because they believe that the cycle with eventually end and conditions will return to “normal”. These individuals were service providers of locally owned businesses outside the park, and lacked connections to larger entities that could help enable adaptations, such as NPS or a national chain such as KOA. As one of these local operators stated:

The park certainly hasn’t provided us with any of their opinions on climate change and the reality of climate change is all unclear…So we’ll just kind of take whatever comes along. If the business drops off and our business fails because of that we’ll just go do something else. (WG6)

Examples such as these illustrate the critical role that individual attitudes and perceptions play in the adaptation process.
CHAPTER 7 - CONCLUSION

The goal of this project was to explore perceptions of climate change vulnerability among tourism operators in the GNP region. Specifically, the relationship between tourism operators and their environment, the effects of climate change, and their adaptations were examined through the collection of semi-structured interviews. There are several important repercussions that emerged.

It has been shown that tourism operators in the GNP region are affected by natural hazards associated with climate change, but that these hazards are often augmented or defined by how operators choose or are constrained to use available resources. Importantly, the role of large-scale organizations including the NPS is significant in determining this. National media acts as an important filter through which potential tourists become informed and make decisions about travel, and this information dissemination process sometimes affects tourism independently of actual environmental conditions. These processes help to create different vulnerabilities among the tourism operators.

Outfitters tend to be much more reliant on specific environmental conditions or resources, and thus experience a greater range of vulnerabilities than many service providers. However, outfitters also tended to have a more nuanced understanding of climate change in the region and how it would affect them. As a result, they tend to be more proactive with adaptation than many of the service providers. By contrast, some service providers rejected climate change as a long
term threat, felt powerless to improve their situation, or lacked multi-scalar connections, indicating that, though they may be less vulnerable to natural hazards than outfitters, they face very different vulnerabilities. Thus, while the tourism community is showing some resilience to the effects of climate change, some individuals remain highly vulnerable.

Theoretically, the range of factors and conditions that collectively determine vulnerability are representative of the range of definitions and conceptualizations of vulnerability. Individuals can be affected by a range of exposure to natural hazards as well as sensitivities derived from social conditions, and they adapt through a range of practices to alter these conditions, many of which are place-specific. In addition, these results have shown how stakeholder perceptions largely determine how they experience and react to these vulnerabilities. Notably, as recognized by Becken (2005), tourism operators act on multiple time scales by adapting to the conditions that they perceive as a threat in the present that simultaneously prepare them for the future. As stated by one operator:

   We can plan a long term legacy or we can try and affect that stuff on a national or broader scale, but we still live in the short term, and certainly feeding my family is a short term goal, so the short term becomes my long term. I can hope and tailor my life to support what I think might encourage long term survival. (EG4)

While semi-structured interviews allow a range of concepts and perspectives to emerge, the methodology has several limitations that must be considered. Importantly, the results obtained from interviews do not represent statistical evidence that can be applied to the entire tourism community, as the
themes obtained represent only the perspectives of the operators selected for
interviews. In addition, several potential interview candidates declined to
participate for a variety of reasons, and thus it is possible that the perspectives
presented of the operators in this study may not represent the dominant
viewpoints of operators in the GNP region. For example, the operators who chose
to participate may have been more concerned with climate change and thus more
informed and proactive than the operators who declined to be interviewed.

At this time the majority of the adaptations being implemented by
operators are in their infancy, and there has been very little time to judge the
effectiveness of these practices. Consequently, future research examining how
operators implemented adaptation and how or why they were successful or failed
should be undertaken. This would serve to integrate a more dynamic view of
vulnerability, which would allow the processes at play to be better understood.

Finally, there is currently no research exploring how visitors will react to
climate change in GNP over the long term. While the assumptions and
experiences of the interviewees, as well as similar research in WLNP, provide
some perspective, it cannot be taken as definitive. As a result, research attempting
to statistically validate these assumptions should be undertaken for GNP, using a
structured sample to ensure that all segments of visitors are sampled from. This
would provide a better understanding of how tourists experience and react to
climate change and would better detail some of the processes relating to
vulnerability explored in this thesis.
REFERENCES


Behringer, Jeannette, Rolf Buerki, and Jürg Fuhrer. 2001. “Participatory Integrated Assessment of Adaptation to Climate Change in Alpine Tourism and Mountain Agriculture.” *Integrated Assessment* 1: 331-338


Thank you for participating in this interview with me. Do you have any questions before we begin?

I want you to know that your identity in this project will remain confidential and that I will not use your name in any reports. You can stop the interview at any time or refrain from answering a question if you don’t want to.

I would like to record our conversation so I can more accurately transcribe your statements. Are you comfortable with me recording this conversation?

Warm-up Questions:

Where is your business located?
What do you do?
What times of year do you operate?
How many people does your business service?
How long have you been operating here?

Tourism and the Environment:

1. How important is the natural environment for your operation?
   Probe: Are any specific natural resources important?
   How does the environment affect your operation in terms of when or where you can operate?

2. Have you experienced any impacts (give examples as needed) from the natural environment before?
   Probe: How exactly did they impact you/your operation?
   How were you economically impacted?
   How long do the impacts last?
   Was there damage to infrastructure?
   Are there any other examples you remember?

3. Did you take steps to avert these impacts in the future?
   Probe: What exactly did you do?
   How did it help or hurt you?
   What was the economic impact?

4. How often do the impacts you mentioned occur?
   Probe: Has this changed over the years?
   Where do these impacts usually occur?
   Has the extent of the impacts gotten better/worse?
Environmental Change and Vulnerability:

5. How do you think that environmental change might be affecting the park?
   Probe: Can you define environmental change?
      Is weather and climate being affected?
      Are the forests and animals being affected?
      Are people being affected?

6. Has climate change affected your business?
   Probe: How has your operation been affected?
      How important is this impact to you?
      Was there damage to infrastructure?
      Have insurance costs increased?

7. What do you think Glacier National Park will be like in the future?
   Probe: How will this affect you and your operation?
      How do you think tourism in general will be affected?

8. If the environment were to change in the future (give examples as needed), how
   would it affect your operation?
   Probe: How important would this impact be to your operation?
      How would you be economically impacted?
      Would season length be a factor?
      Would these impacts be the same all around the park?

Adaptation:

9. How worried are you about future environmental change?
   Probe: How much time do you think you have to prepare for change?
      Do you think you can successfully operate under future conditions here?

10. How have you prepared for environmental change?
    Probe: How easy (or difficult) has it been to implement these changes?
       How long have they taken to implement?
       Were these measures cost effective?
       Are there any government policies that have helped or hurt you?

11. What do you think needs to be done to get ready for future environmental
    change?
    Probe: How would you need to change your operation?
       How long would this take to implement?
       How much would this cost?
       Do you have enough information?
       Do you have adequate access to resources?