

ABSTRACT

McCREARY, ALLIE. A Place-Based Framework for Assessing Climate Change Impacts to Nature-Based Tourism: Why Attributes, Meanings, and Activities Matter. (Under the direction of Erin Seekamp and Jordan W. Smith.)

The concept of ‘place’ can be used to assess both the physical and socio-cultural impacts of climate change on nature-based tourism (NBT) communities. To this end, this dissertation addressed three research questions: (RQ1) what are the key physical attributes visitors ascribe meaning to in a NBT region?; (RQ2) how do place meanings influence visitors’ behavioral and cognitive coping responses to changes in NBT environmental conditions?; and (RQ3) how do place meanings affect how visitors cope with climate-related impacts to their desired outdoor recreation pursuits? The context of the study was the North Shore region of Lake Superior in Minnesota (USA), an area known for high quality natural amenities and outdoor recreation opportunities. Qualitative data, photographs and captions describing a NBT destination, were thematically analyzed to address RQ1. An on-site, visitor intercept survey provided data to answer RQ2 and RQ3. Findings for RQ1 revealed the key physical attributes of the destination’s image are the area’s natural resources and built infrastructure, which provide opportunities for social bonding. Findings for RQ2 revealed place meanings are strong predictors of behavioral coping responses to past climate-related impacts; however, general climate change concern (rather than specific place-based meanings) was the dominant influence on cognitive responses (i.e., climate-related risk perceptions). Findings for RQ3 suggest visitors will engage in activity substitution, more so than temporal or spatial substitution, as the region’s outdoor recreation settings change in response to a shifting climate. Collectively, this study refines the theoretical understanding of place, particularly in the context of NBT and managing for outdoor recreation benefits in the

face of climate uncertainty. Practically, this study can (1) inform recreation providers' inventory, monitoring, management, and prioritization of recreation resources for climate adaptation planning, and (2) guide place-based marketing efforts to diversify tourism opportunities and foster strong place meanings among visitors.

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A Place-Based Framework for Assessing Climate Change Impacts to Nature-Based Tourism:
Why Attributes, Meanings, and Activities Matter

by
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DEDICATION

This dissertation is dedicated to natural and recreation resource managers, planners, policy-makers, and administrators – from all sectors, – who acknowledge the impending threats and opportunities climate change poses to nature-based tourism and outdoor recreation, and are responding through science-based approaches to adaptation.

BIOGRAPHY

Allie McCreary was born and raised in Columbia, Illinois, USA a suburb of St. Louis, Missouri. An adolescence influenced largely by outdoor recreation experiences directed her towards a career path in in the human dimension of natural resources. She obtained her Bachelors of Science degree in Outdoor Recreation Resources Management, with a minor in Environmental Studies, from Southern Illinois University - Carbondale (SIUC) in 2008. Experiences working for the USDA Forest Service as a seasonal recreation and timber technician and in the private environmental education sector eventually led Allie back to SIUC to complete a Masters of Science degree in Human Dimensions of Natural Resources Management in 2010. Next, Allie joined the staff at HeartLands Conservancy, providing community-based park, open space, and alternative transportation planning and mapping services and working with private landowners to permanently protect their land through agricultural or conservation easements. While appreciative of her experiences in the non-profit sector, Allie's true interest remained within research, instruction and outreach at a university setting. Allie returned to academia and completed her Doctor of Philosophy degree in Parks, Recreation and Tourism Management, with a certificate in Geographic Information Systems, at North Carolina State University in 2017. She is interested in exploring how environmental change, emerging technologies, and partnerships are influencing the management of parks and protected areas.

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CHAPTER 1: Introduction

In many natural resource-rich regions, communities are supplementing, or transitioning away from, resource extractive economies to economies built on nature-based tourism (NBT) (Smith et al., 2016; Smith & Krannich, 2000). NBT includes such outdoor recreational activities as fishing, boating and swimming in waterbodies, hiking and camping in parks and protected areas, scenic driving, gathering wild foods (e.g., berries), and observing or photographing wildlife or other natural features (e.g., waterfalls, sunrise/sunset). A NBT economy typically supports a large number of primary recreations providers (outfitters, guides, park managers) and business that cater to outdoor recreationists and tourists (restaurants, lodges, gear shops, gas stations, etc.).

The benefits associated with NBT and outdoor recreation include social (e.g., builds stronger families), personal (e.g., improves individuals' physical and mental health), economic (e.g., generates regional growth and/or stability), and environmental (e.g., results in high quality ecosystems) returns (Manning, 2013). However, such beneficial outcomes of NBT may be threatened by climate change. For example, climate change can alter the recreation setting itself and, subsequently, the types and quality of experiences they are able to support (Coombes, Jones, & Sutherland, 2009; Dawson, Havitz, & Scott, 2011; Fisichelli, Nicholas, Schuurman, Monahan, & Ziesler, 2015; Gossling & Hall, 2006; Lise & Tol, 2002; Scott, Jones, & Konopek, 2007; Scott, McBoyle, Minogue, & Mills, 2006; Smith et al., 2016). Literature aimed at understanding impacts of climate change to natural resources in NBT areas can provide important insights into when and where impacts will occur (Ayscue, Curtis, Hao, & Montz, 2015; S. Nicholls, 2006; Scott, McBoyle, & Schwartzentruber, 2004; Shaw et al., 2009). However, there is also a need to understand the social-psychological

factors that influence visitors' recreation behaviors and perceptions of climate change in NBT destinations (Smith et al., 2016; Weaver et al., 2014). The integration of social science—specifically, research on the attributes, meanings, and activities most important to NBT visitors of a specific locale—with data on the physical impacts of climate change enhances NBT communities' understanding of the complex relationship between environmental conditions, visitor behaviors, and the sustainability of the beneficial outcomes of NBT (Weaver et al., 2014).

The aim of this dissertation is to revisit an original definition of place – defined as the attributes, meanings, and activities of/within a location (Relph, 1976) – as a lens through which to explore how climate change may impact NBT. Assessing place as the gestalt of these three components may enhance researchers understanding of how to approach place-based management and marketing. Place-based management is used by natural resource and outdoor recreation professionals to strategically manage resources based on the multiple meanings and utilities of the space (Davenport & Anderson, 2005; Interagency Visitor Use Management Council, 2016). Place-based marketing and branding is the consideration of multiple, complex uses and identities of a place, with intentions of creating welcoming and vibrant communities for residents and visitors (Kavaratzis & Hatch, 2013). The research presented in this dissertation was conducted with the goal of advancing the theoretical and practical understanding of place, particularly in the context of climate change and NBT. This dissertation calls for a broader consideration of the data contributing to place-based management and marketing, including place meanings, alongside physical attributes and key activities of a NBT location.

A place-based approach

The concept of 'place' has been used in various disciplines (sociology, geography, environmental studies, psychology, planning, and human health) to understand how individuals' residence or the outdoor recreation settings they visit influences various aspects of their lives (Seamon & Sowers, 2008) (see Figure 1). The earliest research regarding place established how this concept is defined, distinct of space, by three main components: (1) physical attributes, (2) the meanings individuals and groups assign, and (3) the activities which occur within those spaces (Relph, 1976). Other research has built on this foundational understanding of place by exploring how 'sense of place,' or one's relational and affective operationalization of space, is manifested and maintained (Tuan, 1974).

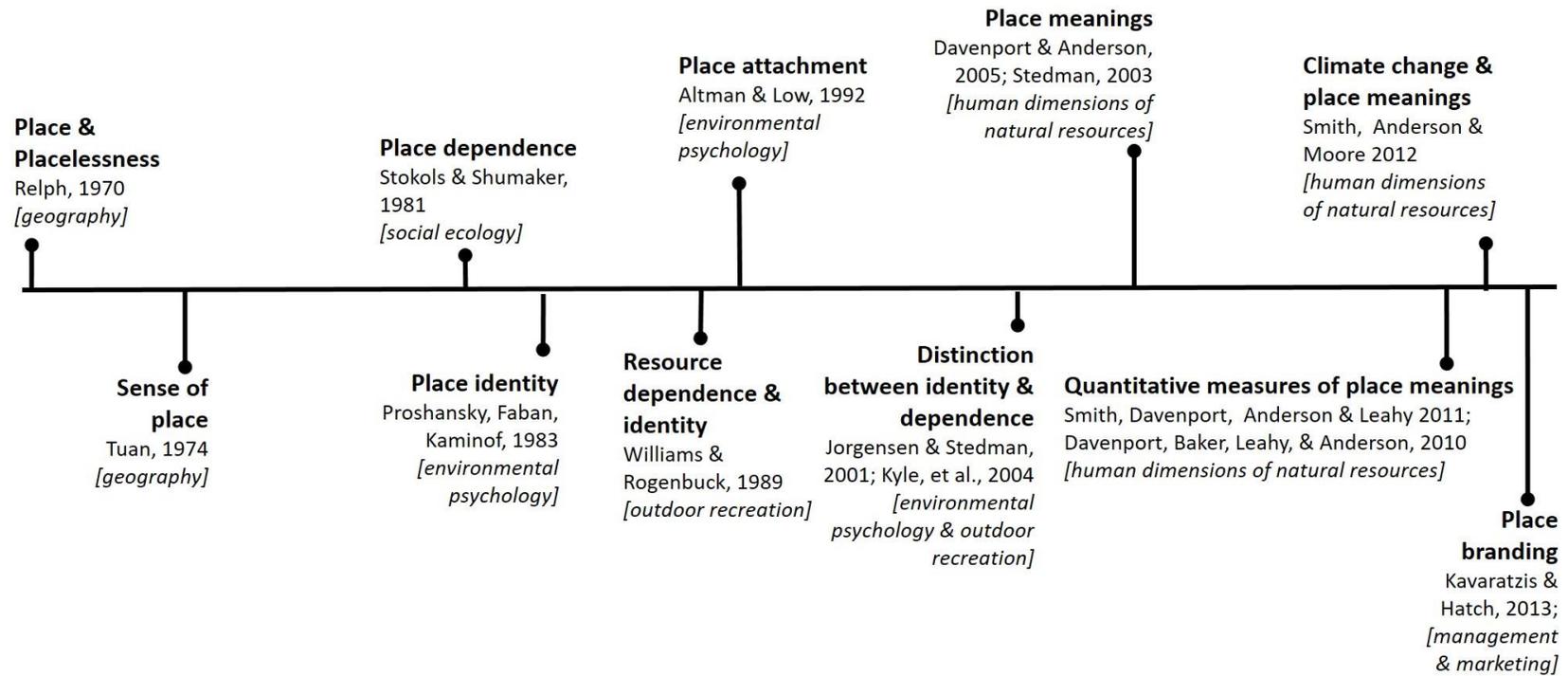


Figure 1. A selected history of place-related literature.

The prevailing trajectory of place research has explored the affective component of place: attachment, identity, and dependence on a place (Altman & Low, 1992; Proshansky, Faban, & Kaminof, 1983; Stokols & Shumaker, 1981; Williams & Roggenbuck, 1989). More recently, place meanings were posited as the functional, descriptive foundations of affective ties (Davenport & Anderson, 2005). Place meanings are the values individuals assign to geographic spaces and can range from the abstract (e.g., a place of spiritual significance) to the tangible (e.g., one's business location is dependent on a particular place). Place meanings have been reliably measured through quantitative survey items, which further operationalize place meanings into various dimensions such as individual identity, family identity, community identity, self-expression, ecological integrity, economic dependency, and place dependency (Kil, Holland, & Stein, 2014; Smith, Anderson, & Moore, 2012). Additionally, qualitative studies have used personal narratives to explore place meanings specific to a geographic space, such as a river valued for providing sustenance, economically and hydrologically, by residents of communities along a waterway (Davenport & Anderson, 2005). Collectively, research has demonstrated that place meanings are related to recreation behaviors (Budruk & Stanis, 2013; Dawson et al., 2011; Kyle, Graefe, Manning, & Bacon, 2004), physical characteristics of the landscape (Stedman, 2003), natural resource-rich communities (Williams & McIntyre, 2001), and land management preferences or values (Davenport & Anderson, 2005; Smith, Davenport, Anderson, & Leahy, 2011).

Place meanings have also been used to evaluate climate change impacts, adaptation, resilience, and communication. For example, Smith et al. (2012) found that individuals with higher levels of place attachment are more likely to be 'engaged' with climate change, or willing to learn about and plan for impacts. However, the direction of this relationship is

uncertain; theoretical arguments support both the idea that place bonds increase risk perceptions and that imminent threats (e.g., risks) enhance emotional bonds (Scannell & Gifford, 2013). Adger, Barnett, Chapin, and Ellemor (2011) argue that the greatest threats from climate change to all human populations will be the impacts to meanings, values, and attachments to places rather than material losses. Uncovering these rich relationships between place meanings and climate change, has led to a call for the continued use of a place-based lens in planning for adaptation to climate change (Chapin & Knapp, 2015; Moser & Boykoff, 2013).

Problem Statement and Study Objectives

Climate change is predicted to impact many sectors of human life, including the supply and demand of outdoor recreation resources (Nicholls, 2014; Scott, Freitas, & Matzarakis, 2009). NBT communities are particularly sensitive to climate-related impacts to tourism as they depend on the ‘pull’ of natural resources to draw visitors into their communities, parks, protected areas, and local businesses (Richardson & Loomis, 2005; Scott et al., 2007, 2004). Many NBT communities are beginning to assess their level of adaptive capacity or climate readiness as a first step and planning strategically for a climate impacted future (e.g., Hogarth & Wójcik, 2016; Murphy, Wyborn, Yung, & Williams, 2015; Scott, Gossling, & Hall, 2012). Place-based planning initiatives, which are holistic, stakeholder-driven processes that consider emotional attachments and place meanings rather than singular resource management objectives (Farnum & Kruger, 2008), may be an appropriate framework for assessing adaptive capacity for both potential physical and social climate-related impacts. While many place-based research studies have focused on understanding multiple meanings attributed to a site (e.g., Davenport & Anderson, 2005), this

dissertation aims to assess place through three components of place: attributes, meanings, and activities (Relph, 1976).

Following Relph's (1976) definition, this dissertation has three objectives to correspond with each component of place (see Table 1). The objectives of this study are to (1) explore the *physical attributes* of a place through imagery of as NBT destination, (2) gain an understanding of how *place meanings* are related to visitors' behavioral (i.e., recreational coping) and cognitive (i.e., risk perceptions) responses to climate change, and (3) understand how place meanings and current trip characteristics are related to future *activity* (i.e., recreation substitution in response to climate change). A multi-methods research approach (Creswell, 2013) was employed (i.e., qualitative and quantitative data were collected in parallel and analyzed separately) to assess the three-dimensional identification of place. Qualitative data were used to explore (Objective 1) physical characteristics of place. Quantitative survey data was used to test relationships between place meanings and (Objective 2) behavioral (coping) and cognitive (perceptions) responses and (Objective 3) future outdoor recreation substitution activity.

Table 1. Dissertation manuscript objectives.

Manuscript:	1	2	3
Component of place:	Attributes	Meanings	Activities
Objective:	Explore the <i>physical characteristics</i> of place as conceptualized through images of a NBT destination	Assess how visitors' <i>place meanings</i> are related to (a) past coping behaviors and (b) future risk perceptions	Understand how climate change may influence future recreation <i>activities</i> (i.e., substitution)
Data:	Qualitative data: photographic images and captions	Quantitative, on-site visitor survey data	Quantitative, on-site visitor survey data
Other variables of interest:	n/a	(a) individual attributes (gender, age) and (b) past impact, perceived efficacy, climate change concern	Place meanings, current trip characteristics (visit anticipation, destination loyalty, distance traveled)

Research Design

Study Setting

The NBT context for this study is the ‘North Shore’ region located along the northwestern edge of Lake Superior, in northeastern Minnesota, extending from Two Harbors, MN in the south to the Canadian border in the north. The study area (Figure 2) was defined using HUC-8 watershed boundaries to delineate a NBT destination dominated by the presence of public parks and protected areas (i.e., state parks, state forests, national forest) and natural resource dependent communities and economies. Tourism on the North Shore during the summer season is characterized by water-based recreation (boating, fishing,

swimming/wading) and forest-based pursuits (hiking, scenic driving, camping). Recreation and tourism resources include the prevalent public lands and small, locally-owned business, outfitters, guides, lodges, and restaurants. While the North Shore includes some inland areas (e.g., the Lake Superior Hiking Trail), the majority of NBT sites are located along the coast, including eight Minnesota State Parks, scenic waysides along state highway 61, shops and historic sites, and communities.

