

Place meanings and climate change vulnerability: Nature-based recreation and
tourism community leaders contemplate change

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Dedication

This thesis is dedicated to all the individuals and communities striving to cultivate a sense of place in our rapidly changing world. May we meet the challenges of climate change with continued connection to the places we hold dear.

Abstract

Climate change adaptation has largely failed to address the importance of changing place meanings in nature based-recreation and tourism (NRT) communities. Twenty-five semi-structured interviews and three focus groups were conducted with community leaders (e.g., residents that were tourism professionals, natural resource managers, and local elected officials) on the “North Shore” of Lake Superior in Minnesota, USA. These qualitative data were analyzed using grounded theory methods. Perceptions of local effects of climate change diverged: stakeholders felt vulnerable, had perceptions of resilience or lacked understanding of impacts. Climate change threatens to cause reduced place satisfaction (vulnerability) and is determined by the level of place dependence (exposure) and the degree of place identity (sensitivity) in the NRT community. This study proposes a theoretical model integrating place concepts and climate change vulnerability that addresses the overlooked role of place meanings and identity in climate change adaptation.

Keywords: adaptation, place satisfaction, vulnerability, place identity, place dependence

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Preface

This paper is a qualitative study of place meanings in the nature based recreation and tourism (NRT) community of the North Shore of Minnesota. It is a component of a multiple-method survey project funded by Minnesota Sea Grant and led by an interdisciplinary team of researchers from the University of Minnesota, North Carolina State University, and Carleton College. The project created region-specific climate projections which were then incorporated into a quantitative survey obtaining trip behavior, climate change attitudes, and place attachment data from North Shore tourists. An economic analysis was also included. The project incorporated the local community through focus groups and interviews which built rapport among community leaders and value to the research through collection of community feedback on the study design.

The project began in July 2014 with a project workshop in the community hosted at Wolf Ridge Environmental Learning Center, Finland, Minnesota. Interviews began on this same research trip. Interviews were conducted in October 2014, November 2014, January 2015, and July 2015. Focus group data were collected in January 2015 and July 2015. The format for the following paper has been prepared in anticipation of journal submission.

Introduction

Anthropogenic climate change is expected to create significant changes to ecological systems and human communities. While global scale climate mitigation efforts continue, the irreversible effects of climate change have created a need to focus simultaneously on local and regional adaptation measures (IPCC, 2014). Nature-based recreation and tourism dependent (NRT) communities are sensitive to climate change (Kajan & Saarinen, 2013). NRT communities often rely on climate and seasonal weather patterns to create environmental conditions suited for the quality recreation and tourism experiences they offer to visitors. For example, an adequate snow pack is needed for winter recreation activities (e.g. snowmobiling and skiing); if a future climate does not provide enough snow, then those pursuits become infeasible (Scott, Dawson, & Jones, 2008). This sensitivity, combined with the community's exposure to climate change (e.g. degree of environmental changes) and its adaptive capacity (e.g. ability to respond to change) create a measure of a community's vulnerability to climate change (IPCC, 2001).

NRT communities have the ability to reduce their vulnerability by planning ahead to adapt to climate change (Scott, 2011). Kajan and Saarinen (2013) reviewed tourism research on climate adaptation and found results emphasized diversification and technological solutions as adaptation strategies. For example, snowmaking can be a strategy to lengthen shrinking seasons and boost a

shrinking snowpack in some regions (Scott et al., 2008; Morrison & Pickering, 2013). Yet despite this adaptation strategy, stakeholders (e.g. resort owners, park managers) may be wary of negative tourist perceptions towards intensive adaptation actions (e.g. water intensive snowmaking) and this fear may prevent them from taking appropriate adaptation action (Morrison & Pickering, 2013).

This social barrier to adaptation action must be addressed. Social components to climate change adaptation have been incorporated into adaptive capacity (Grothmann et al., 2013), a malleable component of vulnerability (Davenport & Seekamp, 2013).

Social barriers to climate change adaptation action are many (for more on this topic, see Gifford, 2011; Gifford, Kormos, & McIntyre, 2011). One social component that may have particular resonance for climate change adaptation in NRT communities are place meanings. Place meanings include the cognitive, symbolic and affective constructs that people associate with a space (Tuan, 1977; Altman & Low, 1992). Place meanings become an important part of a NRT community's identity as a home (Amsden, Stedman, & Kruger, 2010) and a destination (Lichrou, O'Malley & Patterson, 2008). Other authors have addressed the integration of place meanings into climate change adaptation (Adger, Barnett, Chapin & Ellemor, 2011; Fresque-Baxter & Armitage, 2012; Amundsen, 2015) and suggested that vulnerability assessment frameworks have often missed the deeper values present in a community that could be revealed through an investigation of place meanings (Wolf, Alice, & Bell, 2013).

This study furthers the work of these authors by proposing a model of the incorporation of place meanings into the traditional vulnerability assessment used in climate adaptation planning. This theory is supported by qualitative data from twenty-five interviews and three focus groups that were conducted with community leaders (e.g., natural resource managers, local government officials, and tourism professionals) in several NRT communities along Lake Superior in northern Minnesota, USA, between July 2014 and September 2015. The following inductive questions guided formation of the theory: *(1) What role do place meanings play in the North Shore community; (2) How do place meanings manifest in different climate change and adaptation narratives among community leaders?; and (3) How can place meanings be incorporated into a community-based climate change adaptation plan?*

Literature Review

First defined by Tuan (1977), the exploration of human connections with space has expanded beyond the human geographies field into studies in environmental sociology and psychology, recreation and tourism, and recently, climate change adaptation. Place is the social, cultural, emotional and symbolic interpretation of a space as cultivated by history, individuals, and groups of people (Manzo & Devine Wright, 2014; Lewicka, 2010; Scannell & Gifford, 2010). The literature distinguishes between several components of place (for a more thorough review, see Farnum, Hall & Kruger, 2005) and while the semantics of these terms are still debated (Lewicka, 2011) this paper uses place terminology as presented in Table 1.

Place attachment is a form of affect, an emotional bond to a place (Altman & Low, 1992). It engages people's deeply held values (Altman & Low, 1992). Place attachment can function as a predictor for pro-environmental behavior (Vaske & Kobrin, 2001); thus, some have speculated that it could be effectively used by planners to increase community participation (Manzo & Perkins, 2006) but it is not clear if this applies to climate change specific community engagement. Clarity on the best method to incorporate place attachment and other place concepts into existing climate adaptation strategies is needed.

Table 1: Definitions of place concepts for application in this paper

Term	Definition	Literature
Sense of place	Cognitions and sentiments associated with a place that includes knowledge, belonging and commitment to a place. An individual can hold a different sense of place for multiple scales. Nested underneath this concept are meanings, attachment, and satisfaction.	Stedman, 2002; Tuan, 1977; Shamai, 1991
Place meanings	Cognitions and symbols of a place: what it is and what it provides, etc. A place can have multiple meanings. Meanings can change as the physical environment or social setting changes and they can influence attitudes and behavior.	Davenport and Anderson, 2005; Stedman, 2002
Place attachment	The affective connection an individual has to a place. Engages emotions and is often described as rootedness.	Altman and Low, 1992; Tuan, 1977; Lewicka, 2011
Place identity	Place meanings are a part of an individual's identity.	Williams, Patterson, Roggenbuck and Watson, 1992; Williams and Vaske, 2003
Place dependence	The reliance on a place to fulfill certain needs or complete an essential activity.	Williams et al., 1992; Williams and Vaske, 2003
Regional identity and Community identity	A scale of place, these terms refer to the symbols, culture and characteristics originating from place that are shared by a geographically bound group and the associations people have with each other, the boundaries of which may be soft and cross political lines.	Paasi, 2003; Lewicka, 2011
Place satisfaction	Contentedness with the current condition of a place, including services and physical attributes.	Stedman, 2002; Ramkissoon, Smith and Weiler, 2013

Communities have an opportunity to create a sense of place through their actions and messages; positive feedback cycles can enhance an identity that already exists in the community (Amsden, Stedman, & Kruger, 2010). Communities must take this ability and plan to shape a future for their community otherwise they may lose autonomy over their place in a changing climate (Adger et al., 2011). Place meanings have changed as physical landscapes transformed under development (Stedman, 2003) and as climate change alters the functions and features of the environment, some existing place meanings may lose their foundations in the local landscape. Though attachment can remain while place meanings disappear (Stedman, 2003), strong attachment in those averse to place change may be prompted to engage in pro-environmental behavior (Ramkisson et al., 2013), which in this case would be climate change adaptation actions.

Understanding risk and the steps necessary for adaptation could invoke fear in the community, which could hinder decisions and action (Gifford, 2011). Therefore, those practitioners involved in creating and implementing climate change adaptation plans in the community need a more clearly defined strategy to incorporate place concepts. The vulnerability model of exposure, sensitivity, and adaptive capacity is a framework that can be applied to places in order to understand how impacts of climate change will be experienced in a specific place (IPCC, 2001). Vulnerability to climate change has focused on physical threats so Moreno and Becken (2009) proposed a framework for assessing vulnerability

that emphasizes local NRT destinations by integrating social and physical systems into the sensitivity, exposure, adaptation equation of vulnerability. Their framework falls short of considering intangible meanings inherent in places; they include tourist perceptions of physical environmental risk (e.g., hurricanes) but don't address place attachment or place satisfaction. According to Adger et al. (2011), ignoring the identities communities have constructed in the place they call home is a gross oversight within the current body of literature measuring climate change vulnerability. Communities that are unable to continue their traditional way of life or are forced to migrate have not achieved successful adaptation (Adger et al., 2011).

Recently, values based research specifically related to place meanings, identity, and values have begun to address this gap in climate change literature (Table 2). Amundsen (2015) suggests that place attachment could be a strong motivator to engage communities in climate change adaptation. Amundsen (2015) finds no potential for climate change to be a motivating factor for local adaptation in two coastal Norwegian towns as climate change is not considered a concern by the study participants. However, place attachment is a strong emergent theme Amundsen (2015) proposes to utilize for engaging residents in local adaptation. Amundsen (2015) does not present a theoretical model incorporating place into a vulnerability model, but concludes by arguing the data infers the need for such a model.

Table 2: Original studies in climate change literature that address place from the perspective of local residents

Category of study	Methodology	Place concept	Citation
Adaptation theory	Qualitative	Place attachment	Amundsen, 2015
	Qualitative	Place meanings	Wolf, Alice and Bell, 2013
Community mental health impacts of changed place	Qualitative and quantitative	Sense of place	Willox et al., 2012.
	Qualitative	Place dependence	Durkalec et al., 2015.
Place-framing to engage and motivate for adaptation	Quantitative	Place attachment and place identity	Groulx et al., 2014
	Quantitative	Place attachment	Scannell and Gifford, 2013
	Quantitative	Comparing scales of place	Devine-Wright, Price and Leviston, 2015

Wolf et al. (2013) suggest that current vulnerability approaches miss critical components of communities being affected by climate change. While a community may be able to use different technology, policies, or strategies to adapt to climate change, important values of the community may be lost if the adaptation plan does not also consider preserving a sense of place. Adger, et al. (2011) argue that adapting technologically but losing place meanings cannot be considered successful adaptation for a community. In Wolf et al. (2013) the study communities are at high risk of not only losing functional aspects of their landscape, such as being able to hunt and gather food for subsistence, but they risk experiencing an “emotional” loss as their connections to places change. Wolf et al. (2013) advocates for a values-based approach to climate change adaptation.

Similarly, Willox et al. (2012) and Durkalec, Furgal, Skinner, and Sheldon (2015) emphasize the need for incorporation of place concepts into adaptation planning because of the negative impact climate change will have on the mental health of the indigenous communities in their studies. Feelings of hopelessness are prevalent in the community of Nunatsiavut, Canada when community members think about how climate change reduces and/or eliminates their ability to participate in activities critical to their identity (Willox et. al, 2012). The decline in mental health due to changing place meanings and impaired place dependence is similar to reduced place satisfaction. The change of conditions in this community did not alter place attachment; residents still felt bonded to Nunatsiavut and considered it home. These results from a social science and health perspective are similar to Stedman (2002) where lakeshore development altered the physical environment, which reduced satisfaction for those individuals whose place meanings lost foundation in the landscape but did not reduce their attachment to the lake.

In a survey of British Columbia residents, Scannell and Gifford (2013) found that place attachment predicted climate change engagement and local message framing predicted climate change engagement, but the combination of place attachment and local message framing was not significantly more predictive than either concept alone. However, Devine-Wright et al. (2015) suggest that multiple scales of identity need to be explored, as global identities were more salient than local identities in a study of Australian adults. Groulx,

Lewis, Lemieux, and Dawson (2014) found no compelling evidence that local climate change perceptions were related to place attachments or identity in a case study of an NRT community in Manitoba. The authors thought their research design had challenges with issue salience and as a solution, in the future would have used qualitative methods before designing quantitative tools in order to appropriately frame the value and climate change messages.

Additionally, nature values that attract individuals to an NRT community may facilitate quick place attachment, but more social value-based place attachments may act differently than nature-based place attachments (Groulx et al., 2014).

As shown in Table 1, place concepts are complex, act independently from each other, and thus need to be considered separately in connection with climate change adaptation. Place concepts need to be more accessible to researchers and practitioners. Aligning place concepts with the current vulnerability model (IPCC, 2001) used in climate change adaptation will facilitate the incorporation of identity and meaning into future adaptation plans. This paper presents a theoretical model in which to do so.

Methods

Qualitative research is intended to reveal insights about lesser known areas of interest. Methodologies are continuously evolving as researchers debate strategies for study design. As of 2017, many researchers judge a study by its trustworthiness (Lincoln & Guba, 1985). Qualitative research is not meant to be generalizable but it is meant to be applicable outside the scope of its original design. Thick description enhances a study's transferability (Lincoln & Guba, 1985) as readers are provided with dense information and examples from which to draw their own conclusions and interpret the research from their own angle. The qualitative method chosen for this project was grounded theory. Grounded theory is an iterative methodological process that can be used to work with rich, qualitative data and it is most appropriately used for studies where the intent is to build a new theory out of the data (Creswell, 2013).

This study was guided by a vulnerability assessment approach (IPCC, 2001) designed to understand the community's adaptive capacity. Twenty-five interviews and three focus groups were used in this qualitative study. Place concepts were predicted to be an important factor in the NRT's community capacity, and so the study began with the aforementioned inductive, exploratory research questions *(1) What role do place meanings play in the North Shore community?; (2) How do place meanings manifest in different climate change and adaptation narratives among community leaders?; and (3) How can place meanings be incorporated into a community-based climate change adaptation plan?*

Study Community

The region of the state of Minnesota along Lake Superior's western shore is commonly known as the "North Shore" and has been a tourist destination since the early 20th century (Shapiro 2013). The North Shore of Minnesota stretches from just north of Two Harbors to Grand Portage at the Canadian border. There is one major road, Highway 61, a scenic byway extending between the two towns. At 154 miles long, it is the only major access road spanning the area. Along the highway are diverse opportunities for outdoor recreation including hiking, road biking, mountain biking, fishing, motor boating, canoeing, kayaking, picnicking, golfing, downhill skiing, cross country skiing, dogsledding, snowmobiling, and snowshoeing. The land is made up of wetlands, rocky lakeshore, rivers, waterfalls, volcanic geology, sub-boreal forest, and lakes. Other tourist attractions include cultural heritage sites, live music, and restaurants. Popular public land for recreation includes eight state parks, the Boundary Waters Canoe Area Wilderness, and the Superior National Forest. Lodging resorts and businesses that cater to tourists (i.e., souvenir shops, outfitters, art galleries, and restaurants) are common in the private sector.

According to the 2010 U.S. Census, the population of the region is predominately white (88.1% White, 8.6% American Indian, Cook County; 97.7% White, Lake County). The population of Cook County is small, with 5176 residents reported on the 2010 Census. Home ownership includes properties

classified as seasonal, recreational, or occasional use (52.4%) and fewer year round occupants (42.7%), of which 74.9% are owned and 25.1% are rentals. In Lake County, which includes a significant population outside of the study area, 30.9% of properties are seasonal, and 62.8% are occupied, with 80.7% owned and 19.3% rentals.