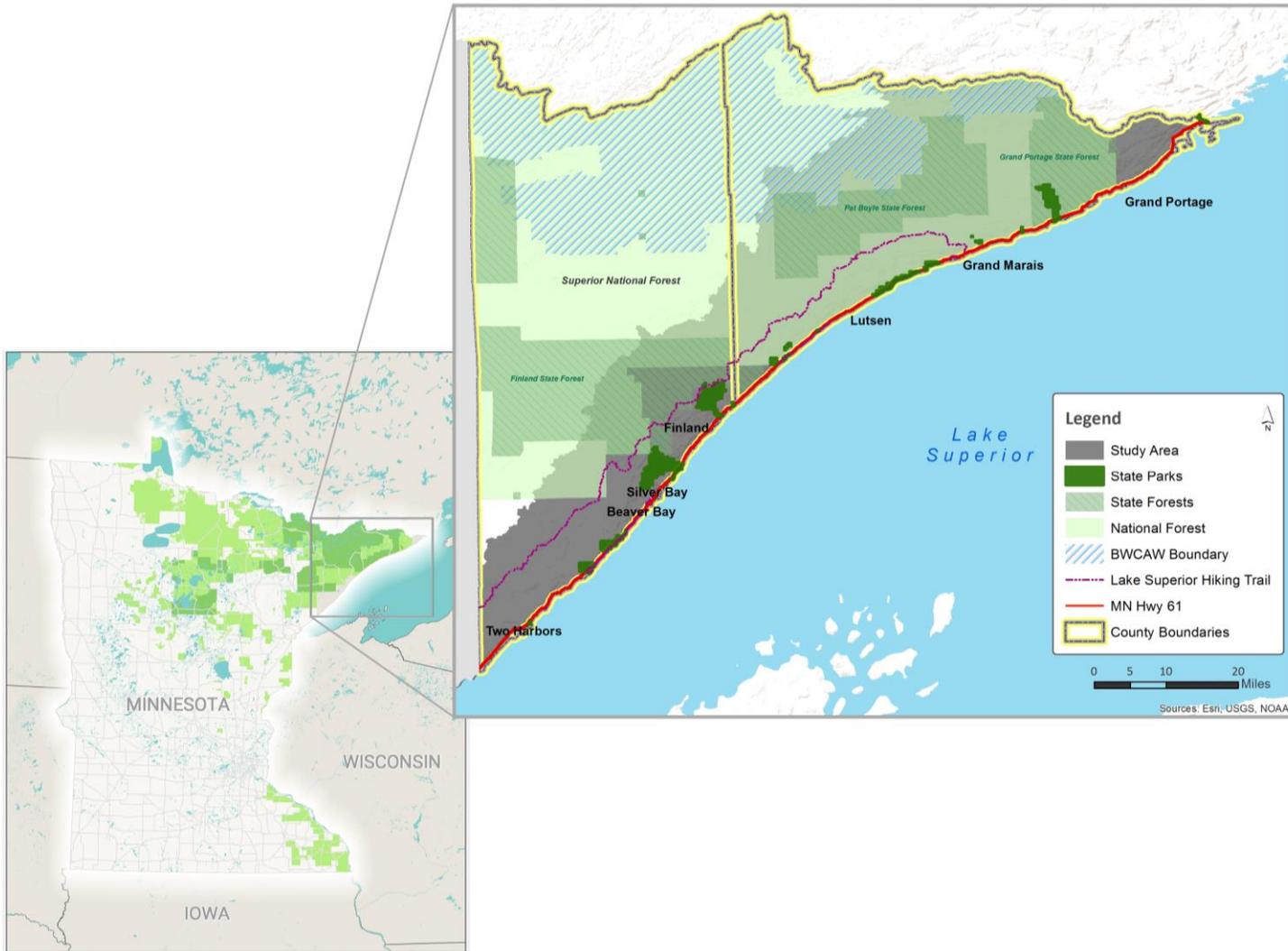


Figure 2. Study area: The North Shore of Lake Superior.

In the next fifty years, climate models project changes to environmental conditions on the North Shore, such as forest composition and the timing and volume of precipitation events (Pryor et al., 2015). The Third National Climate Assessment (Pryor et al., 2015) depicts that for the North Shore region, forest composition is likely to transition from spruce/fir to maple/beech/birch (under a low emissions scenario) or oak/hickory (under a moderate emissions scenario) by 2070. Additionally, precipitation is predicted to become less steady and consistent and more sporadic and severe by 2070 (i.e., greater number of heavy precipitation days *and* an increase in number of consecutive dry days are projected).

While national trends indicate a “potential poleward shift in visitation due to warming” (Fisichelli, Nicholas et al., 2015, p. 9), local reports establish that increasing temperatures, changes in precipitation, and risks to the Great Lakes may impact recreation and tourism in northeastern Minnesota and call for an examination of climate change to Minnesota tourism resources (Interagency Climate Adaptation Team, 2013). The State of Minnesota has identified potential impacts of climate change to recreational fisheries and opportunities for water-based recreation, as well as increases in temperature that could impact NBT communities and recreationists, such as increased snow-making during periods of inadequate snow depth for winter recreation activities and possible human health issues with sustained extreme heat events during summer (Interagency Climate Adaptation Team, 2010). As North Shore tourism opportunities are primarily reliant on environmental conditions, understanding how visitors may respond to such changes in climate and the resources and experiences that hold the most meanings is imperative.

Survey Procedures

A survey instrument (Appendix A) was constructed to measure visitors' place meanings, past climate-related impacts, and coping mechanisms, future risk perceptions, future recreation substitution, and a number of items measuring visitor/visit characteristics (e.g., party size, trip length) and individual attributes (e.g., age, gender). Survey items were constructed using existing literature, expert review, and a pilot testing session (Fink, 2012; Vaske, 2008) with North Shore visitors in the Fall of 2014. The survey instrument and sampling procedures were approved by the researchers' Institutional Review Board (see Appendix B). Following pilot testing, small modifications to the survey instrument and sampling procedures were made to enhance question clarity and flow, as well as the likelihood of engaged participation by visitors.

Target population. The unit of analysis for the quantitative portions of this study was visitors to the North Shore region during the summer season. The summer season was defined as June 1 through August 31 and summer survey sampling occurred between July 15 and August 3, 2015. An on-site visitor survey was employed, as visitor perceptions are important in understanding how climate change will potentially impact the tourism economy and infrastructure within North Shore NBT communities. Survey locations were selected with the consultation of local NBT providers to enhance the interception of diverse visitor types (e.g., types of recreational and tourist activities in which they participate), including state parks and local businesses. Eligibility requirements to participate in the voluntary survey included: (1) being over the age of 18, and (2) residing outside of the study area for at least ten months of the year. One visitor per group was selected to participate; to randomize

survey participation and minimize researcher selection bias, the adult with a birthday closest to the day of the survey intercept was asked to participate.

Sampling design. Sampling procedures were established to ensure all participants received the same treatment and visitors to various parts of the North Shore would have equitable opportunity for participation. A total of 22 on-site survey intercept locations were selected (Table 2). A clustered sampling approach was employed wherein survey sampling sites were identified and then clustered geographically (i.e., categorized as either a ‘northern’ or ‘southern’ location). Additionally, sampling at each site was randomly assigned to either an AM or PM sampling block. To achieve this, each location was assigned a random number, then a random number (from the same range assigned to the sampling locations) was assigned to each sampling slot (i.e., date, am or pm block). Random numbers were assigned first to all weekday slots and then to the weekend slots so that all survey sites were randomly assigned 3-4 weekday sampling blocks and then 2 weekend sampling blocks within the sampling period of July 15 through August 3, 2015 (Vaske, 2008). The sampling plan is presented in Appendix C and reflects the final schedule, as some changes were made to the original schedule. For example, when a site provided weak visitor sampling potential (defined as less than two intercepts per four-hour sampling time block) a replacement site was made for future sampling blocks assigned to that location. Replacements were made based on membership in the same geographic cluster and consideration to intercept a similar type of tourist (e.g., a scenic wayside with another wayside or roadside stop).

Table 2. Sampling locations for on-site survey of North Shore visitors.

State parks	Tettegouche* Gooseberry Falls* Grand Portage Temperance River** Split Rock* Cascade River Crosby-Manitou* Judge C.R. Magney
Hwy. 61 waysides	Beaver Bay* Kadunce River Ray Berglund Cut Face Creek
Private businesses	Java Moose (coffee shop) Stone Harbor Wilderness Supply (gear & outfitter) Lake Superior Trading Post (gear & outfitter) Silver Bay Marina* (bait, boat launch, amenities) Cook County Co-op (grocery store) Finland Co-op* (grocery store) Big Dipper* (ice cream shop)
Other	Cook County Visitor's Center/Artist's Point (public beach area) Lake County Historic Society* (historic rail, homes, lighthouse tours) Sugar Loaf Cove nature preserve* (operated by non-profit association)
*denotes sampling sites that were part of the 'southern' cluster.	
**denotes the sampling site was included in both 'southern' and 'northern' clusters.	

While obtaining a representative sample is difficult with on-site surveys, by randomly assigning sampling locations to date and time blocks and by selecting visitors to participate at random, the likelihood of obtaining a sample population representative of the true population increases (Babbie, 2013; Creswell, 2013).

Survey administration utilized a number of ways in which potential respondents could complete the survey. Primarily, survey questionnaires were completed using an off-line survey administration software program loaded onto tablet computers. Collecting survey data via an electronic questionnaire reduces respondent burden, and decreases the potential for errors, which occur when researchers manually enter responses into spreadsheets or statistical

software. Because of differences in technological literacy among potential participants (and because technology can fail), paper questionnaires were also kept on-hand and offered to visitors as a means of completing the survey. Due to low participation in this collection method ($n = 6$), no paper survey responses were retained as the ‘cost’ of possible differences in the population who participated by paper outweighed the potential ‘benefit’ of including so few cases. In addition to options for on-site participation, there was also an option for ‘delayed participation.’ Pilot testing the survey instrument and sampling design revealed that recreationists/visitors to parks and protected areas are often intent on beginning their recreational experience and may not have the desire to spend time in a parking lot or visitor center completing a questionnaire. To overcome this potential source of non-response, visitors had the option to complete the survey on-line after their visit. Research assistants collected the email addresses of those visitors who elected for ‘delayed participation’ so that an initial survey link and two follow up reminders could be sent to prompt their online participation (Vaske, 2008).

Each survey included a unique code for tracking participation. For the questionnaires administered on tablets, this code was automatically generated by the software, along with a date and time stamp. Paper surveys had a unique code inscribed along the top of the first page, codified with the date, time block, and site information. Surveys taken on-line via the ‘delayed participation’ option were automatically coded with the date and time of participation and manually coded with the site information for the original intercept location (as well as a ‘delayed participation’ variable).

Nonresponse record keeping was a key component of the sampling plan. Non-responders are those who declined participation in either the on-site or ‘delayed participation’

on-line survey options. Vaske (2008) recommends that, for a longer survey (more than one legal-sized paper front and back), the researcher select a few key questions to include in the nonresponse bias check. For those who refuse participation, or quit the survey when partially complete, a researcher may ask them if they would mind answering a few short questions that should take no more than a minute to answer (i.e., those selected for the nonresponse bias check). For this study, the number of trips for the current season, primary purpose of their current trip (recreation, business, visiting family, etc.), climate change concern (on a scale of 1, *not at all concerned* to 5, *extremely concerned*), home postal code, and age were recorded for those individuals who declined participation. A form for capturing these responses was printed and carried with all research assistants so they could record the time, date, and intercept location, as well as answers to nonresponse bias check questions. This form also had space to record complete refusals (i.e., tallies of visitors who would not participate in the survey or nonresponse bias check).

Data Generation

To explore the physical characteristics of place, additional data were generated during summer on-site sampling for the North Shore visitor survey. While place meanings have been studied primarily through the use of standard survey-based measures (Rickard & Stedman, 2015; Smith et al., 2011), there is a call for the use of qualitative methods to explore the concept of place and space (Brehm, Eisenhauer, & Stedman, 2012; Smaldone, 2007; Stedman, 2003). During on-site visitor intercepts, research assistants also distributed stickers that read “#MyNorthShore” (Figure 3). These stickers were affixed with a sheet of paper that directed recipients to use the hashtag when posting photos from their current North

Shore trip to Instagram¹. Visitors were encouraged to use the hashtag with any photos they were posting during the current North Shore trip. Stickers were distributed regardless of survey eligibility or participation. Additionally, stickers with directions affixed were available at the counters of visitor centers and businesses when research assistants were not present.



Figure 3. #MyNorthShore sticker mock-up and directions

Dissertation organization

This dissertation is formatted into the ‘three manuscript’ style. Three manuscripts were prepared, each reflecting one of the three research objectives (presented in Table 1), for submission to a scholarly journal. The conceptual model (Figure 4) was partially informed by popular psychological models which conceptualize dynamic, interrelationships between values, thoughts, behaviors, and environmental and situational (i.e., personal) inputs to influence or construct reality (e.g., cognitive-behavioral therapy model, Bandura, 1989). This model also illustrates the three components of place proposed by Relph (1976) and how

¹ While the directions refer to other, or general, social media sites, post-data gathering revealed that data richness affiliated with #MyNorthShore was greatest on the Instagram platform, and therefore images and captions comprising Instagram posts were used as the unit of analysis for the qualitative portion of this study.

exploring activities and meanings of place can inform place-based management and how assessing physical attributes of place can inform place-based marketing. A final fifth chapter of this dissertation provides an overall discussion of the research findings including broad implications, limitations, and conclusions.

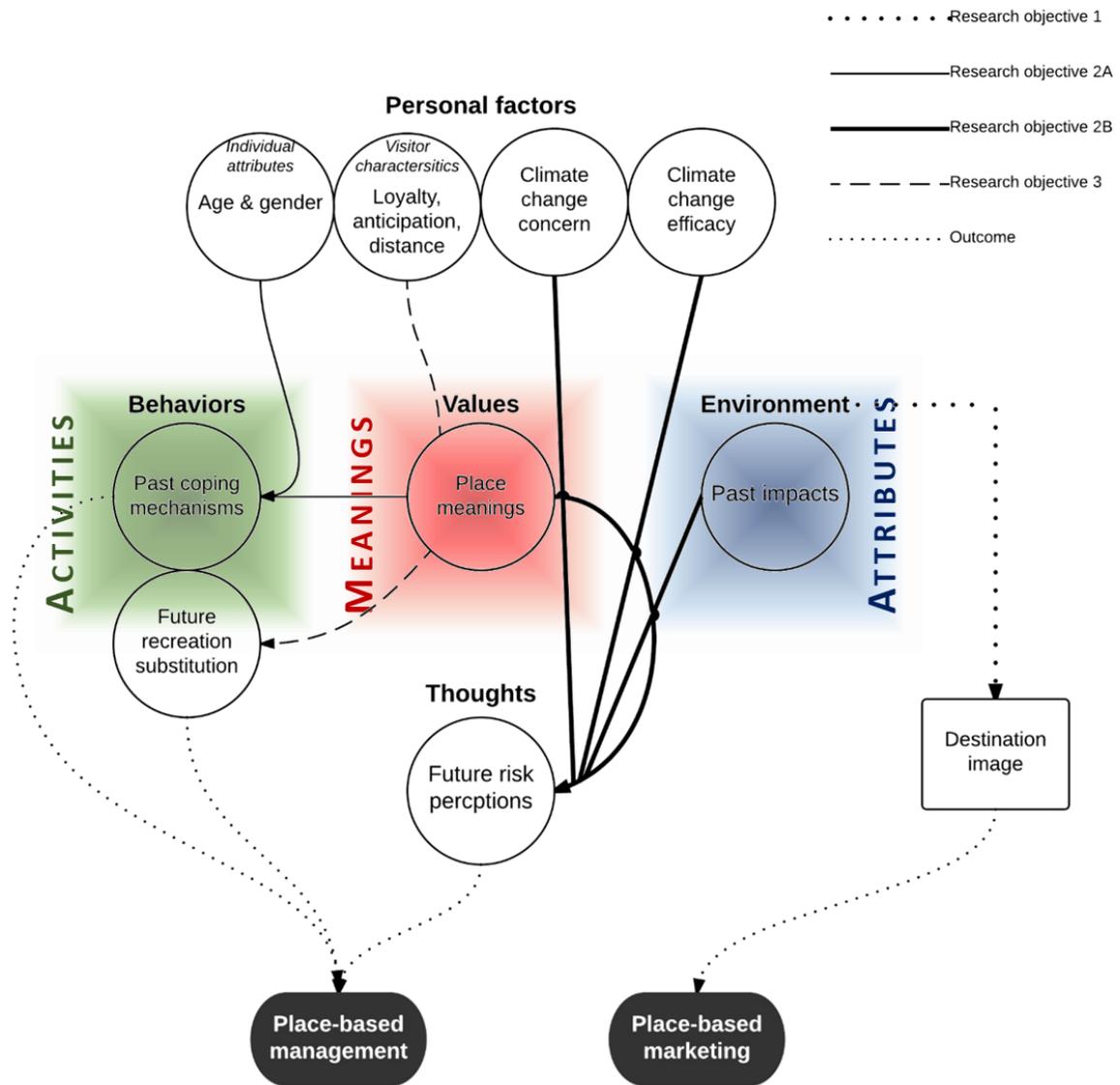


Figure 4. Conceptual model of exploring climate to nature-based tourism through the three component "lens" of place

The first manuscript, which explores research objective 1 (*to explore the physical attributes of a place through imagery of the NBT destination*), presents an innovative

utilization of user-generated content (i.e., photographs and captions posted to social media) with a qualitative thematic analysis approach. Findings and implications were presented within a place-based marketing framework relevant for recreation providers and tourism-dependent communities. This article was structured for an audience interested in tourism resources, marketing, and communication and is intended for publication in a journal such as the *Journal of Outdoor Recreation and Tourism*.

The second manuscript will present analysis and findings emerging from objectives 2A (*to assess how visitor attributes and place meanings are related to past coping behaviors*) and 2B (*to explore how past impacts, place meanings, and climate concern influence future risk perceptions*). This article presents results from a series of logistic regression analyses and is directed towards an audience interested in understanding social responses and predictors of individuals' climate change-related thoughts and behaviors. The discussion emphasizes integrating this knowledge into place-based management, particularly related to climate change adaptation planning and recreation planning and management. This manuscript is prepared in accordance with the guidelines for, and will be submitted to a special issue of the *Journal of Park and Recreation Administration* focused on climate change and outdoor recreation.

The third manuscript presents the analysis and findings related to research objective 3 (*to understand how place meanings and current trip characteristics are related to various recreation substitution behaviors*). This article guides readers through a review of the constructs of current trip-taking characteristics, place meanings, and recreation substitution, and employs ordinal logistic regression to explore the mediating role of place meanings on recreation substitution. Discussion and implications are tailored for a recreation-professional

audience interested in place-based management for nature-based recreation and outdoor recreation. This manuscript will be published in a recreation-related journal such as the *Journal of Leisure Research*.