Public land accounts for a significant portion of land ownership in the area. These public spaces are managed by counties, the state, and federal government. The Grand Portage Band of Chippewa manage land directly adjacent to the international border with Canada. Other governing agencies and groups include the US Forest Service; the Minnesota Department of Natural Resources; the municipalities of Grand Marais, Finland, Lutsen, Tofte, and Two Harbors; and Cook and Lake County government, which include two Soil and Water Conservation Districts. The Iron Range Resources and Rehabilitation Board provides financial resources to communities to invest in sustaining business in northeastern Minnesota. The Arrowhead Regional Development Commission provides multi-disciplinary planning services to communities in northeastern Minnesota. Several non-profits are active in the public land and recreation sector, including Friends of the Boundary Waters Wilderness, Sugarloaf Cove Stewardship Association, The Nature Conservancy, the Minnesota Environmental Partnership, The Superior Hiking Trail Association, The Historical Society of Minnesota and Explore Minnesota Tourism. These organizations partner with government agencies, private businesses and

landowners to manage the natural resources in the North Shore region. Recently, Cook County consolidated their tourism associations, previously managed by municipalities, into a county-wide tourism organization called Visit Cook County.

Fishing, mining, and forestry were the historic economic drivers of this region. Although still a part of the region's economy, these industries are much reduced in scope. Specifically in Cook County, these industries accounted for "68% of employment in 1920" and only 4% in 2011 (Cook County, 2013, p 8). Currently, the region has depended on tourism dollars to support a large portion of the local economy (Cook County, 2013). For example, in 2011, 54% of jobs in Cook County fell directly into the tourism category: accommodation and food services; retail trade; and arts, entertainment, and recreation (Cook County, 2013). The primary tourism season is summer, with smaller numbers of tourists visiting for winter recreation. The shoulder seasons (spring and fall) also receive fewer visitors than summer. Thus, some businesses operate year round, but many are seasonal and depend primarily on a few months of the year to make their livelihood for the entire year. For example, a ski resort depends primarily on the winter months of December, January, February and March, while a canoe outfitter may depend on the months of June, July, August and September.

Climate change projections for the Lake Superior Basin, which includes the North Shore, are available in Huff and Thomas (2014). The Lake Superior Work Group reports that changes to Lake Superior and the surrounding basin include a 3 to 4.5 degree Celsius increase in average air temperature and a 5 to 7 degree

Celsius increase in average water temperatures of Lake Superior. This will lead to significantly reduced ice cover, both in extent and in duration of cover, as well as a lengthening of the growing season, fluctuating water levels, increased risk of wildfire, and more severe weather. These changes will have a ripple effect across ecosystems along the North Shore which will include loss of coastal wetlands, a change in aquatic species, and a change in forest type. These changes are expected to happen rapidly (by 2100) and will be compounded by disturbance from invasive species and human development, likely impacting current tourism patterns (Huff & Thomas, 2014).

Identifying Community Leaders

This sample is not without bias and is not meant to be generalizable, rather, as is the goal with qualitative research, it is to provide depth and insight into a lesser-known topic (Creswell, 2013). Participants chosen for this study are referred to as community leaders and include individuals in positions of leadership or positions with decision-making responsibilities. Our goal with this purposive sampling was to dig deeper into the perspectives of those likely to facilitate climate adaptation planning or lead by example through their business. Study participants were identified through a combination of strategic sampling, internet research and snowball sampling (Creswell, 2013). An initial list was provided by Minnesota Sea Grant and was expanded by an internet search targeting staff and elected officials on agency, organization and business

websites. At the end of each interview participants were asked to recommend other community members of importance or those with a different perspective than their own (Appendix A). The decision to contact an individual was guided by how many times they were referred, what expertise they were said to have, and how they expanded the sample of completed interviewees. One limitation that resulted was a lack of participants specific to the southern half of the region (the Two Harbors area) and only one Grand Portage tribal member. It was more challenging to connect with leaders from the towns of Grand Portage, Finland, Silver Bay and Beaver Bay because the residents kept a lower public profile, were more challenging to identify or contact, declined, or were not explicitly in a leadership position related to recreation and tourism.

Forty-six unique individuals participated in the study (Table 3). In two cases the interview involved more than one individual: a husband and wife co-owned a business interviewed together and a government agent had a coworker sit in on the interview. Thus, the total number of interview participants added up to twenty-seven people in twenty-five interview sessions. The first focus group included (eight individuals) natural resource managers, mostly from agencies or established non-profits; two of these participants were also interviewed. The second focus group included (eight individuals) tourist professionals, mostly individual private business owners; two of these participants were also interviewed. The third focus group included (ten individuals) government officials at the municipal, county, and regional level; three of these participants were also

interviewed. Of the total unique individual participants, fifteen percent (7/46) participated in both a focus group and an interview. Seven participants were involved twice because they were believed to be highly engaged in the project, didn't have their voice heard during the focus groups, or were referred by a community member that declined the invitation.

Table 3: Number of participants by occupation and data collection method

Occupation	Interviews	Focus Groups			Focus Group and Interview			Total Unique Individuals
		FG 1	FG 2	FG 3	FG 1	FG 2	FG 3	
Business owners/employees	8		6			1		
Government employees	6	4		1	1		3	
Non-profit employees	2				1			
Tourism professionals		1				1		
Retired		1						
Local elected official	4			6				
Total Unique Individuals							46	

Data Collection

Interviews were conducted at places of residence, public meeting spaces, or agency/organization offices. Five different research assistants conducted the interviews. For most of the interviews, one or two researchers were present at a time. For three interviews, the interviewer plus three additional students were present. Interviews began in July 2014 and concluded in September 2015. Data collection concluded after twenty-five interviews and three focus groups were completed which is consistent with the point at which previous grounded theory studies reach theoretical saturation (Creswell, 2013).

Focus groups were conducted in conference rooms in businesses located in the study area. Two focus groups took place in January 2015 and the third took place in July 2015. Focus groups were led by two researchers and included presentations from two other researchers. Several research assistants were present at all focus groups to take notes and share project goals. The lead researcher used a script (Appendix B) to guide participant conversation that included an overview of the project goals and design. The latter half of the focus group was designed to prompt a discussion about the vulnerability of the North Shore. Focus groups were two hours in length. Preliminary results were disseminated to the study community in two separate poster-session workshops (March 2016 and May 2016). This informal member-checking and continued engagement in the community positively enhanced the trustworthiness of the study (Lincoln & Guba, 1985). Familiarity with a community and its landmarks, history, and customs is necessary to better interpret the data and can be acquired through prolonged engagement in the study community (Lincoln & Guba, 1985). Researchers were intermittently engaged in the study community for twenty-three months from the start of data collection to conclusion of the community workshops.

Interviews and focus groups were audio recorded and transcribed. Interviewees and focus group participants were asked for consent (Appendix C) for the interview to be audio-recorded and separately, for permission to use quotations from the interview in written publications and oral presentations. One

interviewee declined permission to be audio-recorded so the two researchers present took notes and later compared them for accuracy. These notes were included in thematic analysis though it was not possible to use direct quotation. Prior to beginning the interview and/or focus group, participants were also asked to complete a background information form (Appendices D and E). Focus group transcripts were transcribed anonymously. Since all data was used anonymously, it was not possible to distinguish among the responses of different individuals.

Data Analysis

Data were analyzed using QSR International's NVivo 10 and 11 Software. An iterative coding procedure consisted of an open-coding phase, determination of codes and major themes, a closed-coding phase, and continuous organization to best answer the research questions and stay true to the data (Charmaz, 2014). Four research assistants coded the data using peer debriefing to ensure trustworthiness of the analysis; research assistants coded the data independently in the open-coding phase, and periodically through this process researchers would meet and compare the language of the codes being used. This process created a list of codes which were then grouped through an axial-coding phase, a similar, iterative process where the data were coded independently and then axial codes and respective passages were compared for accuracy in peer debriefing sessions.

To facilitate this process, a team of research assistants conducted the analysis portion of the project. They included the author of this thesis (a graduate student) a second graduate student, and two undergraduate students. The four researchers engaged in open coding six interviews in total. In this open-coding process, the researcher read through the transcription text (one interview at a time) and condensed passages of thought into a short description or label. Typically, all labels were unique but a researcher may have used one label more than once if the passage was believed to be the same idea as a previous passage. This process resulted in a long list of codes and ideas. Each researcher was asked to reflect upon the major themes of the interview and be prepared to share a verbal summary of the overall theme of the interview. A coding framework emerged from a series of peer-debriefing sessions. The framework consisted of select labels that would be consistent for use throughout all of the interviews. The selection of the labels was informed by the themes that emerged in the open-coding process, the interview guide, and the general research questions of the group.