Careful editing was performed to avoid exact replication of figures, tables, and language between manuscripts. However, there are some cases of dual-use of figures and tables that should be explicitly stated: Figures 1 (history of place meanings research) and 3 (#MyNorthShore sticker and directions) and Table 1 (survey sampling sites) presented in this introductory chapter are so featured in a manuscript (Figures 1 and 3 appear in Chapter 2 and Table 2 appears in Chapter 4). The intent was to highlight this foundational information in the introduction *and* present these key figures/table in peer-reviewed journal publications (i.e., the replication is not due to flagrant self-plagiarism). While each manuscript draws on the same (overall) research design, the intent was to present five unique chapters that will contribute to both the scholarly pursuits of future students (through the dissertation document) and researchers (through peer reviewed publications).

Definitions of terms

Behavioral coping responses – typically include temporal, spatial, activity, and strategic substitution of recreation experiences, however may also include using different gear, increased information, worrying more during recreation experiences or seeking safer alternatives (to lodging, activities, and recreation sites) in response to constraints.

Cognitive coping responses – perceptions of the severity and direction (positive or negative) of future climate change risks or impacts to visitors' self and future recreational trips, and the

nature-based tourism setting (i.e., general ‘nature’), recreation infrastructure, and tourism economy.

Climate change – According to the IPCC (2014) “the atmosphere and oceans are warming, the extent and volume of snow and ice are diminishing, sea levels are rising and weather patterns are changing” and “climate change is unequivocal, and that human activities, particularly emissions of carbon dioxide, are very likely to be the dominant cause.”

Climate readiness – There are two underlying factors contributing to nature-based tourism communities’ ability to prepare for and respond to climate change: destination risk and adaptive capacity.

Destination risk is visitors’ perceptions of biophysical conditions that may influence their recreation experiences and consequently impact future recreation demand.

Adaptive capacity is a community’s ability to synthesize knowledge, utilize innovative technologies, retain flexibility, and develop long-term strategies to address climate change (Folke et al. 2003).

Nature-based tourism communities – The stakeholders who hold a vested interest in the future of local and regional outdoor recreation opportunities. This includes recreation and tourism providers (e.g., outfitters and guides), land managers (e.g., state and federal land management agency personnel), business owners (e.g., lodging and restaurant proprietors), and political leaders within the community (i.e., policy makers). Where the term NBT community/communities is used throughout this proposal, it can be assumed that more than one of those groups are referenced.

Place – “is the location plus everything that occupies that location seen as an integrated and meaningful phenomenon” (Relph, 1976, p. 3), additionally defined as composed of three components: (1) the physical setting, (2) the activities and events, and (3) the meanings.

Place attachment – The emotional bond between an individual and a place (Altman & Low, 1992; Williams & Vaske, 2003).

Place identity – The ability of a place to form the way individuals, or others, view and appraise themselves (Proshansky et al., 1983).

Place meanings – socially constructed and cognitive conceptions of why individuals value a specific geographic space, these are also the foundational values upon which identity, dependence, and attachment to place is formed.

Recreation substitution – Are either spatial (changing the space in which one recreates), temporal (changing the timing of outdoor recreation participation), activity-based (changing the intended behavior), or some combination of these three tactics (Manning, 2010).

Sense of place – “An over-arching concept which subsumes other concepts describing relationships between human beings and spatial settings” (Jorgensen & Stedman, 2001), the meanings people assign to places (Tuan, 1974).

User generated content – A term that is established in the computer science field to describe objects –any post, chat, blog, digital image, video, audio file or advertisement– which is created by users on, and made publically available through, an online platform (e.g., Girardin, Blat, Calabrese, Dal Fiore, & Ratti, 2008). Used in this study to mirror the voluntary-employed photography, VEP vernacular.

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CHAPTER 2: Identifying key recreation resources: Using social-media data to understand the characteristics of destination image

Introduction

In the context of climate change, most studies of the meanings individuals associate with specific outdoor recreation and tourism destinations focus on how functional and symbolic connections to place are influenced by shifting environmental conditions (e.g., Cunsolo Willox et al. 2012; Dawson, Havitz, and Scott 2011; Chapin and Knapp 2015; Jacobs and Buijs 2011; Han and Noh 2015). A broad theoretical lens of place allows for a deeper awareness of the potential cultural and emotional impacts of climate change as well as the changes in recreation experience opportunities (Smith, Anderson, and Moore 2012; Hess, Malilay, and Parkinson 2008; Cunsolo Willox et al. 2012). Knowledge of people–place connections can enhance how researchers and practitioners develop climate change adaptation plans as well as recreation management plans (e.g., Adger et al. 2009; Knapp et al. 2014).

Place meanings are also considered in climate research to explore the efficacy of communication and message framing; local, place-based frames have emerged as providing more relevant, tangible, and psychologically ‘near’ climate change communication (Scannell and Gifford 2013; Devine-Wright 2013; Becken, Zammit, and Hendrikx 2015; Shome and Marx 2009; Shaw et al. 2009; van der Linden, Maibach, and Leiserowitz 2015; Smith, Bitsura-Meszaros, et al. 2016). Powerful, local imagery can enhance engagement, communication, and behavioral intentions for climate change policy support or mitigation actions (Leiserowitz 2006; Scannell and Gifford 2013). These studies demonstrate the utility of understanding the socially-constructed meanings of place. Socially constructed meanings

imbue values and attitudes into geographic space and can influence intentions and behaviors within, and outside, those spaces (Rickard and Stedman 2015). However, it is not only the symbolic and functional connections to place that influence individuals' attitudes towards, and behaviors within and outside of those places; the physical attributes of a place also matter (Lin et al. 2007; Stedman 2003).

Place form (Beckley et al. 2007) and place image (Kavaratzis and Hatch 2013) explain the physical characteristics and attributes of a geographic space. In the tourism sector, this is referred to as 'destination image' (Stylidis, Sit, and Biran 2014). Previous research has established a relationship between place or destination image and place satisfaction (Chen and Tsai 2007; Lee, Lee, and Lee 2014), intention to re-visit a place (Assaker and Hallak 2013), and destination loyalty (Prayag and Ryan 2011). Climate change can alter the physical resources and consequently, the image of a place. Given that attributes are the 'pull' factor for tourism-based economies, understanding key attributes of place can help recreation managers prioritize key resources and tourism developers better brand the destination to ensure sustained tourism flows. The guiding research question for this study was *what are the dominant themes captured in images of a nature-based tourism (NBT) destination that are shared with family and friends?*

To answer this research question, a modified visitor-employed photography (VEP²) approach was utilized to explore the content of photographs that visitors to a specific NBT destination (the North Shore region of Minnesota, which spans two counties adjacent to Lake Superior) are sharing with family and friends via the Instagram social media platform.

² VEP allows visitors to capture their own images (often on disposable cameras provided by a researcher) and then discuss those images with a member of the research team (Dorwart, Moore, and Leung 2009). The VEP method allows for the generation of rich data; however, the technique is time-intensive as researchers must administer the cameras and instructions and then follow up with post-photography surveys or interviews.

Specifically, photographs that were posted to Instagram were analyzed thematically (e.g., Richards & Friess, 2015) to reveal the key themes of destination image. In this paper, this method will be referred to as user-generated content (UGC), a term that is established in the computer science field to describe objects, such as Instagram posts. Understanding the physical characteristics of the places that are valued by visitors—albeit in the case of typical Instagram users, younger, image-conscious visitors—can help inform how recreation providers determine critical assets (i.e., dominant physical properties of place as generated by visitors) to prioritize in climate change adaptation planning efforts. Although prefaced with a specific utility to North Shore NBT climate planning efforts, this paper seeks to demonstrate a more general utility of the method that may be applied in other NBT destinations.

Literature Review

Roots of place research

The constructs of sense of place, place attachment, and place meanings have a rich history in the social sciences (See Fig. 5). Growing out of the field of geography and using phenomenological perspectives, early theorists introduced the idea that people–place connections can instill environmental attitudes and values. For example, Tuan (1974) explained that a sense of place represented ‘topophilia’ (literally, love of the earth). Around the same time, Relph (1976) defined multiple components of place and coined the term ‘placeslessness,’ which represents the potential decline in community, regional, or national identity in response to increased globalization. In subsequent decades, place dependence and place identity came to be the most-studied components of place attachment theory within the fields of sociology, psychology, and recreation. Within this body of research, place dependence has referred to outcome-related attachments while place identity has referred to

more affective or emotional ties (Stokols and Shumaker 1981; Proshansky, Faban, and Kaminof 1983; Williams and Roggenbuck 1989).

Low and Altman (1992), focusing on place attachment, established that social interactions influence people–place connections as strongly as physical and spatial characteristics of a place. Social bonding has been considered as a third component of place attachment studies, alongside place identity and place dependence (eg., Budruk and Stanis 2013). In the place meanings realm, family identity emerged as the value that represented this construct of social ties driving place-based relationships, such as ‘history’ and ‘neighborly’ values being tied to family identity to a place (Mae A. Davenport and Anderson 2005). Family identity has been defined as a relationship wherein an individual’s heritage and/or present and future familial bonds are dependent upon a specific physical area including the characteristics and management of that area (Smith et al. 2011; Smith, Anderson, and Moore 2012; Smith and Moore 2012).

For the past 25 years, place-based research has more or less followed this lead, exploring how identity, dependence, and/or attachment are socially constructed and related to other social-psychological, behavioral, and demographic variables (e.g., Jorgensen & Stedman, 2001; Kyle, Graefe, Manning, & Bacon, 2004; Kyle, Mowen, & Tarrant, 2004). Furthering the practical applications of place-based research, Williams (1995) presented place meanings in tandem with ecosystem management as the new paradigm for managing natural resources, one which considers the scientific and biological properties of a resource along with the social, historic, and personal attributes of that space, allowing managers to achieve benefits related to both tangible and abstract outputs of the place. Place-based planning frameworks allow managers to consider social, cultural, and political attributes of

resources and create a shared, integrated vision for the future of the resource (Williams & Stewart, 1998).

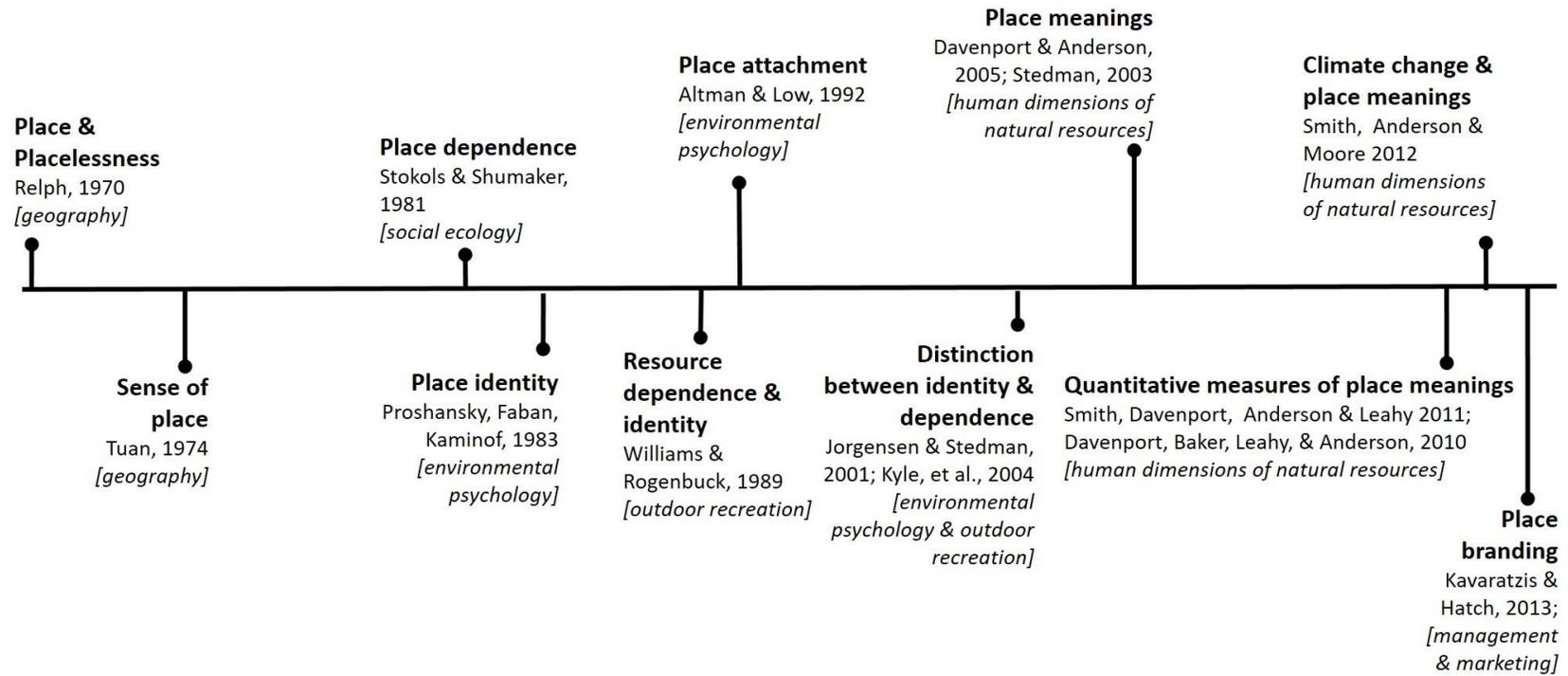


Figure 5. Timeline of sense of place, place attachment, identity, dependence, meanings, and management literature

Place & natural resources recreation management

More recently, place meanings (Mae A. Davenport and Anderson 2005; Stedman 2003) emerged from place-based research as a way of explaining the foundational values upon which identity, dependence, and attachment are built in the context of natural resources and recreation management (Rickard and Stedman 2015; Brehm, Eisenhauer, and Stedman 2012; Smaldone 2007). Place meanings explain individuals' descriptive, as well as emotional, relationships to a space. Advancing this theoretical advancement of place meanings, Smith and his colleagues (2011) documented a battery of seven place meaning dimensions: individual identity, family identity, self-efficacy (i.e., place dependence), self-expression, community identity, economic meaning, and ecological meaning; these dimensions enabled operationalizing a spectrum of place meanings. Other studies have utilized or modified this quantitative measurement scale of the presence and strength of place meanings in relation to recreation setting preferences (Kil, Stein, et al. 2012), participator planning actions (Kil, Holland, and Stein 2014), understanding differences between distant and proximate visitors (Kil, Holland, and Stein 2015) and explored in marine (rather than terrestrial) settings (Wynveen and Kyle 2014).

As “it is not the possessors of meaning that are local but the meanings themselves” (Williams & Stewart, 1998, p. 19), place attachment has been examined in relation to other constructs within the outdoor recreation and tourism fields. For example, Williams and Watson (1998) found different ‘types’ of recreationists (e.g., day users versus overnight campers) are attached to recreation settings for different reasons; leading to variation in recreationists’ willingness to pay for access to natural areas. In another example, Lee and Shen (2013) demonstrated that place attachment and leisure involvement are strong

predictors of destination loyalty, and as such can be leveraged by recreation providers through initiatives that enhance recreation involvement and subsequently heighten place attachment and place loyalty.

Understanding visitors' place attachment also enhances our understanding of their recreation preferences and, therefore, can guide recreation management to meet the expectations and preferences of recreationists. For example, Budruk and Stanis (2013) documented that place attachment predicts recreation experience preferences, with place dependence influencing visitors' motivation to encounter 'similar' people and social bonding influencing visitors' motivations to 'learn,' 'escape,' 'teach,' 'enjoy nature,' and have time for 'introspection.' Additionally, Kyle, Graefe, Manning, and Bacon (2004) established that, in nature-based settings, different dimensions of place attachment have distinct relationships with recreationists' perceptions of both social and use impacts, with place identity related to higher sensitivity to impacts and place dependence related to broader acceptance of impacts.

Place and natural resource planning

Qualitative place meanings research has used a diverse array of techniques to explore the dynamic nature of person–place experiences and relationships (Kemp 2011). For example, public participation geographic information systems (PPGIS) can be used to elicit individuals' dialogues and delineations of spatially explicit and important areas that may inform place-based planning processes (Lowery and Morse 2013). Interviews are often used to elicit narratives that can inform theory regarding how and why places take on certain meanings for individuals (e.g., Gustafson 2001). Qualitative data from focus groups, meetings and workshops have also been used to identify support for natural resource management and intentions to participate in planning process (Jacobs and Buijs 2011; Kil,

Holland, and Stein 2014). For example, public comments, such as those recorded at public planning meetings, can also be used to understand how residents identify with the physical characteristics of a place and how future planning and management may impact the meanings those visitors ascribe to a place (Smith 2013). Thus, place meanings provide a platform for collaborative planning and management, as they allow for diverse views and consequently diverse management strategies to be considered by managers (Yung, Freimund, and Belsky 2003).

A more recent tangent of place research extends the idea of place-based management to include the concept of place branding. Generally defined, place-based management or 'place management' is "a coordinated, area-based, multi-stakeholder approach to improve locations, harnessing the skills, experiences and resources of those in the private, public and voluntary sectors" (IPM, 2016, n.p.). Place branding is defined through three components: visual, verbal, and behavioral expressions of place (Kavaratzis and Hatch 2013), or "the link between identity, experience, and image" (Govers & Go, 2009, p. 23). Both of these definitions reveal that an important component of place branding is the visual image of a place. In some cases, the image may transcend verbal marketing cues that can be misinterpreted by individuals with different socio-cultural backgrounds (Kavaratzis and Hatch 2013; Govers and Go 2009).