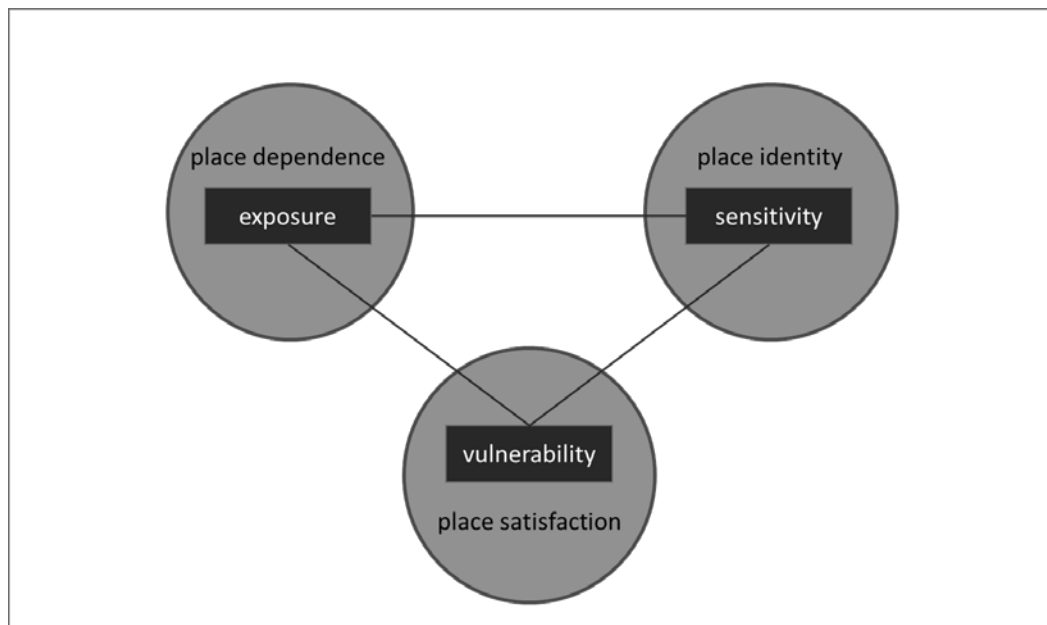
An important part of qualitative analysis is data familiarity (Charmaz, 2014). All four of the research assistants involved in the coding process were also familiar with the data by either leading an interview/focus group or transcribing an interview/focus group, or both. Three researchers then tested this framework on three interviews (different interviews than the ones used for open coding) and made revisions as needed. A final version of the framework was

used to code all twenty-five interviews. The author revisited the literature to connect the themes from the final coding framework to the literature, and created a revised framework to use for focused analysis on all interviews and focus group transcripts. Peer debriefing sessions allowed for reflexivity, discussing biases, and researchers collaborated on memo writing by sketching relationships and idea mapping.

Results

Qualitative research seeks to shed light on the structure of a lesser-known problem or topic (Creswell, 2013) through thick description that allows for readers to create their own interpretations and applications across disciplines (Lincoln & Guba, 1985). Rich description in this paper includes quotations from interview participants and focus group participants. Individual identities remain anonymous but the participants' occupations are ascribed to quotations. Data analysis procured rich themes of how community leaders were thinking about climate change vulnerability in the context of place. We linked these themes to place dependence, place identity, and place satisfaction and propose a model (Figure 1) integrating these concepts.

Figure 1: Integration of place concepts and vulnerability in an NRT community



Analysis focused on grouping passages relating to place. These passages were then linked to climate change vulnerability in the advanced focused-coding process. Following with the definition of vulnerability as stated in the literature review (IPCC, 2001) we present Table 4.

Vulnerability to climate change emerged as community leaders spoke of concerns over reduced place satisfaction because of changes to resources. Satisfaction was enhanced or reduced by how place dependence was being affected by change (exposure) and the severity of the impact these changes had to place identity (sensitivity). The model is explained in detail following a clarification of community leaders' climate change perspectives, as they are divergent.

General Climate Change Perspectives

Climate change was a pervasive theme throughout the study, however, it was deemphasized in the interview guide questionnaire (Appendix A). Questions were designed to gather information about observed changes in the region in “natural resources” and in “recreation and tourism resources”. For each of these topics, the following wording was used to hone in on climate change: “Some people we have talked to in the community are concerned specifically about climate-change and related impacts to [natural resources /recreation and tourism resources]. What are your perspectives on this issue?” Climate change perspectives were divergent. While climate change was a visible, concerning

factor in the local community for some, others did not recognize climate change on a local context, and a few denied its existence. “I can’t believe anybody who lives in this county thinks that there is any kind of global warming up here because we sure have not seen it” (*Local business owner*). For some, climate change was seen as a problem of the future, a gradual change that would produce conditions the community could adapt to over time. “We can change with it. The climate changes, we’ll adapt” (*Tourism professional*). Other participants anticipated climate change would cause (and was already causing) negative outcomes for the local community. They shared their experience with local events and conditions that they attributed to climate change.

This was the first year where I actually felt fear from climate change . . . the storms that we’ve had this year and that fire a couple years ago . . . this could do us in. It could literally put this place out of business . . . that is where the fear is coming from. Am I setting my kids up for this really bad experience trying to keep . . . this family tradition alive and all of this good will and just have it blown away by one big wind storm? (*Local business owner*)

It became evident that many participants felt uncertain about what climate change looked like on the North Shore. The following passages highlight different interpretations of the Pagami Creek Fire, a significant natural resource event that occurred within the last five years of data collection. “[The Pagami Creek Fire] had nothing to do with climate change. If you believe that I’ll sit with you a couple hours and make you change your mind” (*Third Focus Group*). Another community leader spoke to the same event:

I don't know for certain that the Pagami Creek Fire was caused by climate change, but . . . it was a pretty significant thing to have happen . . . the conditions of our weather have certainly fluctuated a lot lately, let's just say that. And what else do you call that, that's climate change. (*Nonprofit employee*)

However, nearly all of our participants provided first-hand accounts of how weather conditions have been changing on the North Shore. Many people associated seasonal changes, including variations from what they perceived as normal air and lake temperatures to be certain or possible evidence of climate change. Winter was described as an especially vulnerable season: "We know that our winters are getting warmer, our snow conditions are changing, which also changes our conditions for some of our animals out in the woods" (*Government employee*). A few people linked climate change to extreme weather events. In this case, the participant is referring to a large rainstorm that damaged roads and overwhelmed storm drainage systems:

Climate change is not just temperature increase . . . we've been getting ridiculous weather events that we are not used to having . . . The city had tons of expenses because of that [storm] . . . And the question is not if we are going to get another [hundred year event], it's just when we're going to get another one. (*Local elected official*)

These changes were described as concerning by participants regardless of their confidence in a firm connection of the changes to climate change.

Participants expressed their concerns (or lack thereof) for general natural resource and recreation and tourism changes in the region. Many types of change that emerged in the data can be linked to climate change predictions for

the region (e.g., fire risk, precipitation events, warming lake temperatures) (Huff & Thomas, 2014). While knowledge and understanding of climate change are important in climate change engagement those are not absolute predictors of climate change opinions or engagement (van der Linden, 2015). Thus, the analysis did not discount any perspectives because of how the participant perceived the connection between an observed change and climate change.

Place and Climate Change Vulnerability

Place Dependence

Place dependence, the ability to fulfil a basic need, is affected by the exposure of the area from climate change. While there are a few other natural resource related businesses in the community (logging and mining), tourism came to the forefront of community leaders' minds as the main driver of the economy. Should tourism numbers decline due to access barrier or other declines in satisfaction, many in the community do not have a backup plan for income. For some, the susceptibility to change of the tourism economy was a concern because of the isolation of the community. "If our visitor numbers decrease . . . we don't have a plan B" (*Focus group 2*). Some worried about how the community was ill-equipped to meet these threats because of limited budgets. This community

leader speculated that money for projects that enhance recreation and tourism would be diverted to pay for damages associated with climate change.

If we are spending all of our money fighting fires and taking care of other things, then we can't be spending it on maintaining trails and campground and pavements on the bike trail, and wayside rests . . . climate change could potentially eat up funds that would otherwise be designated for recreational resources. (*Government employee*)

Consistent throughout the majority of the interviews, community leaders noted the ease of access from any of the small towns to vast amounts of public lands for recreation. Having access to water, woods, trails and wildlife was recognized as a huge asset to the North Shore community for residents and tourists alike. Things that would reduce access to those resources (e.g., road washout, unmaintained trails, privatized land, wildfire, declining water levels) were of concern. Additionally, if these resources were reduced in quality (e.g., splendor of scenery, collapsing fish populations, unaesthetic forests), community leaders speculated that the region would not be as attractive to tourists or residents. The diversity of recreation activities and infrastructure that could be pursued drew people to the area. For example,

We're here [because] we really like all aspects of the county and think that the county is very unique. It's got the North Shore, it's got the edge up to the Boundary Waters, got the Gunflint Trail. We've got hiking, sea kayaking, canoeing. It's a really diverse community to recreate in. And that's what brings people here. (*Business owner*)

The degree to which exposure to climate change compromises these aspects of place dependence will determine how much climate change contributes to the vulnerability of the community.

Place Identity

Nature values were prevalent among community leaders and many said that the landscape of the North Shore is what brought them and kept them as residents. Community leaders believed tourists shared these values. Loss of the foundation for individuals' identity (i.e., decreased beauty, altered landscape) would likely cause significant dissatisfaction among residents and tourists alike. If that identity is likely to disappear can be measured by how sensitive its foundation is to climate change.

Many community leaders spoke of how the North Shore community was a place for their family and a place where they felt strongly connected to other people. A culture of volunteerism and engagement from other community members was deemed an asset. These social bonds may be influenced by place aspects such as geographic isolation and the landscape attracting like-minded individuals, but they may also persist as the physical landscape is altered by climate change. Thus, the community may be less sensitive to change because of these social bonds.

Table 4: Integration of place and vulnerability

Vulnerability Framework	Place Concept	Category	Example
Exposure	Place dependence	<p>Nature based recreation and tourism (NRT) economy</p> <p>Access to natural resources</p> <p>Diversity of recreation opportunities</p> <p>Quality of environmental conditions</p>	<p>We need the snowmobilers, a lot of people come up here because we have the snow and extensive trail system and ice fishing. We need ice. Having the four seasons of recreation really kind of keeps the ball rolling. So I think this decreased snow and decreased ice could have legitimate negative effects on the economy. (<i>Focus Group 3</i>)</p> <p>People get real risk averse, I think. And you know, if storms increase and the number of days where Highway 61's closed and people say "well I can't be away I have to get back, we're not going to go there", that affects us. (<i>Focus Group 2</i>)</p> <p>If [water] volumes go too far down, then that's going to have a fall out on the number of people that are visiting the state parks sites . . . the prime visuals are the waterfalls, the rapids. (<i>Focus Group 1</i>)</p> <p>But even with the art colony we have a couple of plein air festivals in the winter and in the summer. And without the beauty out the front door, you know, you're not going to have a successful plein air art festival. So I would say absolutely critical. Critical. (<i>Tourism professional</i>)</p> <p>I mean folks come up here to see moose all the time and are disappointed because they're not seeing moose. Well what's going on with the moose? We don't know, but we'll try to find out, try to find an answer to that. And I don't believe right now if all the moose disappeared the people would disappear as well and not come up here but, it's a draw. (<i>Government employee</i>)</p>
Sensitivity	Place identity	Social bonding	<p>This whole town, for me, is family. When I come here and I walk into the gas station, I have ten relatives there to talk to. So it's hard to describe it. (<i>Local elected official</i>)</p> <p>They're not just neat people because they show up, but they keep improving this thing. This place we call community. Purposefully. (<i>Non-profit employee</i>)</p>

		Personal values	<p>I think it's a highly educated population. We have a lot of retirees in the community that are here again because of the environment. Both the cultural and the natural environment. They bring a lot of skills with them. (<i>Business owner</i>)</p> <p>And certainly, an aesthetic dimension to many people, not just their colony, but people want to live there because it's pretty. (<i>Government employee</i>)</p>
		Substitutability	<p>If you don't like the outdoors you're probably not going to like living on the North Shore very well. (<i>Government employee</i>)</p> <p>You can just look out there, and dream about forever. To me, that's like nowhere else. (<i>Government employee</i>)</p> <p>Well, as the owner of the ski area, I would be concerned about what is happening to us locally, but also, we compete in a pretty direct sense with people deciding whether they want to fly to the western ski areas . . . If we're impacted in a way that would be worsening our business season, how does that compare to what is happening in the western places, if they are going to be hurt worse maybe that will offset some of how we're hurt? (<i>Business owner</i>)</p> <p>We are losing a pretty major archeological site into Lake Superior. We believe because of lake levels are aggregating it, winds and more high wave action . . . we are convinced we are getting rain events that are pretty big and at one time rather than steady. So you put all of those together, and we are losing archeological [sites] into Lake Superior. (<i>Government employee</i>)</p>
Vulnerability	Place satisfaction	Meeting expectations	[People] want to see the lake a certain way, and if they're not seeing it that way anymore, they're going to go [elsewhere] (<i>Focus Group 2</i>)
		Allure	Birding is very popular up here. And we have some of the best birding in the country in Superior National Forest. So again if those ranges of those birds change, and they are no longer up here, then that becomes less desirable. (<i>Focus Group 1</i>)

		Changing preferences	What is neat . . . is that we are also talking about a group of people that [are] somewhat of a blank state. They are not already coming up here to snowmobile and ski, so they are maybe more open to come up here and hike, and fat tire bike. (<i>Focus Group 1</i>)
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Some community leaders acknowledged that the North Shore tourism market was part of a larger system. Climate change is occurring in other destinations than the North Shore, and tourists may be considering the allure of those areas while considering the allure of the North Shore. High substitutability of a place combined with low substitutability of an activity means that a tourist would be expected to go to whichever place has suitable conditions for their activity. However, if the activity is highly substitutable but the place is not, tourists may keep going to the North Shore and will participate in an alternate activity when conditions are not suitable for their primarily desired activity. If both activity and place are un-substitutable then the tourist would logically be dissatisfied. Thus, substitutability will affect the sensitivity of the North Shore in a complex manner.

One community leader speculates on the loss of cultural sites that could be exacerbated by climate change. “We are not just losing renewable resources, we are losing one of a kind [resources]; they just don’t come back again” (*Government employee*). Some physical symbols of place meaning cannot be recovered once lost. Another community leader suggests that when climate change impacts her/his favored activities that s/he is open to change.

If I’m interested in weaving bark, I damn well better care about that tree . . . there’s a lot of people here who care about the northern landscape and recognize the threat that global warming pertains to their craft but also to their lifestyle. You know, I love to ski. I cross country ski. Well, the winters are getting shorter. I love

to paddle, you know, past pine trees. Well I'm open to other alternatives. (*Nonprofit employee*)

These two examples suggest there may be a range of sensitivity to climate change in the North Shore community depending on the substitutability of identities and meaning.

Place Satisfaction

Participants were concerned with changes they were seeing in natural communities. Many expected these changes to continue or worsen in the future and take away from the allure of the region. A loss of place symbols could decrease the allure of the region; if the region no longer has novel wildlife, tourists may not be inclined to drive as far for the chance of seeing moose. Some participants speculated that wildlife would suffer under a changing climate and changing landscape. Wildlife changes included concerns for moose populations, bird ranges, and cold-water fish.

The moose population has dropped considerably in the last five years . . . is it [because of] climate change? I don't know, but moose are really important resource to our community; tourists love moose . . . If it is [climate change] then I'm concerned. (*Government employee*)

If so much of what was expected out of a North Shore trip, such as certain wildlife species, tree species—all things that contribute to a sense of place that make for the “up north” experience—changes and is no longer novel, participants speculated that living or visiting the North Shore wouldn't be as rich of an experience as it is now.

If the temperature on average was 1.75 degrees warmer, or whatever number you want to pick, it would be a different place, and I would be concerned about that place not being attractive to live and recreate in. (*Government employee*)

Some community leaders were concerned about the anticipated variability to temperatures and seasonal conditions that climate change is anticipated to cause.