Place branding is image-focused in four ways: expressing, reflecting, and mirroring the identity of a space (based on values, cultural norms, individual identities) and impressing that image upon others (Kavaratzis and Hatch 2013). While heavily applied to urban, metropolitan, and residential settings, place management and branding also occurs in tourism locales and is referred to as 'responsible tourism,' which is aimed at enhancing tourism

benefits for both residents and visitors of a locale (IPM 2016). However, limited research has been devoted to exploring visitors' conceptualizations of place meanings through user-generated images, suggesting a need to explore the implications of UGC for place management and branding. Social media platforms provide a potential wealth of data regarding individuals' conceptualizations (images) and reflections (captions/narratives) of a NBT destination.

Social media data

Social media data have the potential to inform social science in new and meaningful ways, including understanding social values and identifying opportunities for place management and branding, as well as resource conservation (Di Minin, Tenkanen, and Toivonen 2015; Metaxas and Mustafaraj 2014). Recently, UGC has been used to quantify landscape values at a continental scale (van Zanten et al. 2016). UGC has also been used to assess sense of place through analysis of the 'tags' that accompany Flickr photographs from urban areas throughout the United States (Feick and Robertson 2015). Online activity allows researchers to uncover, in nearly 'real time,' how individuals are responding to a specific person, place, or thing. These studies illustrate how UGC has been validated as a robust data source and how it can effectively provide place-based data.

The US EPA also demonstrates the efficacy of photography in conveying place-based meanings and management. In their *Community Culture and the Environment: A Guide to Understanding a Sense of Place*, a featured case study includes a documentary photography project aimed at diffusing sustainable agricultural practices through a video (containing photographs and tape-recorded interviews with 'expert' farmers) distributed to other farmers. Further, this study found that UGC joins "laws, customs, myths, legends, novels, poems,

stories, histories, biography, art, photography, music, and movies” as some examples “of the media through which landscapes are created, recreated, and redefined” (Greider & Garkovich, 1994, p.18). As such, UGC is another mechanism for individuals to define the meaning of a landscape and share that meaning with others.

Using images generated by a population of interest (‘participatory photography’) to explore place attachment, allows for data that not only reduces researcher subjectivity but also enables participation by individuals with varying levels of literacy, eligibility, and availability in the research process (Sancar and Severcan 2010). Further, Stedman’s (2003) exploration of place attachment and place meanings reveal that “landscape characteristics matter, they underpin both place attachment and satisfaction, but in very different ways” (Stedman 2003, p. 682).

In light of the phenomenon that “the natural environment is transformed through symbols and concepts that organize peoples’ relationships in the social world...[and] cultural groups socially construct landscapes as reflections of themselves” (Greider & Garkovich, 1994, p. 8), this research enhances the understanding of key components of a NBT region destination image. A rocky outcrop may mean an area of high adventure to a climber, a place of peaceful introspection for a solo hiker, a site that provides a fantastic view and photography angle for a third visitor, and a place of emotional nostalgia for the couple that became engaged to be married at the vista. Studying visitors’ photographs alone will not reveal these complex and dynamic meanings. However, analyzing visitors’ photographs can reveal the key outdoor recreation resources to which visitors assign these complex and dynamic values. Researchers and recreation managers cannot directly manage for the many,

unique values of each individual visitor, but they can seek to understand the elements of a setting or recreation opportunity that facilitate the realization of visitors' place meanings.

Methods

While there are many approaches to understanding place image and meanings, this study used social media data to understand place form and image as conceptualized by NBT visitors. Specifically, we analyzed photographs and textual information posted to Instagram that were affiliated with (i.e., #MyNorthShore) Lake Superior's North Shore NBT region during the summer of 2015. The North Shore region is a tourism dependent, natural-resource rich region in northeastern Minnesota (MN, USA). A study of the region's 'climate readiness' has revealed that place meanings are influential in future recreation demand for the region (Smith et al. 2016). Additionally, research in the region demonstrated the reluctance, and subsequent inability, of recreation providers to designate specific resources as particularly vulnerable to climate change during a participatory geographic information systems (PGIS) exercise "because they believed large portions of the region as a whole were equally vulnerable to the effects of climate change" (Meszaros 2015, p. 77).

Research design

A phenomenological research design using qualitative thematic analysis was utilized to explore how visitors to a NBT destination conceptualized key attributes of place image. Specifically, visitors' photographs, which were posted to Instagram with the hashtag "MyNorthShore" (from here on #MyNorthShore) were thematically coded using interpretive content analysis to reveal key themes in the destination image of the North Shore tourism region (Drisko and Maschi 2015). The coding strategy was developed to ascertain and illustrate the specific and tangible resources captured and shared by North Shore visitors to

social media. Photographic imagery allows researchers to understand not only the type and density of place meanings but also the physical landscape characteristics that hold various types of meanings to visitors.

Sample

The initial sample consisted of visitors to the North Shore between July 15 and August 3, 2015, which corresponded with the sampling period for an on-site visitor survey. During visitor incepts, #MyNorthShore stickers were handed out to visitors, regardless of their eligibility to participate in the survey, and displayed at sampling locations after on-site survey sampling concluded. Visitors, as characterized by data resulting from the summer 2015 on-site survey (n = 4,298; 57% response rate), are typically in-state (71%) visitors, making on average two trips to the North Shore per summer season. Common activities of North Shore visitors, also collected via the on-site survey, consist of scenic driving, hiking, and visiting cultural and historic sites (Table 3).

Table 3. Descriptive statistics emerging from the summer 2015 on-site survey of North Shore visitors.

Survey measure	North Shore summer visitors
Gender	56% female
Age	75% over the age of 35
Income	29% make more than \$100,000 annually (2015 USD)
Education	66% hold at least a Bachelor's degree
Trip purpose	82% are primarily recreating at North Shore sites
Origin	71% from Minnesota
Years making visits to the North Shore	$\mu = 16$ years (SD = 15.82)
Trip length	$\mu = 4$ nights (SD = 4.01)
Party size	$\mu = 3$ people (SD = 2.08)
No. of current trips per summer season	$\mu = 2$ trips per summer season (SD = 1.60)
Activity participation:	
Scenic driving	89%
Hiking	81%
Visiting cultural/historic sites	65%
Swimming	51%
Picnicking	46%
Wildlife viewing	46%
Rock collecting	38%
Camping	36%
Bicycling	15%
Fishing	15%
Non-motorized boating (inland lakes)	10%
Creating art	9%
Non-motorized boating (Lake Superior)	9%
Motorized boating (Lake Superior)	6%
Gathering wild plants (foods)	6%
Motorized boating (inland lakes)	6%
ATV riding	2%
Horseback riding	1%
Hunting	1%

1,298 total usable survey resulted from on-site summer sampling (a 57% response rate).

A target sample size for the content analysis of the UGC was not pre-determined, as the research design was predominantly exploratory. Additionally, no explicit efforts were made to reduce sampling error within the target population. Rather, data generation was intended to occur organically via visitors' exposure to #MyNorthShore through either

primary or secondary prompts. A primary prompt refers to visitors receiving the sticker and printed directions (Figure 6) from a research assistant at summer on-site surveying locations. The sticker included hashtag – #MyNorthShore – and the printed directions (paper clipped to the sticker) included a brief description of how to use the hashtag when posting photographs to social media³. Secondary prompting occurred when visitors self-selected to take stickers with printed directions that were left at survey site locations (no research assistant present) or when individuals saw other individuals (friends/family/individuals they ‘follow’ on social media) using the hashtag on social media and also elected to use the hashtag in their own social media posts.

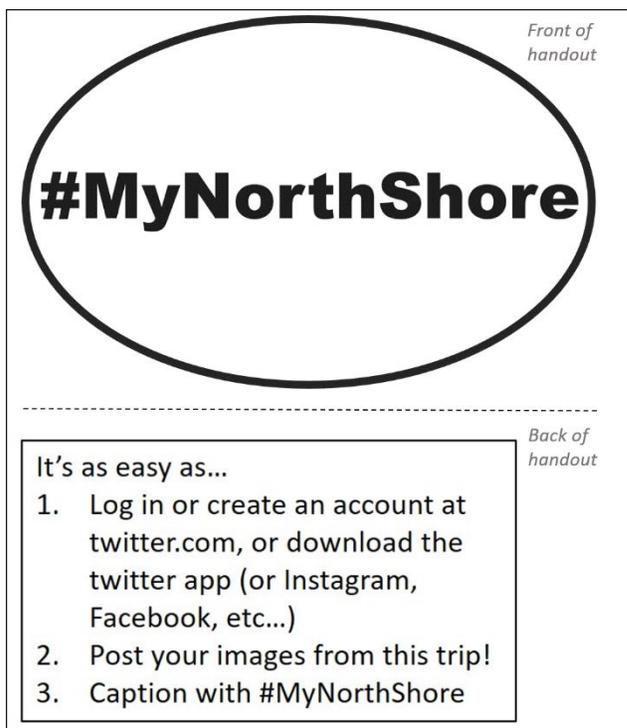


Figure 6. Directional handout provided to visitors for data generation of North Shore destination image study

³ While the directions (see Image #) referenced a variety of social media sites, review of content on multiple sites revealed that after the data generation period the majority of #MyNorthShore posts were made to Instagram. For this reason, Instagram was the platform ‘scraped’ for the #MyNorthShore data and is the platform primarily referred to in this article.

Data gathering

A Python script, enabled by an Instagram Application Program Interface (API) token, was used to ‘scrape’ the content associated with #MyNorthShore from the Instagram website (see Appendix D: Python Script). The resulting data were organized into an Excel spreadsheet. Data in the spreadsheet included the individuals’ username and user ID, time and date of the post, a Uniform Resource Locator (URL or web address) of the image, any tags and captions posted with the image, type of filter used on the image, number of likes and comments on the image, and additional data not included in the analysis presented here. A geo-tagged location was available for some posts, depending on the individuals’ Instagram settings and voluntary choice to designate the location of the photograph in their social media post (see Fig. 7 for spatial distribution of those images which were geo-tagged⁴).

Photographs posted between July 18 (when sticker distribution/data prompting began) and September 7, 2015 (Labor Day, a typical date considered to be the end of a summer season) were retained for analysis.

⁴ Some of the photograph locations illustrated in Fig. 7 fall outside what was defined as the North Shore for survey sampling purposes, however these photographs were retained for analysis in this study as the North Shore boundary may be perceived differently by various individuals.



Figure 7. Locations of the 68 geo-tagged images posted to Instagram with #MyNorthShore between July 18 and August 31, 2015

Analysis

Once data were gathered, analysis was completed within QSR International N*Vivo (v. 10) software, which enabled us to create and assign parent category codes and themes to individuals' posts (both images and text), query data, and export results. An initial codebook was created based on the place meaning literature to date. Instagram posts were analyzed using interpretive content analysis, which focuses on identifying characteristics (the subjects or objects) of an image or text rather than quantitative descriptions (i.e., words counts) (Drisko and Maschi 2015). Photographs were coded iteratively; that is, as new themes emerged and were added to the codebook, reanalysis of previously coded photographs would

occur. Examples of themes that were added after the initial codebook construction included: waterfalls, weather, lighthouses, and recreation providers (a final version of the Codebook is found in Appendix D). Coding was not restrictive; that is, multiple themes could be applied to a photograph or its accompanying text.

Categories and themes were not meant to represent place meanings explicitly, as meanings are socially constructed and “meaning is not a property of the person or the object, but a relationship between the two mediated through culture and individual past experience” (Williams & Patterson, 2007, p. 936). The desired outcome of this study is not to reveal the place meanings contained within visitors’ photographs but rather to document the physical characteristics and dominant components of a place’s image. Thus, the codebook was used to provide an organizational system for understanding the most dominant themes included in the UGC.

Although coding focused on physical attributes, the concept of affect emerged in captions and additional hashtags related to #MyNorthShore photographs. Specifically, we coded textual data for instances of positive or negative emotional narratives. While affect is not a tangible component of destination image, the construct was included in thematic analysis of this data to explore how captions reveal additional characteristics of individuals’ reflections on their North Shore experiences. The affect code will be briefly presented in the findings, as this finding has implications for advancing UGC as a data source for place research.

After coding by the primary researcher was complete, inter-rater reliability was assessed. Although ‘member checks’ are typically used in qualitative research inquiries (Williams & Patterson, 2007), this research design did not include communication with

participants and, therefore, validity of the coding was assessed through inter-rater reliability. To assess reliability of the thematic coding, three researchers analyzed a random selection of the images/captions coded by the lead author, using the codebook to guide their analysis. A random 10% of the dataset (18 photographs and captions) was assigned to all three of the secondary researchers. To assess inter-rater reliability between more than two judges, an intraclass correlation was computed in SPSS v. 24. Two-way mixed, absolute agreement intraclass correlation (ICC) statistics were calculated to determine reliability where subjects (photographs and captions) are randomly assigned and raters are fixed. Results of the ICC reveal high reliability of coding among the coders. For all 18 images the ICC statistic was above .792 (range = .792 to .951, $\mu = .819$). This exceeds the commonly accepted threshold of .6 as an acceptable level of reliability among raters (Bruton, Conway, & Holgate 2000). While research bias can never be completely removed, credibility of the data analysis was also enhanced through the lack of a researchers' presence, reducing the bias of the type of images and captions visitors shared by allowing the visitors and photographs to 'speak' for themselves.

Results

A total of 194 images were posted to Instagram with #MyNorthShore between July 18 and September 7, 2015. Seven images were removed from the data set due to irrelevance (e.g., advertisements for e-cigarettes that contained #MyNorthShore, among other tags related to Lake Superior and Minnesota). A total of 53 unique users posted the usable 186 images for an average of 3.6 posts per user (range 1-33). The majority (n=37) of users posted three or fewer images. A few avid users (n= 6) posted a dominant number of images. The terms 'dominant number of images' and 'avid' user was operationalized as those individuals

who contributed 5% or more of the dataset (8 or more photographs). To explore the influence of more avid users, results were analyzed both including and excluding avid users to determine if these enthusiastic Instagram users/North Shore visitors influenced the emergent patterns and themes.

Results from the thematic coding are organized into six, overarching, parent categories (Table 4) including: (1) natural resources, (2) built infrastructure, (3) human subjects, (4) outdoor recreation, (5) affect, and (6) culture. Themes were codes that emerged under each of these six categories to further describe each of these themes. There were not large discrepancies in the dominance of particular categories or themes when avid users were removed from analysis (Table 4), suggesting that the avid users are no different from other users. Many images/captions contained components from more than one of these categories; for example, outdoor recreation is explicitly captured in Fig. 8 through the image of an active recreationist in rock climbing gear. The image also highlights the rock formations, Lake Superior, and prominently features the blue sky. The caption supports the application of these codes as the narrative contains references to rock climbing, the type of rock, and the lake itself (as well as the neighboring Boundary Water Canoe Area Wilderness). This UGC example demonstrates that outdoor recreation (climbing), natural resources (rock, lake sky), affect (“very heady”), and human subjects are all components of this visitor’s image of, and experience on, the North Shore.



@fezzarollo dropping in for a morning climb at Shovel Point. Very heady getting lowered down this crack climb practically into the water. The rock (Rhyolite) is quite sharp but made for a great climb. On to Ely and the boundary waters!
#vanlife #lakesup

Figure 8. Example of image/caption with multiple themes present.

Table 4. Definitions and density of categories and themes used to analyze #MyNorthShore Instagram posts.

Category	Definition	Full (N)	Full (%)	Avid removed (N)	Avid removed (%)
I. Natural Resources	Photo includes imagery of natural resources; text refers to a natural resource listed below.	205	45%	117	43%
<i>Themes include:</i> Wildlife, weather, waterfalls, rocks, plants, rivers, Lake Superior, inland lake, landscapes, insects, forests, coastline.					
II. Built infrastructure	Photos includes, or text references, an element of built infrastructure	70	15%	40	15%
<i>Themes include:</i> Roads (waysides, transportation corridors, streetscapes), recreation infrastructure (e.g., trails, boat ramps, bridges), historic sites, buildings (e.g., lighthouses, retail shops, restaurants) hotels, cabin or lodge.					
III. Human Subjects	Image or text containing or referring to a person.	66	14%	44	16%
<i>Themes include:</i> Self, recreation provider, pets, number of subjects in photo, family and friends, youth, mixed generation, adults					
IV. Outdoor Recreation	Photos depict and/or text includes a reference to participation in a recreation activity listed below.	51	11%	29	11%
<i>Themes include:</i> Visiting cultural and historic sites, swimming, scenic driving, rock collecting, recreation constraints, recreation substitution, picnicking, leisure at home, interpretation, visitor's center, signs, museums, hunting, hiking, gathering wild plants (foods), fishing, creating art, contemplation, rock climbing, camping, campfires, boating, bicycling, ATV use.					
V. Affect	Text containing, “awe,” “epic,” “best,” etc. or “horrible,” “worst,” “lame” etc.	39	9%	18	7%
<i>Themes include:</i> Include both references to positive and negative emotional responses.					
VI. Culture	Photo includes images and/or text references a cultural component listed below.	29	6%	22	8%
<i>Themes include:</i> Native American symbols or cultural references, food and drink, art					

‘Natural resources’ was the most dominant category in the UGC, which is logical as the North Shore is NBT destination. The most common themes under the natural resources parent category were water (one-half of all photographs coded with the natural resources category were also coded with “open water,” most often Lake Superior), forests, and rocks. Landscape level images were also prominent, as well as photographs of waterfalls. The example photograph displayed in Fig. 9 illustrates the themes of water (Lake Superior) and rocks. Agate stones pebbling the shoreline, as well as the large stone bluffs surrounding Lake Superior emerged from analysis as key components of the North Shore destination image. Additionally, this post captures a less dominant theme under natural resources parent category, ‘weather.’ The characteristic wet, misty weather along the North Shore in summer when many other locales are experiencing hot, dry conditions are also components of the North Shore destination image.