The timing of what the business people are used to, because when tourists start to arrive for a particular activity or if we have more or less snow . . . the more predictable climate of the past doesn't seem to be as predictable anymore. (*Government employee*)

Being able to predict conditions aids tourists in preparing for appropriate weather and activities. Winter has always been a slower and more challenging business season than summer and community leaders expressed concern that this season was shrinking, or that poor winter snowpack elsewhere in the state was fueling misperceptions about snow conditions on the North Shore. Perception of the North Shore is important to attract tourists to the area. If the reality of conditions do not match expectations then tourists may be dissatisfied with their trip.

However, a few community leaders mentioned that they have noticed changing tourist preferences. Some described this as a problem because the new tourists were hard to cater to since they had unknown preferences. Others saw this as an opportunity to start fresh and reimagine the North Shore experience by encouraging new clientele to pursue more versatile activities like

hiking and biking, and gradually move away from climate sensitive experiences like skiing and snowmobiling.

Adaptive Capacity

Adaptive capacity is the remaining component of vulnerability. When asked what priorities should be in the community (Appendix A) a few people had suggestions related to place concepts. For example, one participant said that place-based education would put climate change on a comprehensible level.

So it's just the matter of those aha moment[s] that you have to have with people up here . . . helping people to get to this self-discovery is something that is very much needed in this community, and it's literally a one person by one person . . . if these trees go then what's going to happen to your woods that you love so dearly?
(Government employee)

Some community leaders had a sense of responsibility and stewardship to the area and thought that the assets of the community needed to be protected. "Lake Superior is a draw. Seeing a moose is a draw. Getting out in that nice big stand of white pine is a draw. And we should try and take care of some of that"
(Government employee).

Community leaders were concerned that their opinions did not reflect the community as a whole and that the community was lacking a "shared sense of direction" (*Non-profit employee*). They suggested that the community needed to define their assets before they could be able to protect them. For example:

What are those assets? If there is a tier, what is most important, somewhat important, and less important? Let's articulate what those are, so then we can have some level of assurance of what to shoot for. (*Government employee*)

Participants described their communities on different scales: municipal, county, regional or tribal (Table 5). At the opening of an interview, participants were asked to identify their community so when the word was used in conversation, both the researcher and participant would know what was being described. This information was not recognized as an important theme until after data collection was complete and therefore was not collected from the focus group participants. Another theme that emerged from the data was inconsistent collaboration in the region; if community leaders were to collaborate on climate adaptation in the future, relationships within the region would need to be strengthened.

Table 5: Self-identified community of interview participants

Community identity	Number of participants
North Shore Region	6
Cook County	5
Finland	3
Grand Marais	9
Grand Portage	1
Gunflint Trail	1
Lutsen	2

Adaptive capacity is a vulnerability component that community leaders and residents have potential to influence. A collective community place-identity

may lessen vulnerability by preserving and enhancing meaning and quality of life in the North Shore community. Further research is needed in order to build this component into a place and vulnerability framework.

Discussion

Incorporation of place meanings into climate change vulnerability assessments addresses the current absence of social values from many adaptation plans. Addressing place meanings gives communities an opportunity to determine what is meaningful to them and facilitates the discovery of shared values. Our model links vulnerability, exposure, and sensitivity to place satisfaction, place dependence, and place identity, respectively.

Exposure, the degree of impacts to the community, is analogous to place dependence. If people are unable to access a location due to road washout, or if snow is not present for snow-based recreation, they will be unable to fulfill their needs and may go elsewhere to find that activity. A place is more or less sensitive depending on how substitutable that need is. If the planned activity can be changed to one that is possible in the climate-changed conditions, then the community is less vulnerable. However, if a compromised activity, condition, or place is irreplaceable, then tourists may be unhappy with the area and the region becomes more vulnerable. For example, a dissatisfied tourist could be expected to be less likely to refer others to the area. Place satisfaction, the contentedness with a place, is most like vulnerability in an NRT community. If tourists are not satisfied with their experiences or if they are not drawn to the North Shore region, then the community could lose their sustaining visitor base which would mean they are more vulnerable to change. If conditions do not change in such a way that decreases tourist satisfaction, or if changing visitor preferences open up new

opportunities that attract them to the region, then the community is less vulnerable.

In our study, participants identified their community on different scales. Some individuals identified on a municipal scale (Grand Marais), others on a county scale (Cook County) and others on a regional scale (the North Shore). These boundaries may influence the willingness to work across communities and to share resources for those that identify on a small scale. The challenge of conflicting community identities remains a problem, and must first be addressed by community leaders before cultivating a sense of place. However, mixed messaging was said to be a current problem in the region. Some community leaders suggested a strong need for leadership and consistent climate change messaging. Therefore, we recommend the North Shore community develop a comprehensive climate change adaptation plan that treats the region as a whole. Grand Marais and Grand Portage are affected by any access problems that happen south along scenic Highway 61. Smaller communities like Schroeder and Little Marais and Finland may benefit from the resources and collective action of their larger, northern communities. The community of Two Harbors may be too far removed from the challenges faced by their smaller neighbor communities, but regionally operating, Two Harbors-based recreation and tourism business owners and leaders should be included in the conversation, as they also have a stake in the future of the North Shore.

As many of our participants were concerned that their perspectives are not reflected by the community, we recommend further qualitative research on place meanings and other social values to better understand how individuals connect to each other and their landscape. This is a limitation of our analysis. We are left asking, will the greater community reflect the desire of community leaders to cultivate a shared sense of place? It would be ineffective for community leaders to move forward on an adaptation plan that doesn't resonate with the greater community. Thus, community leaders must take the place-vulnerability framework from this study and apply it to their constituents. Community leaders will then be able to incorporate the place attachments shared by community members into local climate change adaptation planning.

The degree of exposure and sensitivity the community experiences may inevitably cause the loss of some place meanings. The community will need to understand how much change it can handle before it becomes a new place. Adaptive capacity is the construct that offers communities the opportunity to shape their identity in a changing world. Capacity building can be addressed through the cultivation of a shared community identity, regional collaboration, and strategic planning and marketing. For example, Including a visioning process as a part of adaptation planning will allow for the exploration of ways shared place values can (or cannot) manifest in a changed physical environment. As one participant said, "So, our heritage and our culture is slipping away, but we have an opportunity to build and grow a new one" (*Focus Group 1*).

Conclusions

This study's participatory approach with community leaders has enhanced the conversation on climate adaptation in the community. By focusing on community leaders, this research has offered practical tools (e.g., framework of community vulnerability) to continue adaptation planning in the community. This study has contributed to the literature around climate change adaptation by presenting a theoretical model to incorporate place concepts into the widely used vulnerability model. The data are contextually specific to the North Shore (e.g., the scenic beauty of Lake Superior) but the concepts they have been gathered under (e.g., place dependence) are universal. Thick description of the data within these conceptual categories creates transferability of our theoretical model. Researchers and practitioners can interpret their own instances of place concepts using this framework. This model can be applied to other NRT communities to assess their vulnerability to climate change in meaningful terms (e.g., place concepts) and begin building their adaptive capacity to reduce vulnerability.

The irreplaceable loss of some aspects of identity and meaning (Adger et al., 2011) cannot be addressed by adaptation. Place meanings may have to change on the North Shore and elsewhere. Preservation of conditions that support the physical subjects of place meanings must be met by global mitigation efforts that reduce climate change exposure. In the meantime, local communities

can reduce their vulnerability to climate change while global mitigation efforts continue.

Epilogue

Findings of this paper and select results of the multi-method project were disseminated to the community in a set of community workshops in March 2016 and May 2016. This study has sparked conversation in the study community regarding climate change adaptation and the future of the North Shore under changing place meanings. A project website is maintained at www.northshoreclimate.com as a resource for community members and researchers. It is the author's hope that the community will move forward with climate adaptation planning and that discussions on place meanings will be an important part of that process.

On its own, this paper is a valuable theoretical exploration into the perspectives of an NRT community about the future of place meanings under climate change. Place meanings will change as the climate changes; it is up to the people that value them to articulate their importance and take the initiative to move forward with mitigation and adaptation efforts that alleviate these psychological distresses of climate change. Researchers can facilitate this process for practitioners by furthering understanding of how the physical landscape contributes to place meanings and by offering practical suggestions on how a sense of place can be maintained when that physical environment changes.