Figure 9. Example of natural resources photograph and caption.

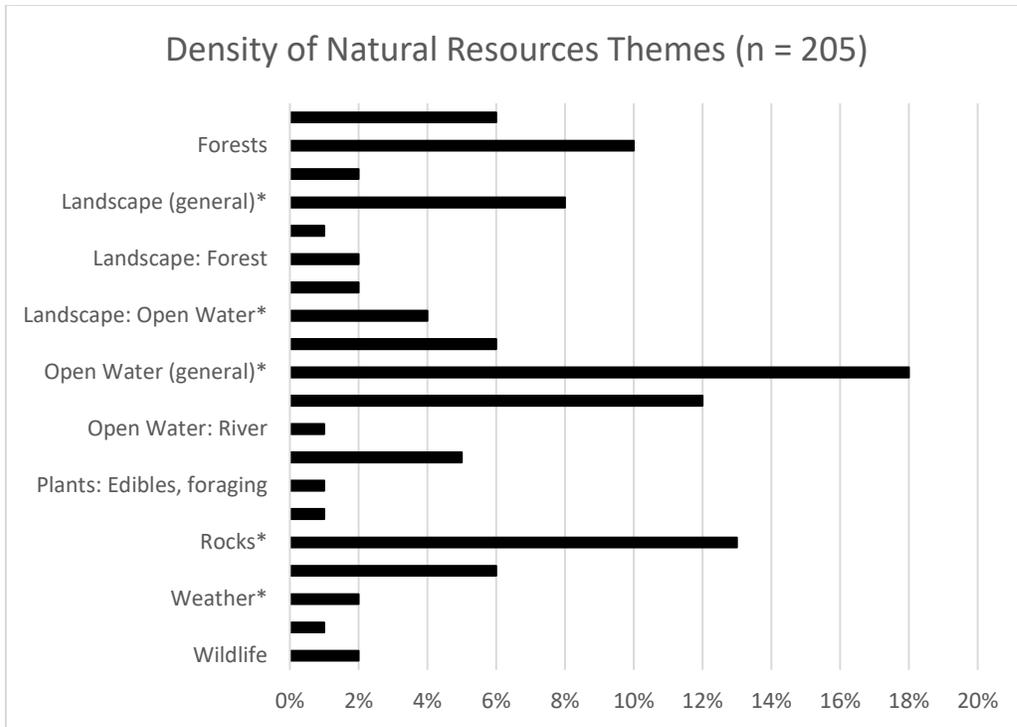


Figure 10. Chart of the natural resources category’s theme density.
*An * denotes natural resources themes that were applied to the example image in Figure 9.*

Built infrastructure was the second most dominant category in the UGC. The most dominant themes of this category include buildings, lighthouses, and roads. Recreation infrastructure (e.g., trails, boat ramps, signs, camp sites or cabins) was a less dominant theme, indicating that while these are known components of visitors’ trips (the infrastructure upon which NBT depends), they are not dominant aspects of the destination image explored in this study. An image that captures an iconic North Shore lighthouse along the shoreline is presented in Fig. 10. Also featuring natural resources (rocks, trees, sky, water), this image highlights the importance of unique components of built infrastructure as key components of the North Shore’s destination image.

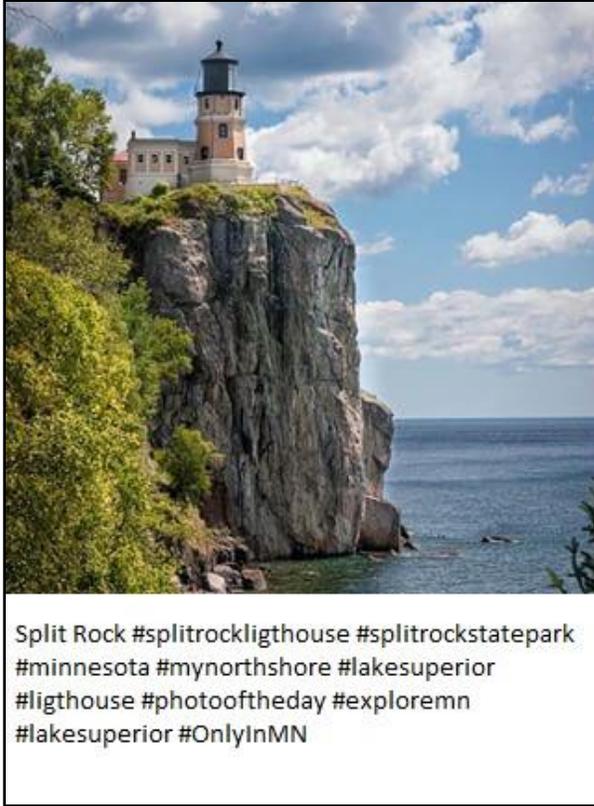


Figure 11. Example of built infrastructure photograph and caption.

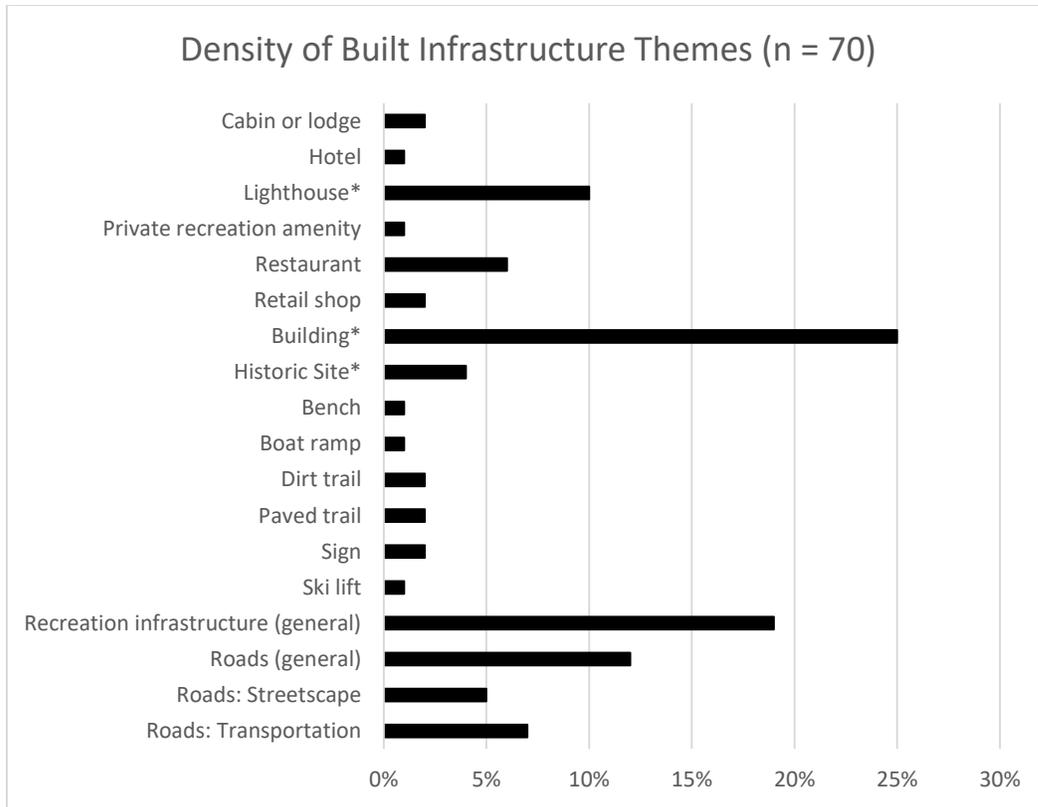


Figure 12. Chart of built infrastructure theme density.

An * denotes built infrastructure themes that were applied to the example image on the left.

Human subjects had moderate prominence among all categories captured in the UGC. Images and captions in this category most often contained references to family and friends, with adults being more prominent than youth (and pets less prominent than actual humans) and photographs containing one human subject being the most common (no groups of five or more captured in the images). An example of the ‘pervasive’ nature of human subjects in the destination image of the North Shore is displayed in Figure 11. The caption of this image refers to watching the waves break on the shore; however, the image does not simply contain the water and shoreline but also includes two individuals occupying this space. This demonstrates, similarly to outdoor recreation, that for many visitors, companions are an integral component of the destination image.



Figure 13. Example of human subjects photograph and caption.

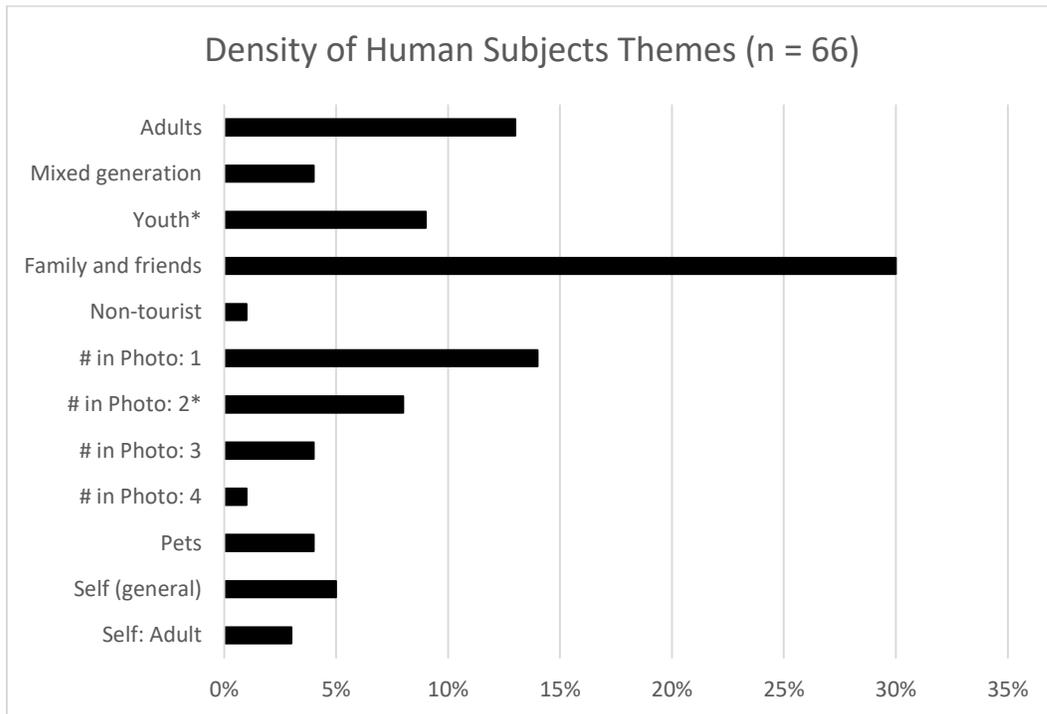


Figure 14. Chart of human subject theme density.

An * denotes built infrastructure themes that were applied to the example image on the left.

Overall, the category of ‘outdoor recreation’ was not prominent in the UGC. This could be due to the difficult nature of capturing actual recreation participation (it is difficult, and risky, to take photographs while canoeing for example), or the decreased likelihood that one is concerned with capturing their participation as a core component of the destination image. For those photographs and captions that included elements of outdoor recreation, the most common themes were boating (particularly non-motorized boating such as canoeing and kayaking) and hiking. Many of the images were more general representations of outdoor recreation. For example, an individual captured an image of a companion paddling a non-motorized water (Fig. 12). This image demonstrates that many photographs and captions coded as outdoor recreation were also coded with a human subject category; most often the image of outdoor recreation is not focused on the gear or recreation resource, but rather the individuals sharing in the recreation experience.

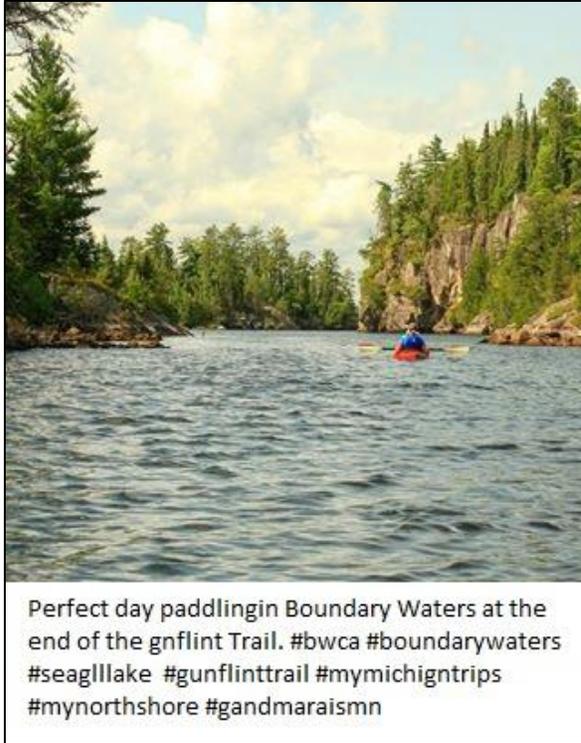


Figure 15. Example of outdoor recreation image and caption.

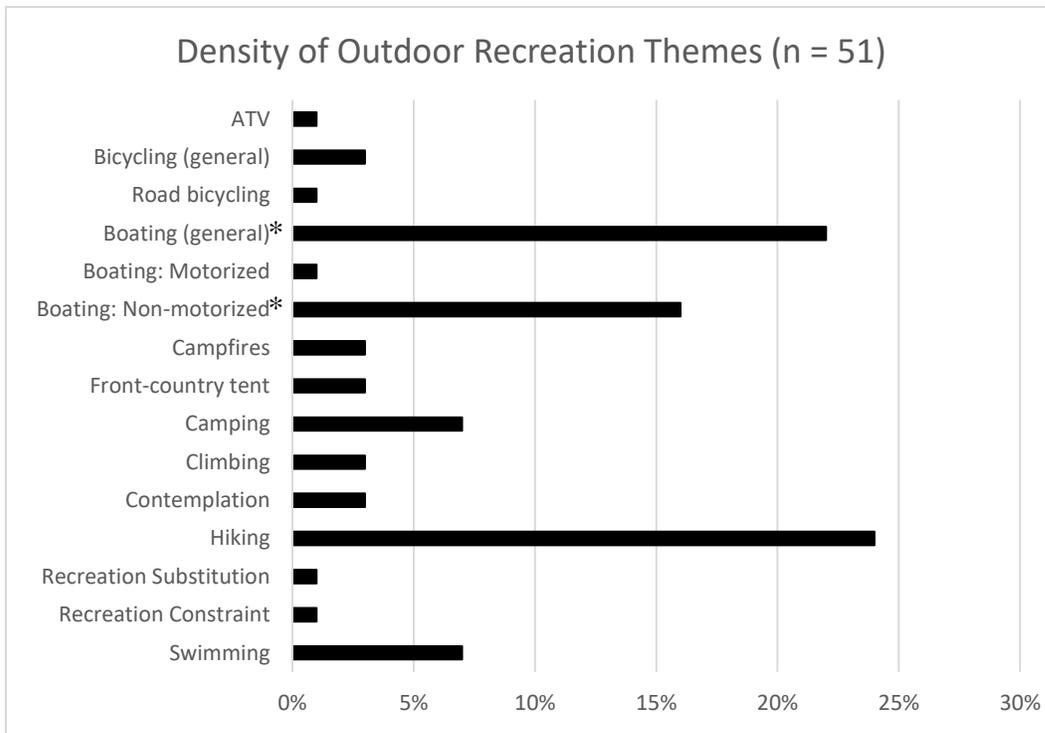


Figure 16. Chart of theme prominence in the outdoor recreation category. *The photograph on the right was coded using the parent category 'outdoor recreation,' and themes of boating, non-motorized were also applied.*

Culture was a less dominant category in visitors' UGC. Culture was conceptualized and operationalized through themes of art, food, and drink, and Native American culture. Among these components, images of food and drink were most common. There was a relative lack of images associated with native American art or captions referring to native American storytelling. Perhaps this is due to a reverence associated with native culture and a sensitivity toward exploiting Native American symbols and stories on social media. The example image displayed in Figure 13 illustrates the most dominant theme of culture in the UGC, food. Visitors' destination image contains the quintessential (and often loathed) quality of Instagram images generally: to share photographs of one's meals. Photographs, such as the one displayed in Figure 13, demonstrate that visitors' images of culture/food are focused on local, unique offerings that are a component of the destination image and the trip itself.



Figure 17. Example of a culture photograph and caption.