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Appendix A: Interview Guide

In our study we are interested in perspectives on community assets; changes to natural, recreation and tourism resources; as well as community responses to these changes. Our study communities include Grand Marais, Lutsen, and Finland. We are also interested in the “North Shore” as a community. What community would you say you are most familiar with?

1. How would you describe your connection to this community?
 - a. Could you describe for me some of your work responsibilities or activities in the community?

First, I have a few questions about the community’s assets.

2. What are some of the best things about the [North Shore, Grand Marais, Lutsen, Finland] community?
3. What draws people to visit the community?
4. What makes this community unique from other communities in the area?
 - a. How would you describe the community to someone who has never been here before?
5. How important are natural resources and the environment to...
 - a. Recreation and tourism in the area? Please explain.
 - b. Area residents’ quality of life? Please explain.
 - c. The local economy? Please explain
6. Do you think that people who visit become attached to the North Shore?

Next, I’d like to ask some specific questions about natural resources and the environment in the community. For clarity, I’ll just generally refer to “natural resources” but that may include all aspects of the natural environment including water.

7. Have there been any significant changes or impacts to natural resources on the North Shore in the past 5 years? Please explain.
 - a. What were the effects of these changes on the community?
8. Are you concerned about future changes or natural resource impacts? Please explain.
9. Some people we have talked to in the community are concerned specifically about climate-change and related natural resource impacts. What are your perspectives on this issue?

Now, I’d like to ask some questions about nature-based recreation and tourism in the community. I will use the term “recreation and tourism resources” as a general term to include experiences visitors have, as well as facilities, services, and industries across the private and public sectors.

10. Have there been any significant changes or impacts to recreation and tourism resources on the North Shore in the past 5 years? Please explain.
 - a. What were the effects of these changes on the community?
11. Are you concerned about future changes or impacts to recreation and tourism resources? Please explain.
12. Some people we have talked to in the community are concerned specifically about climate-change and related impacts to recreation and tourism resources. What are your perspectives on this issue?

Now, I have a few questions about your community’s responses to problems.

13. Who is most likely to get involved in natural resource issues in the community?
 - a. Are individual community members actively engaged in natural resource issues? Please explain.
 - b. Are business owners actively engaged in natural resource issues? Please explain.
 - c. Are local community groups actively engaged in natural resource issues? Please explain.
 - d. Are local government entities actively engaged in natural resource issues? Please explain.
 - e. Are non-profit organizations actively engaged in natural resource issues? Please explain.
14. What types of resources do these groups bring to address the problem?
15. Are there other individuals, groups, resources or approaches that are needed?
16. Who is most likely to get involved in recreation and tourism resource issues in the community?
 - a. Are individual community members actively engaged in recreation and tourism resource issues? Please explain.
 - b. Are business owners actively engaged in recreation and tourism issues?
 - c. Are local community groups actively engaged in recreation and tourism resource issues? Please explain.
 - d. Are local government entities actively engaged in recreation and tourism resource issues? Please explain.
 - e. Are non-profit organizations actively engaged in recreation and tourism resource issues? Please explain.
17. What types of resources do these groups bring to address the problem?
18. Are there other individuals, groups, resources or approaches that are needed?

Finally, I have just a few closing questions

19. To sustain those community assets you described earlier into the future, what do you believe should be the biggest priorities of decision makers and managers in the community?
20. Is there anything else you'd like to add about your community or its natural and recreation/tourism resources?
21. Who else should we talk to?
 - a. Who has a different perspective to offer?
22. We are putting together a Project Advisory Team from natural resource and tourism experts who are interested in continued participation in our research project. PAT members will be contacted to share expertise on critical parts of the research design and development. Are you interested in being part of the PAT?

Appendix B: Focus Group Script

CCR Focus Group (1 and 2) Script

1. Welcome and agenda (2:30 - 10 min): Researcher A

Hello everyone and welcome. My name is _____. I am [*self-introduction*] We are hosting this focus group to explore your perspectives on Climate, Recreation and Tourism Resources on the North Shore and to present some very preliminary project findings for us to discuss. Thank you for joining us today. This focus group is part of a larger research project led by the University of Minnesota to assess and build community climate readiness on the North Shore. We are joined here today by students and researchers from UMN and North Carolina State University, our partners in this project. (*Name each.*)

Agenda

I have today's agenda here. Let's take a minute or two to look it over together. (*Walk through day's agenda.*)

Roles

Your role today is to share your thoughts and opinions and to listen to the thoughts and opinions of others. **There are no right or wrong answers.** We invite ideas that may differ from what others have said. The success of this process depends on your willingness to think creatively, voice your ideas, listen to others' ideas, and maintain an open mind.

I will play the role as facilitator the others will be assisting me throughout. As a facilitator, my job is to direct the flow of conversation and make sure that everyone has the opportunity to participate. I am also responsible for keeping us on task and on time, so I may need to interrupt discussions to make sure we stay on target. I know everyone's time is valuable. We hope to work together to make the most of the next two hours and will end on time.

Before we begin, I want to ask you to please check your cell phones and make sure they are silenced or turned off. Also, if you should need to use the restroom, they are _____. Feel free at any time to help yourself to the refreshments at any time.

2. Introductions and ice-breaker (go-around) (2:40 - 5 min) Researcher A

While many of you may already be acquainted with one another, I would like to start by letting you all introduce yourselves. Let's go around the room and, one at a time please tell us your name, what do you do, and one thing that inspires you about the work you do on the North Shore.

3. Project Overview and Current Data Collection Efforts(2:45 - 15 min) Researcher A and B

At this point I would like to share with an overview of the project and further details on some specific data collection efforts.

Q1: What observations do you have about what we've heard so far? Did anything surprise you? Do you have any other comments about the material presented?

4. Participatory Risk Mapping (3:00 - 15 min) Researcher C and D

5. Break (3:15 – 5 min)

It is now time to take a break. To help keep the day on time we ask that everyone is back and ready to start in 5 minutes at 10:20. As a reminder restrooms are ____ and please help yourself to refreshments.

6. Climate Impacts Discussion (3:20 - 25 min) Researcher A and B

The remainder of the focus group we will be discussing two topics: Climate Impacts and Community Readiness. We will be documenting your responses on flipchart paper.

First, let's take a look at some results from our focus group pre-survey to help frame our discussions (Qs 14, 1-5).

Q2: *What observations do you have? Did anything surprise you? Do you have any other comments?*

Q3: *In what ways might climate affect recreation and tourism on the North Shore?*
(Participants brainstorm, list on flipchart, prioritize with stickers)

7. Community Readiness Discussion (3:45 - 25 min) Researcher A and B

Next, let's take a look at a few more results from our focus group pre-survey (Qs 6-8).

Q4: *What observations do you have? Did anything surprise you? Do you have any other comments?*

Q5: *In what ways are North Shore Communities **ready or prepared** for climate impacts to recreation and tourism resources? (Participants brainstorm, list on flipchart)*

Q6: *In what ways are North Shore Communities **NOT ready or unprepared** for climate impacts to recreation and tourism resources? (Participants brainstorm, list on flipchart)*

8. Closing (4:10 - 10 min) Researcher A

We have just a few more minutes now and one question item before we wrap up. We are interested to know from you...

Q7: *Based on what you've heard and discussed today, what do you see as future priorities for community climate readiness building on the North Shore? What resources are needed?*

9. Focus Group Reflection (4:20 - 10 min) Researcher A

Q8: *Is there anything else we should know as we continue this project? Suggestions? What else would you like to know about the project?*

Thank you all so much for your participation today. Your input has been extremely valuable. We will be available after the session to answer any specific questions about the project or if you have anything else you would like to share with us.

CCR Focus Group (3) Script

1. Welcome and agenda (9:30 - 10 min): Researcher A

Hello everyone and welcome. My name is _____. I am [*self-introduction*]. We are hosting this focus group to explore your perspectives on Climate, Recreation and Tourism Resources on the North Shore and to present some very preliminary project findings for us to discuss. Thank you for joining us today. This focus group is part of a larger research project led by the University of Minnesota to assess and build community climate readiness on the North Shore. We are joined here today by students and researchers from UMN and North Carolina State University, our partners in this project. (*Everyone introduces themselves.*)

Agenda

I have today's agenda here. Let's take a minute or two to look it over together. (*Walk through day's agenda.*)

Roles

Your role today is to share your thoughts and opinions and to listen to the thoughts and opinions of others. **There are no right or wrong answers.** We invite ideas that may differ from what others have said. The success of this process depends on your willingness to think creatively, voice your ideas, listen to others' ideas, and maintain an open mind.