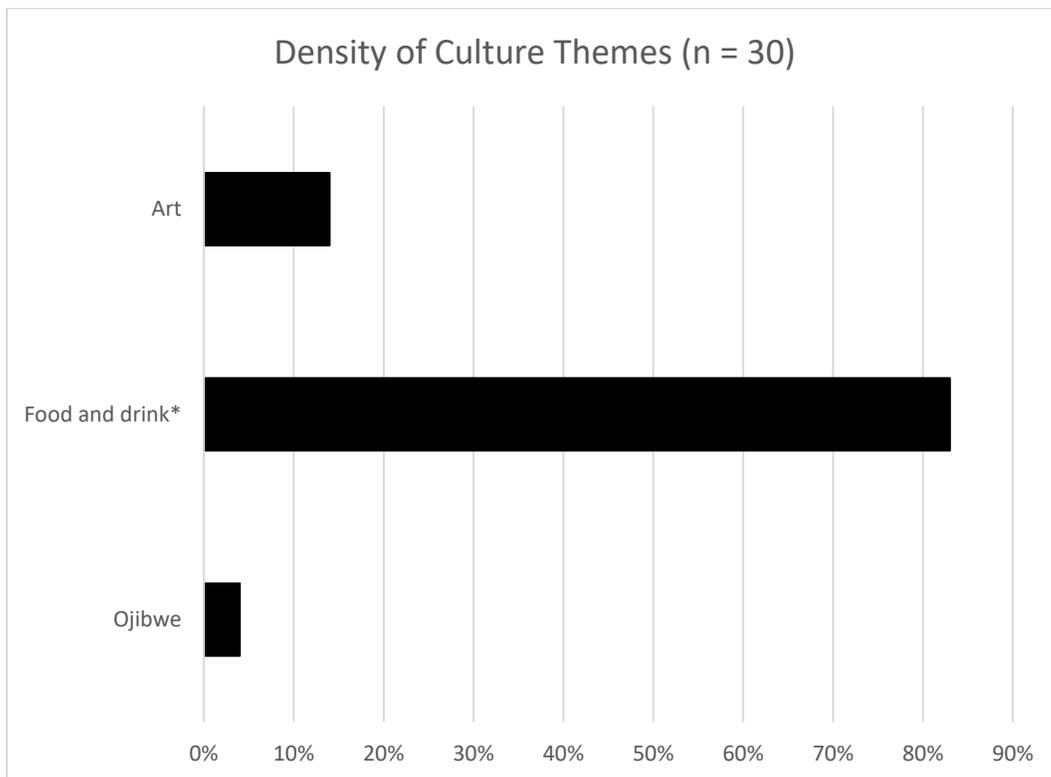


Figure 18. Chart of culture theme density.

*An * denotes culture themes that were applied to the example image on the left.*

Affect was moderately prominent in the UGC, which was captured through captions and additional hashtags associated with the images visitors posted to Instagram. Positive affect was much more dominant than negative affect (with less than 5 captions being coded as ‘negative’ affect). For example, positive affect is demonstrated in the caption to the image displayed in Figure 14, which reads ‘certainly a good way to start off my day!’ Such captions reflect that destination image inherently includes the emotional ties to a space, even from the perspective of a study grounded in understating the physical attributes of place.

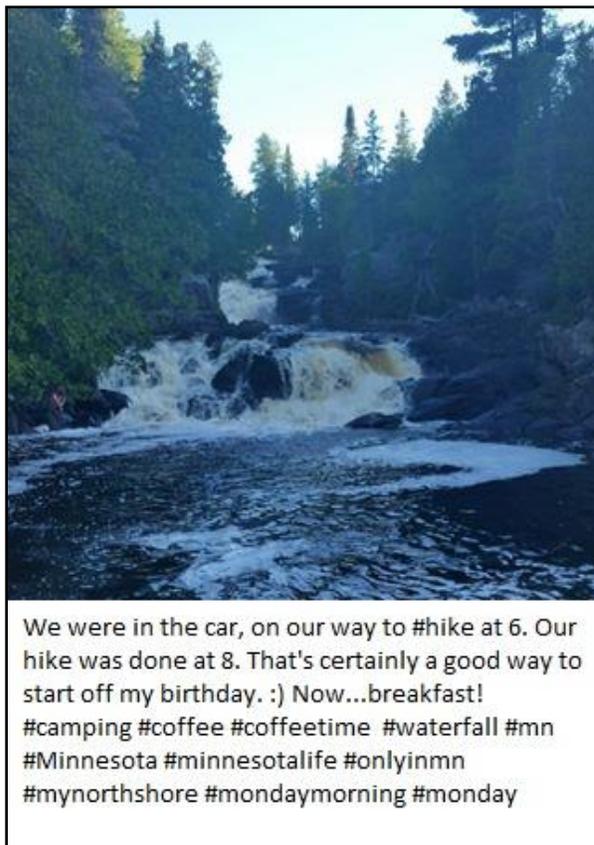


Figure 19. Example of a caption demonstrating affect.

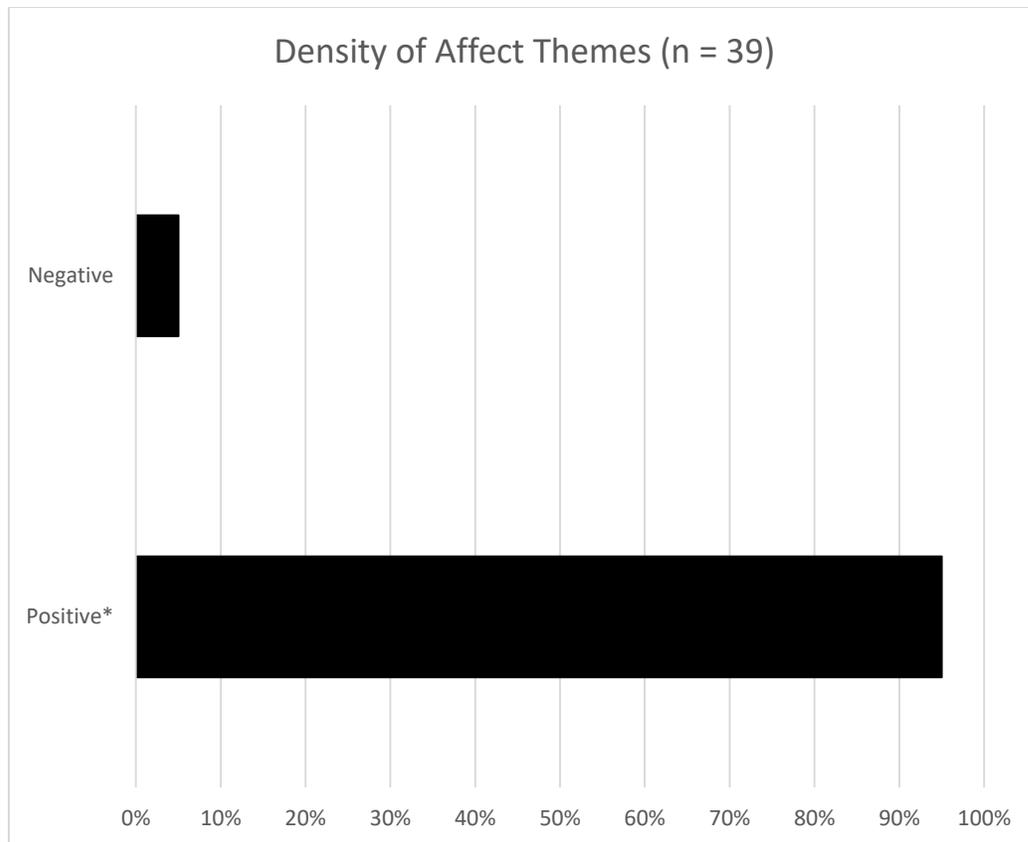


Figure 20. Chart of affect theme density.

*An * denotes the affect theme that was applied to the example image on the left.*

Discussion

To return to Relph's (1976) conceptualization of place, there are three components: the physical attributes, the activities that occur within, and the meanings assigned to the place. We acknowledge the vast contribution and advancement of the study of symbolic meanings assigned to place and how this research has informed theoretical and practical advancements for outdoor recreation and tourism research (e.g., Wynveen and Kyle 2014; Davenport et al. 2010; Kyle et al. 2004; Kil, Holland, and Stein 2015). An understanding of the connections between place and activities has also lead to constructive development of how place connections and recreation experiences are related (e.g., Dawson, Havitz, and

Scott 2011; Kyle et al. 2004; Kyle, Mowen, and Tarrant 2004). This study, however, was designed to assess another component of place: the physical attributes.

Imagery-based studies have the potential to reveal the framework, or web, within these relationships and values of symbolic meanings are strung. There is place-based research that strives to map place meanings as a technique for informing place based planning and management efforts (Lowery and Morse 2013; IPM 2016b; Williams 1995). This study presents a complementary extension of this research. Understanding not only the spatial extent of areas that hold meaning, but also the physical characteristics that are dominant in individuals' images of specific locations can further refine place-based planning and management approaches. Yung, Freimund, and Belsky (2003) found that place names can be a successful place to start conversations regarding the political meanings of place. Extending this same logic, then the image of a place themselves may also be conducive in eliciting conversation regarding place-based management during public planning processes (EPA 2002; Allen et al. 2009).

Climate change research, especially that which includes the construct of place meanings, typically considers the general context or setting of the study area (Smith, Anderson, and Moore 2012; Hess, Malilay, and Parkinson 2008; Cunsolo Willox et al. 2012). Establishing the physical characteristics of place wherein climate change and place meanings are being assessed can lead to deeper analyses of how physical characteristics may shape the meanings or the relationships between meanings and climate change adaption capacity. Geography has long informed other components of outdoor recreation and tourism research. For example, urban-wildland interfaces are studied because the physical characteristics of

these settings are key determinants of the environmental impacts and community or managerial capacity to adapt (e.g., McCarthy 2001; Murphy et al. 2015).

For climate change adaptation planning, the results of this study may fill the gap between researchers knowledge that place connections drive recreation demand in a climate change context (Smith, Seekamp, et al. 2016) and stakeholders' constraints to determining the key physical attributes or resources to consider in climate adaptation planning (Meszaros 2015). Results from this study and others (e.g., Lin et al. 2007) reveal that natural resources are a dominant component of destination image. Dominant resources within a NBT destination's image should be carefully monitored and, if necessary, adapted to conserve these elements of place image and the place. Other dominant themes, such as key elements of built infrastructure (e.g., streetscapes), will need their own consideration in climate adaptation planning for the North Shore. Community resources and built infrastructure must be monitored and adapted differently than natural resources; however, changes to the character or integrity of cultural resources could alter visitors' connections to those assets (Adger et al. 2011).

The dominant categories and themes identified in this study are consistent with existing research that demonstrates both cognitive (physical attribute of space) and affective (emotional response to a place) imagery contributes to destination image (Lin et al. 2007), and that both physical and emotional components should be considered in climate change adaptation planning and management (Dunlap and Brulle 2015). Additionally, climate change communication research reveals that imagery is powerful in shaping climate perceptions (Leiserowitz 2006), that individuals are most concerned with climate impacts to specific physical components of the landscape (Smith, Bitsura-Meszaros, et al. 2016), and that

powerful communication can actually create a sense of place (Rickard and Stedman 2015). Considering the physical characteristics of space more explicitly in place-based research will allow us to determine more specifically how the physical characteristics of space lead to symbolic meanings and a sense of place.

This study reveals that key components of North Shore visitors' destination image include natural resources, built infrastructure, and human subjects. Tourism providers can use such information to inform place-based branding. Marketing materials may include images of these elements that are key characteristic components of the region for current visitors and identified (through the shared nature of social media) by potential visitors who have not yet visited the North Shore. Recreation and tourism providers can also enhance opportunities to cultivate access to water-based experiences and both historic and current cultural hubs through conscious planning and management of infrastructure, programming, and events that enhance the likelihood of visitors encountering these elements of the North Shore image during their recreational visit to the area.

Implications

Methodologically, the study demonstrates that social media data can be used in place-based research. UGC is a readily available data source that is imagery-focused and represents a population that is not typically captured through traditional research methods (e.g., survey participants tend to be older than Instagram users). While the majority of UGC based studies utilize a quantitative research design (Feick and Robertson 2015; Brando and Bucher 2010; Antoniou, Morley, and Haklay 2010), this study demonstrates how UGC can be used to qualitatively explore the themes of destination image through social media posts. This study demonstrates that 'big data' are not necessary for UGC to provide a deeper understanding of

a localized study area. Furthermore, the type of content analysis employed here enables potential adoption by practitioners to assist in place branding.

As place image is related to satisfaction and intention to revisit a destination (Assaker and Hallak 2013, Chen and Tsai 2007, Prayag and Ryan 2011, Lee, Lee, and Lee 2014), having a deeper understanding of the key components of destination image can inform management of resources or refinement of marketing materials, such as developing a destination image that matches key attributes and elements of recreation experiences. Image-based marketing can also transcend cultural, language, and literacy barriers (Sancar and Severcan 2010; Kavaratzis and Hatch 2013; Govers and Go 2009). Managers can include the more prominent themes of visitors' shared destination image (e.g., natural resources, key features of built infrastructure, and human subjects) into marketing materials or strategic planning processes. Companions are an important component of the destination image presented here and marketing materials and business plans should consider relationships along with tangible elements such as opportunities to see and access the water, or streetscapes that appeal to visitors. While place branding is typically a top-down approach (instigated by government officials), the most successful place branding initiatives are co-created between both community leaders and community residents (Swinney, Lang, and Runyan 2012). Moreover, successful place branding considers the image of a place from the perspective of visitors and residents (Swinney, Lang, and Runyan 2012; IPM 2016). As such, future research is needed to explore how the physical attributes of place differ among residents and visitors, and more importantly, how the physical attributes of place can create shared place meanings.

Limitations

The destination image of a specific cross section of North Shore visitors (i.e., those who use social media) was captured by this study. This limits the generalizability of which components of destination image are most prominent (i.e., which resources are ‘key’ to visitors’ place meanings and experiences), as the themes presented here pertain to that narrow section of individuals represented by summer 2015 Instagram users. Although Instagram users specifically tend to be younger, identify as a racial/ethnic minority, and live in urban areas (Pew 2016), these voices represent a novel market segment. Social media users may be too young to participate in traditional methods of climate change adaptation data gathering (interviews, surveys, focus groups). In addition to a youthful perspective, social media users also represent a growing body of recreationists that seek opportunities for nature viewing and photography. Wildlife observation and nature photography are the fastest growing outdoor recreation trends (in total participants and in participation days; White et al. 2014).

Exploring the content posted by these visitors enhances managers’ understanding of what a young visitor, one invested in the image of the place, highly values (enough to share with their friends and family via social media). Images of place that are shared with outsiders are important part of understanding place. Places are not isolated but rather defined, in part, by their relation to the outside world (Massey 1994); thus, social media UGC allows managers to understand what attributes of a place are being shared with the outside world. Although UGC represents how a narrow of section of visitors conceptualize spaces physically, this information can be integrated with other data sources during planning or

decision-making, particularly in the face of climate change impacts to the natural and cultural resources upon which NBT demand is based.

Additionally, the lack of two-way communication between researchers and participants limited inferences into the deeper meanings of photographs. While reduced researcher influence may enhance the validity of the study in some ways (e.g., what visitors posted was not influenced by researcher presence), there was also no way to affirm with participants the researchers' interpretation of the photographs and text. However, this study analyzed photographs thematically to assess the physical attributes, not the underlying meaning of those places and attributes, so communication of the deeper, underlying meanings of the photographs and components within was not necessary. To overcome this limitation, future research may utilize UGC alongside traditional VEP data gathering methods to further assess the limitations and benefits of these unique methodologies.

Conclusions

This study's results demonstrate that natural resources, built infrastructure, and human subjects are among the most dominant components of imagery for the North Shore NBT destination, which indicates that the region's rocks and water are likely important physical attributes for visitors to seek, create, and recreate place meanings. Elements of built infrastructure in visitors' photographs underscore the importance of basic infrastructure in facilitating visitors' access to the North Shore's natural resources. Human subjects' prominence demonstrates that North Shore place image is also a function of interaction between the place and the relationships that occur within that space. It is probable that the weaker prominence of culture and outdoor recreation in visitors' images reflects the implicit and hard-to-capture-via-photograph nature of these components of place. While these components may be

stronger when analyzed through interviews, focus group, or mapping techniques (e.g., Davenport, Baker, Leahy, & Anderson, 2010; Kil, Holland, Stein, & Ko, 2012; Lowery & Morse, 2013), this study demonstrates that these facets of place meanings may not be strong indicators of place image in the region.

Landscape impacts, such as those from climate change, will only change the meanings of landscapes if individuals acknowledge the change is also occurring to themselves (e.g., Greider and Garkovich 1994 who discuss general landscape impacts). Therefore, the full impact of this research may be yet to come. As climate change alters the recreation resources of the North Shore, the attributes and image of the destination will also change. If visitors internalize these changes, the meanings they attach to the region may also change. This study presents one method for ascertaining some core components of the physical landscape that contribute to the formation and affirmation of place meanings. Future studies may investigate the key resources of the North Shore through visitor UGC again and use comparative analysis to explore how changes to the region's natural resources change the images visitors capture and share with family and friends.

Future research could include longitudinal studies using UGC to explore visitors' perception of the image and attributes of a NBT destination over time. As an area is impacted by climate change, 'solastalgia' may occur, a term that describes the "potential human response in contexts where one's physical environment is transformed" that can cause stress and changes to the way individuals identify with the place (Higginbotham, Connor, Albrecht, Freeman, & Agho, 2007, p. 246). Visitors' UGC can reveal how relationships to the physical attribute of place change over time, in response to change, and inform an enhanced understanding of destination image impacted by solastalgia. Other studies have used

adolescent populations to understand how changes to place impact the meanings of those places, as place attachments and meanings often develop in childhood and later are the foundation for adults' sense of place (Sancar and Severcan 2010). Future research on climate change impacts to NBT may strive to gather data from children who frequent the destination to understand those key attributes of place that are building the underpinnings of place meanings for future visitors.

To undermine the importance of place image would be failing to fully examine the full conceptualization of place. Images have been a powerful force throughout the history of natural resources and outdoor recreation management. From the art of Thomas Moran, which led to fascination and eventually protection of the United States' expansive western parks to the photography of Ansel Adams and the posters of the Works Progress Administration, which inspired affinity for and travel to natural spaces by other generations, the physical characteristics of space are what drives individuals to visit and create meaning within these spaces.

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CHAPTER 3: Climate & outdoor recreation: Predictors of past climate-related coping behaviors and future climate risk perceptions

Introduction

Climate change impacts outdoor recreation by altering both the supply of outdoor recreation opportunities (e.g., Scott et al. 2004) and the demand outdoor recreationists place on those opportunities (e.g., Dawson et al. 2013). Weather also impacts visitors' recreational experiences (Hipp and Ogunseitan 2011; Hendrik and Jeuring 2017). Climate and weather are closely related concepts, and climate has been defined as long-term average weather conditions (Scott et al. 2007; Forland et al. 2012). Ideal weather or climate is highly subjective with individuals having various preferences and responses to environmental conditions; however, impacts sustained from adverse weather or climatic conditions (hereafter, *climate-related impacts*) are generally perceived negatively by tourists and recreationists (Forland et al. 2012). In response, recreationists find ways to cope with climate-related impacts, including behavioral and cognitive responses (Miller and McCool 2003).

Recreationists' behavioral coping responses from climate-related impacts typically include temporal, spatial, activity, and strategic substitution (e.g., Dawson et al. 2013; Aas and Onstad 2013). In response, recreation providers' must also cope with climate-related impacts to maintain visitor flows (e.g., Scott et al. 2006; Beaudin and Huang 2014; Ayscue et al. 2015). For example, enhancing accommodations and creating indoor programming may curb lost tourism revenue resulting from climate-related impacts, such as decreased snowpack (Balbi et al. 2013). Partnerships may also become increasingly necessary to address more complex management problems that climate change poses, such as campground

concessionaires coordinating flooding impacts with emergency management personnel (De Bruin et al. 2009). However, both recreationists and outdoor recreation providers may use similar strategies to cope with climate-related impacts, including using short-term (daily, weekly) forecasts and long-term climate modeling (Becken et al. 2015; Ayscue et al. 2015). A recent study documented that more than one-third of recreationists reported checking the weather of a destination before booking their trip as well as in the weeks leading up to their visit (Hamilton and Safford 2015). As such, weather and climate not only play a role in the activities and experiences available in a NBT destination but also the image and perceptions visitors have of that destination (Denstadli et al. 2011; Gómez Martín 2005).

Past climate-related experiences or impacts may also influence a NBT regions' destination image, as well as visitors' subsequent cognitive responses to climate-related impacts, including the formation of future climate-related risk perceptions (Akerlof et al. 2013; Hamilton and Lau 2006). Risk perceptions are related to individuals' values and perceived behavioral control and are important to consider in overall place management, as risk perceptions can drive support for policy and management aimed at adapting to or mitigating climate change impacts (e.g., Leiserowitz 2006; van der Linden et al. 2015; Zhao et al. 2011). Risk perceptions can be assessed in relation to a number of aspects of individuals' lives. For example, risk can be conceptualized relative to oneself, ones family, across varying temporal ranges, and even across non-human species (Zhao et al. 2011; Yang et al. 2014).

In relation to both behavioral (climate-related recreational coping mechanisms) and cognitive (climate-related risk perceptions) responses to climate change, the concept of place meanings may be particularly influential, as place meanings are the reasons why individuals

value a specific geographical space. Ranging from instrumental to intangible, these meanings reflect individuals' relationship with that space (Cheng et al. 2003). Consequently, place meanings may determine the type of coping behavior an outdoor recreationist employs (e.g., Miller and McCool 2003) and provide a lens through which to assess risk perceptions.

This study seeks to add to the current literature on climate change impacts to NBT by exploring how visitors are responding both behaviorally (recreational coping) and cognitively (risk perceptions). Insights from this study will enhance the theoretical understanding of these two constructs, and how they are related to place meanings. Understanding place meanings is imperative for practitioners utilization of place-based management approaches (Davenport and Anderson 2005). Integrating place meanings into climate change planning initiatives can help address the challenges associated with adaptation, such as the lack of meaningful engagement and the need for communal problem solving (Moser and Boykoff 2013).

Specifically, this paper addresses two research questions:

1. How are visitor attributes and place meanings related to how individuals have coped with past climate-related impacts?
2. How does exposure to climate-related impacts affect future risk perceptions, while accounting for place meanings, perceptions of personal efficacy, and general climate change concern?

Results from this study will enhance recreation providers' understanding of how individual attributes and values (place meanings) are related to how individuals respond to climate-related impacts. Further, this study will reveal how encountering climate-related impacts influences future perceptions of climate change risk, even after controlling for place

meanings, perceptions of personal climate change efficacy, and general climate change concern. Theoretically, this study builds on the understanding of how personal factors and values are related to individuals' actions (coping behaviors) and thoughts (risk perceptions). These insights can inform how outdoor recreation providers plan and manage opportunities for recreational experiences within the context and uncertainty of climate change.

Literature review

Tourism, as a global industry, is projected to be impacted by climate change, with specific impacts dependent on the nature of the tourism activity itself (e.g., winter or summer tourism) (McCarthy et al. 2001; Nicholls 2006; Scott et al. 2004; Lise and Tol 2002). Those tourism locations most vulnerable to climate-related impacts are typically the ones with the least resources (often times, information) to strategically plan for climate change (McCarthy et al. 2001). Furthermore, communities with little economic diversification and natural resource dependent economies (such as NBT) are increasingly vulnerable to climate change (McCarthy et al. 2001; van der Veecken et al. 2016; Pearce et al. 2012). However, adaptation based on relevant information can reinforce sustainable development and equity in communities (and economies) threatened by climate change (McCarthy et al. 2001). Research regarding the impacts of climate change to natural resources in NBT areas (Ayscue et al. 2015; Shaw et al. 2009; Scott et al. 2004; Nicholls 2006) provides important insights into when and where climate change will occur. Understanding visitors' behavioral and cognitive responses to climate change provides NBT communities with complementary information needed to make strategic adaptations to climate-related impacts.

Behavioral responses

Coping in outdoor recreation occurs in response to recreational conflict, goal interference (with the goal being recreationists' achievement of a preferred recreation experience), or constraints (factors that inhibit leisure pursuits) (Miller and McCool 2003; Schneider and Wynveen 2015; Manning 2010). Coping occurs when outdoor recreationists “either change their behavior, attempt to change their environment, or change the way they evaluate the situation” in response to undesirable conditions that inhibit them from achieving their goal of obtaining a desirable recreational experience (Miller and McCool 2003, p. 261). There are various reactions to goal interference, such as cognitive coping through rationalization (justifying the problem), product shift (shifting idea of acceptable conditions), and direct action (talking through the issues with others). Outdoor recreationists may also react to goal interference through behavioral coping mechanisms, such as changing when or where they engage in outdoor recreation (i.e., temporal or spatial recreation substitution) (Miller and McCool 2003; Schneider and Wynveen 2015; Aas and Onstad 2013). It is presumed that recreationists will make the smallest or most similar changes to their cognitive processes or behaviors to cope with a conflict or constraint (Aas and Onstad 2013); however, as recreation resources shift in supply, coping alternatives also become uncertain or reduced (Core Writing Team et al. 2014).

Tourism, especially NBT, has been identified as a climate-sensitive industry with global shifts in visitation trends predicted in response to gradual changes in climatic conditions (Scott et al. 2012; Nicholls 2014). Climate change impacts coping mechanisms by directly influencing the supply of outdoor recreation resources (Scott et al. 2004; Fisichelli et al. 2015). For example, ski areas are likely to either (1) diminish services with the loss in

snowpack or (2) flourish if they are able to maintain adequate conditions and capture the market from ski areas that have closed due to a lack of snow (Pons et al. 2014). Further, when visitors are displaced from a climate-impacted recreation setting that holds deep-rooted meanings for them, there may be no effective substitution (Adger et al. 2013).

Research demonstrates that spatial, or resource, substitution is the most common among recreationists who may be highly involved (e.g., skilled, committed) in an activity, and care less about where (the resource or spatial context) they recreate (Aas and Onstad 2013). While resource substitution was originally conceptualized as a reaction when demand outstrips the supply of a resource (Cordell 1976), the construct is now considered more broadly, such as in contexts where the environmental conditions are not ideal for recreationists (Aas and Onstad 2013). Moreover, place meanings intersect with the concept of recreation substitution. Individuals who value a specific geographic space may be less likely to spatially substitute another recreation setting and instead utilize temporal or activity substitution to overcome constraints (Miller and McCool 2003; Hammitt et al. 2004)

Activity substitution was conceptualized by early researchers from the fields of outdoor recreation management (Hendee and Burdge 1974) and leisure sciences (Iso-Ahola 1986). Across both these fields, activity substitution is the concept of outdoor recreationists swapping activity choices rather than the location of their recreational experience. Temporal substitution refers to changing the timing of recreational pursuits to overcome conflicts or constraints such as crowding (Dawson et al. 2013; Manning 2010). Strategic substitution refers to using different gear, equipment, or methods (e.g., bow hunting and rifle hunting, tent camping and using back-country shelters) to overcome constraints or goal interference (Aas and Onstad 2013).

Additionally, visitors' response to a constraint can depend on not only environmental factors (climate-related impacts) but also individual attributes and psychological characteristics (Miller and McCool 2003). To date, research has predominately focused on linking individuals' attributes (e.g., their sociodemographic traits) and their psychosocial characteristics (e.g., the centrality of an activity to their lifestyles) to specific recreational activities. For example, income can have been found to be influential when substitution is viewed as an economically-driven response (Cordell 1976). In another example, outdoor recreationists' loyalty to an activity has been found to affect activity-specific behavioral coping responses (Dawson et al. 2013; Hammitt et al. 2004; Oh and Hammitt 2011). Given this study is focused on visitors to a NBT region (i.e., not activity specific visitors), broader individual attributes (e.g., age and gender) are assumed to be more reliable predictors of coping. For example, gender has been considered in the context of outdoor leadership participation and coping, with findings illustrating that men spend less time considering risks and perhaps are less likely to identify the need to cope but rather focus on activity participation (Propst and Koesler 1998).

Place meanings challenge the typical ways we think about coping. Miller and McCool (2003) have explicitly urged for more research on the coping behaviors of populations that are tied to a place. Coping within human systems is location-specific and climate-related impacts and coping responses should be assessed at a small scale to adequately consider unique place-based values and coping mechanisms (McCarthy et al. 2001). Generally, findings reveal that as place attachment increases, the likelihood of resource (or spatial) substitution decreases (Hammitt et al. 2004b). While some researchers consider place attachments as the predictor of substitution, Dawson and others (2011) present a counter

relationship wherein recreationists who do not spatially substitute, instead returning to the same settings despite climate-impacted conditions, consequently enhancing the strength of the meanings they hold towards a particular space.

Cognitive responses

Research on individuals' perceptions of risk has replaced traditional approaches to risk assessment (i.e., subjective measures of rational, 'real' dangers), and demonstrated that individuals' perceptions of risk influence support for policy and management (e.g., Slovic 1999). Managers, planners, and policy-makers must consider individuals' risk perceptions and scientific appraisals of risks to cohesively inform climate change related policies and management plans that are relevant to the public (Leiserowitz 2006; Slovic 1999). Climate change risk perceptions are commonly conceptualized as the probability that the outcome of climate change will occur as well as the level of impact, either positive or negative, from that outcome on some relevant aspect of importance to an individual (Leiserowitz 2010). Individuals' value orientations, such as egalitarianism or fatalistic, are found to be better predictors of their climate change risk perceptions than personal attributes, such as demographic variables, and the strongest risk perceptions are related to impacts that affect individuals and their families (Leiserowitz 2006). However, recent research suggests that climate literacy among younger populations (adolescents) may influence climate change risk perceptions (along with personal worldviews which dominate adults perceptions of environmental risks) (Stevenson et al. 2014).

In the context of outdoor recreation and NBT tourism, de Urioste-Stone et al. (2015) found that climate change risk perceptions are heightened for environmental aspects of their visit rather than social aspects. This shift in risk attenuation may be directly related to the

relationship between climate change risk perceptions and prior experience with climate-related impacts (Leiserowitz 2006). That is, individuals who reported they have ‘experienced’ climate change in their lifetime also report heightened climate change risk perceptions (Akerlof et al. 2013). Other research has found this relationship more complex. Reser et al. (2014) found the influence of ‘experiencing’ climate change on risk perceptions to be dependent upon the “prior degree of uncertainty and/or direct influence” rather than indirect, virtual, or vicarious ‘experience of climate change.

Environmental change has the potential to alter the physical characteristics of a landscape, which may result in heightened risk perceptions (due to ‘experiencing’ and proximity to impacts) and may alter the meanings individuals attach to those altered landscapes (e.g., meanings change when an agricultural space is no longer productive due to pollution) (Broto et al. 2007). Place meanings can also facilitate individuals’ advocacy for certain management actions that either controls or eliminates the cause of change to a landscape with which they attach deep meaning (Jacquet and Stedman 2014; Müller 2011). Existing studies of risk and place, consider the two constructs directly connected, in that “risk perceptions emanate from the meaning and connection ascribed to a physical setting” (Rickard 2014, p. 278). In some cases, risk perceptions may be heightened by strong, existing place meanings. For example, individuals who are attached to a place (for various reasons) demonstrate greater awareness and opposition to the risks climate change poses to their locale (Scannell and Gifford 2013). However, other literature demonstrates that disruptions to the places with which individuals’ identify can cause shock and denial of the cause of disruption (in the most extreme cases, e.g., Aboriginal migration, relocation) and opposition

of the disruption (in more moderate cases, e.g., development of natural area) (Jacquet and Stedman 2014).

General climate concern has been used as a proxy measure for universal climate change risk perceptions, but this limits the insights researchers can glean from such data (Leiserowitz 2006). General climate concern may be more highly associated with general pro-environmental attitudes, while climate change risk perceptions can gauge individuals' concern with distinct type of climate impacts that may be unrelated to the environment, such as risks to the economy (Carlton and Jacobson 2013). While general climate concern is predictive of participation in environmental actions such as energy conservation (Whitmarsh 2009), this construct is reflective of 'elite cues,' which are the most recent viewpoints on climate change being espoused by the media and influential political leaders (Brulle et al. 2012). Understanding general climate concern allows researchers to assess individuals' broad cognitions of climate change, which are both shaped by and predictive of their immediate environment.

Furthermore, visitors may perceive distinct aspects of the recreation setting as more or less severely impacted by climate change based on their personal attributes. For example, research on climate change beliefs document that perceptions of personal efficacy—specifically, feelings that one individual can make a meaningful difference—is generally low (van der Linden et al. 2015) and can lead to feelings of guilt (Lorenzoni et al. 2007), which may mitigate the formation of negative risk perceptions. Overall, risk perceptions are challenging to study because of the numerous potential predictors of these subjective, individual appraisals and the uncertainty surrounding potential climate change impacts. However, existing literature urges researchers to consider how socio-cultural values (place

meanings), personal experiences (past impacts), and cognitive components (general climate concern and perceived personal efficacy) are related to future risk perceptions, particularly in the context of nature-based tourism (van der Linden et al. 2015; De Urioste-Stone et al. 2015).

Methods

The study area for this research is the “North Shore” NBT region located in Minnesota (USA) along the northeastern shore of Lake Superior (see Figure 15). The North Shore is characterized by public land ownership, a majority of the region is owned and managed by federal and state agencies (USDA Forest Service, Minnesota Department of Natural Resources) for public recreational access. The dominant recreation settings are forests (mixed aspen-birch-conifers) and open water (Lake Superior, inland lakes, river and streams). Small communities are concentrated along the coastline and provide lodging options, restaurants, and outfitting and guiding services to facilitate recreation experiences by visitors.

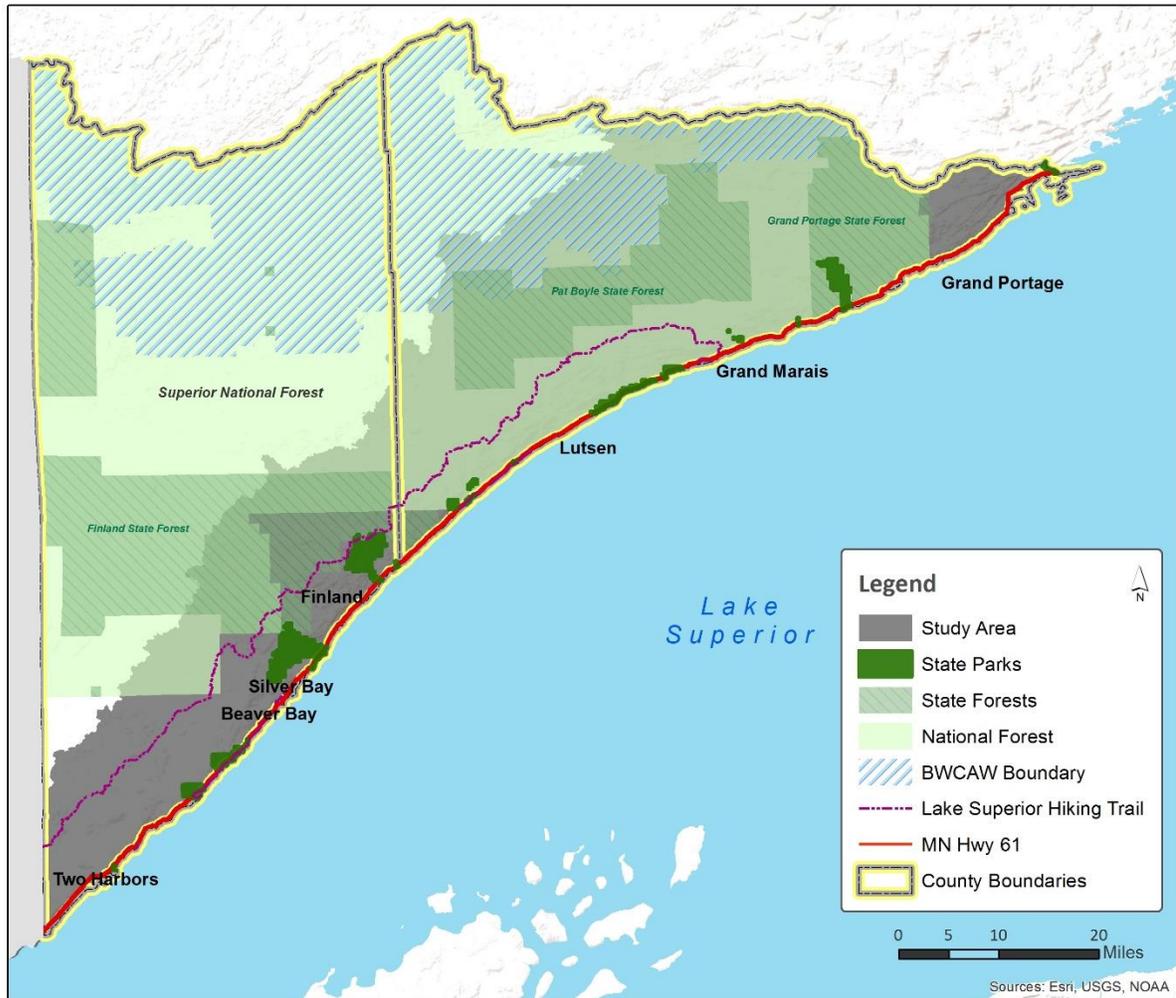


Figure 21. Study area: The North Shore NBT region in Minnesota, USA.