I will play the role as facilitator the others will be assisting me throughout. As a facilitator, my job is to direct the flow of conversation and make sure that everyone has the opportunity to participate. I am also responsible for keeping us on task and on time, so I may need to interrupt discussions to make sure we stay on target. I know everyone's time is valuable. We hope to work together to make the most of the next two hours and will end on time.

Before we begin, I want to ask you to please check your cell phones and make sure they are silenced or turned off. Also, if you should need to use the restroom, they are

_____. Feel free at any time to help yourself to the refreshments at any time.

Sign Consent Form, Background Information, and Photo Release Form

Recorder should start if not yet started

2. Introductions and ice-breaker (go-around) (9:40 - 5 min) Researcher A

While many of you may already be acquainted with one another, I would like to start by letting you all introduce yourselves. Let's go around the room and, one at a time please tell us your name, what do you do, and one thing that inspires you about the work you do on the North Shore.

3. Project Overview and Current Data Collection Efforts(9:45 - 15 min) Researcher A, B, and C

At this point I would like to share with an overview of the project and further details on some specific data collection efforts. Introduce absent partners in the project. Continue with power point.

Q1: What observations do you have about what we've heard so far? Did anything surprise you? Do you have any other comments about the material presented?

4. Climate Impacts Discussion (10:00 - 25 min) Researcher A, B and C

The remainder of the focus group we will be discussing two topics: Climate Impacts and Community Readiness. We will be documenting your responses on flipchart paper.

First, let's take a look at some results from our focus group pre-survey to help frame our discussions (Qs 14, 1-5).

Q2: What observations do you have? Did anything surprise you? Do you have any other comments?

Q3: In what ways might climate affect recreation and tourism on the North Shore?
(Participants brainstorm, list on flipchart, prioritize with stickers)

5. Break (10:25 – 5 min)* Can be flipped with 6 if previous conversation leads into Question 6 discussion

It is now time to take a break. To help keep the day on time we ask that everyone is back and ready to start in 5 minutes at 10:30. As a reminder restrooms are ____ and please help yourself to refreshments.

6. Geographic Vulnerabilities Discussion 10:30 – 15 min)* Researcher D and E

Now we would like to focus on identifying vulnerable resources in terms of geography. These locations can be of any size. There are 3 categories and we will make a list for each one. At

the end we will vote on the top three most vulnerable for each category. Please use the map on the power point as a reference.

Q4: A. *What are built structures that are vulnerable to climate change? Built structures can include roads, bridges, culverts, etc. (Participants brainstorm, list on flipchart)*

B. *What are natural resource locations that are vulnerable to climate change? Natural resource locations can include bodies of water, parcels of land, etc. (Participants brainstorm, list on flipchart)*

C. *What are recreation and tourism destinations that are vulnerable to climate change? Recreation and tourism locations can include destinations such as businesses, trails, etc. (Participants brainstorm, list on flipchart)*

D. *Out of these lists, what are the top three most vulnerable resources for each category? (Participants vote, star on flipchart)*

7. Community Readiness Discussion (10:45 - 25 min) Researcher A, B and C

Next, let's take a look at a few more results from our focus group pre-survey (Qs 6-8).

Q5: *What observations do you have? Did anything surprise you? Do you have any other comments?*

Q6: *In what ways are North Shore Communities **ready or prepared** for climate impacts to recreation and tourism resources? (Participants brainstorm, list on flipchart)*

Q7: *In what ways are North Shore Communities **NOT ready or unprepared** for climate impacts to recreation and tourism resources? (Participants brainstorm, list on flipchart)*

8. Closing (11:10 - 10 min) Researcher A

We have just a few more minutes now and one question item before we wrap up. We are interested to know from you...

Q8: *Based on what you've heard and discussed today, what do you see as future priorities for community climate readiness building on the North Shore? What resources are needed?*

9. Focus Group Reflection & Future Steps (11:20 - 10 min) Researcher A, B and C?

Q9: *Is there anything else we should know as we continue this project? Suggestions? What else would you like to know about the project?*

Thank you all so much for your participation today. Your input has been extremely valuable. We will be available after the session to answer any specific questions about the project or if you have anything else you would like to share with us. Moving forward, we would like to include you on our Project Advisory Team. Our Project Advisory Team a group of individuals who are interested in ongoing participation in the project. Members serve largely as our resource for feedback when we are drafting a survey or planning a workshop. Participation is voluntary and you can decline at any time. We will include everyone here on the PAT unless you request otherwise – please let [Researcher A] know if you do not wish to be contacted about the project.

Appendix C: Consent Form

Building Climate Readiness in Nature-Based Tourism-Dependent Coastal Communities Consent Form

You are invited to participate in a research study that explores community readiness to respond to impacts of climate change on the North Shore. You were selected as a possible participant for an interview because you are currently living or working in the North Shore area. We ask that you read this form and ask any questions you may have before agreeing to be in the study. This study is being conducted by: Mae Davenport, Associate Professor at Department of Forest Resources, University of Minnesota.

Background Information

The purpose of this study is to better understand what impacts climate change will have on the nature-based tourism economy along the North Shore. The study also aims to identify the tools and resources available for the community to respond to these changes; and make recommendations to further prepare for potential future scenarios.

Procedures:

If you agree to be in this study, we would ask you to do the following thing:
Participate in an interview, lasting approximately 60 minutes. The interview will be audio recorded and transcribed.

Risks and Benefits of being in the Study

Risks associated with this study are minimal, responses are confidential and names will not be linked to any information in any publications. Benefits of participation include increased awareness of resources and tools in place to adapt to impacts of climate change. Study results will be made available to the public and all participants will have access to them.

Confidentiality:

The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records. Your responses to the interview questions will be audio recorded, transcribed and kept for three years in a locked office. Afterward, these tapes will be destroyed. Only those directly involved with the project will have access to the audio tape of the interview notes.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is: Mae Davenport. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at address: 115 Green Hall 1530 Cleveland Ave. North, St. Paul, MN 55108-6112, phone: 612-624-2721, email: mdaven@umn.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650. ***You will be given a copy of this information to keep for your records.***

Statement of Consent:

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

"I agree_____ I disagree_____ to have my responses audio recorded"

"I agree_____ I disagree_____ that Mae Davenport may quote me anonymously in her papers"

Signature:_____ Date: _____

Signature of Investigator:_____ Date: _____

Appendix D: Interview Background Information Form

ID#: _____

Date: _____

North Shore Coastal Climate Readiness Assessment

Participant Demographic Information

Age:

Highest level of formal education:

Years lived in community:

Occupation:

Gender:

Race/Ethnicity:

Community groups/organizations/agency:

Appendix E: Focus Group Background Information Form

Focus Group Background Information Form (010915)

We would like to know more about your background. This information will only be used as group data and will remain completely confidential.

1. Are you _____ female _____ male?
2. What is your year of birth? _____
3. Which answer best describes where you lived longest while growing up? (Check one)
 - Rural (farm)
 - Rural (non-farm)
 - Small Town (<10,000)
 - Large Town (10,000 - 100,000)
 - City (>100,000)
 - Suburban Area
4. How long have you lived within 50 miles of your current residence? _____ years
5. What is the highest level of formal education you have completed? (Check one)
 - 8th grade or less
 - Some high school
 - High school graduate or GED
 - Some college, business or trade school
 - College graduate
 - Some graduate school
 - Masters, doctoral or professional degree
6. In what ethnicity and race would you place yourself?

Ethnicity	<input type="checkbox"/> Hispanic or Latino
	<input type="checkbox"/> Not Hispanic or Latino
Race	<input type="checkbox"/> American Indian or Alaska Native
	<input type="checkbox"/> Asian
	<input type="checkbox"/> Black or African American
	<input type="checkbox"/> Native Hawaiian or other Pacific Islander
	<input type="checkbox"/> White
10. What is your occupation? _____
11. With what organization/agency are you employed?

12. How many years have you been employed by this organization/agency? _____