Sampling

The unit of analysis for this study was visitors to the North Shore during the 2015 summer tourism season (defined as June 1 through August 31). To participate in the survey, individuals had to reside outside of the North Shore region (as delineated in Figure 15) for at least 10 months of the year, be 18 years of age or older, and voluntarily participate in the study. Visitors completed survey questionnaires on-site at recreation sites along the North Shore between July 15 and August 3, 2015. Project personnel determined sampling sites with

consultation from North Shore recreation providers, considering geographic consistency (i.e., locations along all portions of the region) as well as diversity in the type of tourist likely to be intercepted (i.e., sites were selected where anglers, hikers, shoppers, diners, scenic drivers, etc. were likely to stop). Sampling was semi-random, with sites assigned to either the northern or southern end of the region and then randomly assigned 3-4 weekday sampling blocks and 2 weekend sampling block within the sampling time frame. For those visitors traveling in groups, the individual with the most recent birthday was asked to complete the survey questionnaire.

Instrument

On-site pilot testing of the survey questionnaire was completed in November 2014. Small changes were made to the language and flow of the survey and sampling procedures to maximize visitors' time and engagement with the questionnaire during the summer sampling period. Additionally, an Institutional Review Board at the authors' home institutions reviewed and approved the survey instrument and sampling procedures.

Visitors were presented with a table depicting current, average climate and environmental conditions (heat index, high temperature, rainfall, fire risk, and fish stock) for the North Shore region. Alongside the current conditions, visitors were shown what potential conditions for those climate and environmental conditions are likely to be during a future summer season (see Question 7 in Appendix A: Survey Instrument). One of four versions of the survey was administered to visitors at random (i.e., every fourth visitor received the same survey treatment). Each survey version presented slightly different potential future conditions (all other portions of the survey instrument were identical). The four survey treatments resulted from two scenario components. First, different potential future environmental

conditions (including: average high temperature, heat index, and rainfall) based on a high or low emissions future (i.e., high impact, low impact) were downscaled for the North Shore region from Representative Concentration Pathway (RCP) scenarios that represent various assumptions behind future greenhouse gas emission trajectories. Second, two different fire risk scenarios, one that included future days at ‘high,’ ‘very high,’ and ‘extreme’ fire risk, the other included only days at ‘very high,’ and ‘extreme’ fire risk (i.e., high fire risk, very high fire risk) were developed based on historical trends. These two scenario building components (climate projections and fire risk) resulted in the four survey treatments: (1) high impact, high fire risk; (2) high impact, very high fire risk; (3) low impact, high fire risk; and (4) low impact, very high fire risk (all four survey treatments are included in Appendix A).

Social-psychological variables included nine measures of place meanings, modified from previous research that had validated the scale reliability (e.g., Davenport, Baker, Leahy, & Anderson, 2010; Smith et al., 2011; Smith, Siderelis, Moore, & Anderson, 2012) (see Question 17 in Appendix A). Respondents were asked to rate their agreement with each item on a five-point Likert-type scale (1 = *Strongly disagree*, 2 = *Disagree*, 3 = *Neither Agree nor Disagree*, 4 = *Agree*, 5 = *Strongly Agree*). One item was included to measure visitors’ self-perceived personal climate change efficacy: *I am able to plan for changes to outdoor summer recreational activities on the North Shore* (modified from a measure used in Brody et al. 2008), with response options measure on a five-point Likert-type scale including: *Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree*. Another item was used to assess climate change concern, with responses measured on a five-point Likert-type scale including options: *Not At All Concerned, Slightly Concerned, Moderately Concerned, Very Concerned, and*

Extremely Concerned. The survey instrument also included measures of visitors' sociodemographic characteristics (e.g., age, gender).

Visitors were also asked if they had encountered one or more of six different types of climate-related impacts and, if in response, they had adopted one or more of eight possible coping behaviors (see Question 15 in Appendix A: Survey Instrument). The six types of past climate-related impacts included: (1) *heavy rainfall*; (2) *flooding*; (3) *excessive heat indices*; (4) *abnormally cold temperatures*; (5) *forest fires*; and (6) *forest blowdowns*. The eight types of past coping behaviors included: (1) *purchasing new or better equipment or gear*; (2) *planning trips for other times of year*; (3) *paying closer attention to weather forecasts **prior to trips***; (4) *paying closer attention to weather forecasts **during trips***; (5) *worrying more about safety prior to or during trips*; (6) *seeking lodging options that enhance safety*; (7) *visiting recreation sites that reduce risks*; (8) *participating in less risky recreational activities*. Respondents could check (e.g., respond yes) for any combination of past climate related impacts and subsequent behavioral coping responses (e.g., responses were dichotomously coded).

Following the table of current and potential future environmental conditions, a number of items asked visitors to reflect on current and potential future conditions and consider, for one, how they believe those future conditions will impact five aspects of their North Shore recreation experiences: (1) *their self (health safety, and security)*; (2) *their future trips on the North Shore*; (3) *recreation infrastructure on the North Shore*; (4) *nature on the North Shore*; and (5) *the local tourism economy on the North Shore* (modified from measures used in Yang et al. 2014, see Question 11 in Appendix A: Survey Instrument). Risk perception items were measured on a six point Likert-type scale with response options of:

Negatively Impact; Slight Negative Impact; No Impact; Slight Positive Impact; and Positively Impact.

Data Transformation

Several items were transformed by recoding items into binary variables for analyses. A principal components analysis was used to assess the validity of the place meanings items, all nine items loaded into a unidimensional scale (see Table 5). Varimax rotation was used, with cases of missing data excluded on pairwise basis, and estimated components with an Eigenvalue greater than one being saved as factor scores. All nine place meanings items loaded sufficiently onto one factor, demonstrating an overall measure of place meanings rather than a three-factor solution. Based on the factor score, three categories of place meanings were computed for all cases: low place meanings (affiliated with a factor score below -1.5, 8% of the dataset), moderate place meanings (factor score between 0.0 and -1.5, 42% of the dataset) and high place meanings (factor score above 0.0, 50% of the dataset). These categories were computed and used to ensure a sufficient number of cases per category. Category 'cut-offs' were guided by an examination of individuals' mean response to all nine place meaning items (i.e., those in the 'low' place meaning category had a mean place meaning values of below 2.0 [2 = *disagree*], those in 'moderate' place meaning category had a mean place meanings value between 2.1 and 3.4 [3 = *neither agree nor disagree*], and those in the 'high' place meanings category had a mean place meaning values of 3.5 or higher [4 = *agree*].

Table 5. Component matrix for principal component analysis of place meanings items.

<i>Item</i>	Component 1
I identify strongly with the North Shore.	.881
I feel the North Shore is a part of me.	.813
I am very attached to the North Shore.	.804
I get more satisfaction out of visiting the North Shore than any other place.	.892
Doing what I do on the North Shore is more important than doing it in any other place.	.789
No other place can compare to the North Shore.	.787
I feel a sense of pride in my heritage when I am on the North Shore.	.770
The North Shore is a special place for my family.	.852
Many important family memories are tied to the North Shore.	.794
$\alpha = .933$	

Responses for perceptions of future risk were computed into binary categories due to low cell count along the full six-point scale and to make interpretation of results focused only on those visitors perceiving impacts as negative or positive. Responses were re-categorized as either ‘negative’ or ‘positive’, with responses of ‘*no impact*’ removed from the analyses for this study. The number (and proportion) of the responses that were removed from the data set for the analysis associated with the second research question are as follows: *impact self*, n = 703 (50%); *impact trip*, n = 748 (54%); *impact recreation infrastructure*, n = 530 (38%); *impact nature*, n = 413 (30%); and for impact economy n = 552 (40%). A composite variable was also created for each of the coping behaviors; for example, a respondent indicating they have coped by *using weather forecasts prior to trips* was coded as a 1 for that specific coping behavior, regardless of the type of past impact (e.g., heavy rainfall, flooding, etc).

Data analysis

To explore each of the research questions, a series of binary logistic regression analyses were computed (all analysis was completed using SPSS, v. 24). To answer research question 1, eight separate binary logistic regressions were conducted in which the dependent

variable was one of the eight coping behaviors and place meaning level, age, and gender were the independent variables. To answer research question 2, five separate binary logistic regression analyses were conducted in which the dependent variable was one of the five aspects of future climate-related risks and place meanings, self-reported past climate-related impact, degree of perceived personal efficacy, and level of climate change concern were the independent variables.

Binary logistic regression was selected because the dependent variables (past coping behaviors and future risk perceptions) were both being explored as binary (yes/no, negative/positive respectively) variables. Further, binary logistic regression does not assume a linear relationship between the dependent and independent variables (the data used here were not linearly correlated) and the independent variables did not need to be normally distributed (our independent variables were not) or have equal variance within each group (our independent variables did not). For each analysis, the use or non-use of a coping behavior was mutually exclusive (i.e., each visitor was either a 'yes' or 'no' for each of the eight coping behaviors) even though visitors could have participated in more than one coping behavior. The Hosmer-Lemeshow statistic was used to demonstrate goodness of fit for each of the analyses (a non-significant statistic, $> .05$, demonstrates that we fail to reject the null hypothesis that there is no difference between the observed and model predicted values, i.e., acceptable model fit).

Results

Response Rate & Participant Profile

Survey sampling resulted in 1,398 usable responses of the 2,453 intercepts made, a 57% response rate. Non-response bias testing revealed that there were no significant

differences between participants and non-participants for number of trips per summer season or climate change concern. Independent t-tests were used to assess number of trips (participants $\bar{x} = 1.79$; non-participants $\bar{x} = 1.64$; $t = 1.62$, $p = .245$). Mann-Whitney U tests were used to assess climate change concern ($z = 1.904$, $p = .057$). Chi-square testing reveal there were differences between groups based on age (participants were younger, overall, than non-participants ($\chi^2 = 32.33$, $p < .001$) and trip purpose (participants, overall, had a primary purpose to recreate at the site at which they were intercepted, non-participants were more likely to recreate at multiple sites or to be on a business trip, $\chi^2 = 23.06$, $p < .001$). Additionally, the datasets for each climate projection treatment were combined following a test for significant differences between responses to variables analyzed by this study, based on survey treatment (i.e., set of potential future conditions visitors were presented). A one-way ANOVA test (excluding case-by-case) revealed no significant differences between groups (i.e., between survey treatments) for any of the variables included in this study (see Table 6).

Table 6. ANOVA test of significant differences between survey treatment groups for independent and dependent variables.

Variable	Sum of squares	df	F	Sig.
Place meanings	0.450	3	0.372	.773
Age	9.583	3	1.444	.228
Gender	0.351	3	0.477	.698
Equipment coping	0.235	3	0.516	.672
Timing coping	0.601	3	1.075	.359
Forecasts (prior) coping	0.536	3	0.747	.509
Forecasts (during) coping	0.125	3	0.201	.896
Worry coping	0.596	3	1.494	.214
Lodging coping	0.112	3	0.286	.835
Site safety coping	0.547	3	1.148	.329
Activity coping	0.846	3	1.752	.154
Impacted in past	1.017	3	1.580	.192
Climate concern	2.026	3	0.431	.731
Personal efficacy	1.099	3	0.624	.599

Descriptive statistics for the independent variables (Table 7), visitors’ past climate-related impact coping behaviors (Table 8) and future cognitive responses (Table 9) illustrates general trends in North Shore visitors’ characteristics, values, and behaviors. Overall, visitors had strong place meanings, were middle-aged (most respondents were between 35 and 64 years of age), and were equally likely to be either male or female. Over two-thirds of summer North Shore visitors are at least *moderately* concerned about climate change globally, and *agree* or *strongly agree* that they are able to plan for climate change impacts to their recreational experiences on the North Shore.

In regards to past impacts, ‘pay attention to weather forecasts prior to *and* during trips’ is the most common coping mechanism for North Shore visitors who have been previously impacted. For visitors who have coped in response to flooding, fires or

blowdowns, ‘purchasing new equipment or gear’ is not reported as a typical coping mechanism, perhaps due to the nature of these events and that gear and equipment will not assist visitors in coping with a fire the same way as it may allow for coping with temperature-related impacts (e.g., proper clothing, sleeping bag, footwear, etc.). Overall, in response to all types of impact, few visitors (generally under 10%) worry or seek safer lodging or recreation activities. Temporal (timing of trips) and spatial (sites that reduce risk) substitution are moderately favored by visitors who have been previously impacted by climate-related impacts.

Visitors’ perceptions of future climate-related risks, overall, tend to reflect that no impacts will be sustained from the potential future conditions. Although, as described above, responses of ‘no impact’ were removed from analysis for this study. Depending on impact type, one-quarter to over one-third of visitors perceive future climate change risks as negative. The strongest perceptions of negative impacts were for nature and the North Shore tourism economy. Generally, less than one-quarter of visitors perceive climate impacts as positive.

Table 7. Descriptive statistics of independent variables for both research questions 1 and 2.

Variable	Percent of the sample population	
	Research question 1	Research question 2
Place meanings:	n = 1,326	n = 996
Low	8%	8%
Moderate	42%	41%
High	50%	51%
Age:	n = 1,374	--
18-24	10%	--
25-34	14%	--
35-44	21%	--
45-54	22%	--
55-64	21%	--
65+	11%	--
Gender (male/female)	n = 1,372 (43%/57%)	--
Encountered a past climate-related impact	--	n = 997 75% have
Able to plan:	--	n = 997
Strongly disagree	--	1%
Disagree	--	4%
Neutral	--	18%
Agree	--	61%
Strongly agree	--	16%
Climate concern:	--	n = 994
Not at all	--	12%
Slightly	--	17%
Moderately	--	26%
Very	--	28%
Extremely	--	17%

Table 8. Descriptive statistics of past climate-related impacts and resulting coping behaviors of North Shore visitors.

	n, %								# of unique cases (visitors) impacted by each climate-related incident
	Purchase new or better equipment	Plan trips for other times of the year	Pay closer attention to weather forecasts prior to trips	Pay closer attention to weather forecasts during trip	Worry more about safety prior to or during trips	Seek lodging options that enhance safety	Visit recreation sites that reduce risk	Participate is less risky recreation activities	
Heavy rainfall	168, 13%	132, 10%	322, 24%	238, 18%	50, 4%	75, 6%	84, 6%	129, 10%	893
Flooding	35, 3%	156, 11%	265, 20%	166, 13%	76, 6%	84, 6%	105, 8%	155, 12%	809
Excessive heat	49, 4%	142, 10%	288, 21%	207, 15%	65, 5%	59, 4%	100, 7%	124, 9%	813
Abnormally cold	166, 12%	160, 11%	265, 19%	189, 14%	51, 4%	83, 6%	70, 5%	101, 8%	553
Forest fires	22, 2%	165, 12%	237, 18%	132, 10%	107, 8%	76, 6%	141, 11%	139, 11%	804
Forest blowdowns	27, 2%	133, 10%	203, 15%	130, 10%	99, 7%	67, 5%	131, 10%	124, 9%	765
# of unique cases (visitors)	261	346	504	407	221	214	277	282	

Proportions out of 1,329 observations, 68 cases from the full dataset not included due to missing data. 962 unique cases reported some coping behavior in relation to a past climate-related impact.

Table 9. Descriptive statistics of future risk perceptions related to five aspects of visitors' North Shore recreational trips.

	Negatively	Slightly negatively	No impact	Slightly Positively	Positively
Impact self n = 1,282	6%	22%	55%	10%	7%
Impact future trips n = 1,290	5%	19%	58%	11%	7%
Impact recreation infrastructure n = 1,278	8%	25%	41%	14%	12%
Impact nature n = 1,276	16%	21%	32%	12%	19%
Impact tourism economy n = 1,277	9%	23%	43%	15%	10%

Behavioral Responses

The first set of binary logistic regression analyses explored the relationship between the visitor attributes of age and gender, visitors place meanings, and eight types of coping behaviors. Controlling for other variables in the model, the likelihood to ‘purchase new or better equipment or gear’ is increased for visitors’ with higher place meanings, $p = .006$ ($\text{Exp}(\beta) = 2.388$); specifically, visitors with increased place meanings are two times more likely to use gear to cope (see Table 10). Age was also significantly related to purchasing new gear or equipment, $p < .000$. Controlling for other variables in the model, visitors under the age of 65 (all $p < .046$) are two (ages 55-64, $\text{Exp}(\beta) = 2.058$) to five (ages 25-34, $\text{Exp}(\beta) = 5.115$) times more likely to use gear to cope than visitors over the age of 65. Gender also emerged as significantly related to purchasing new gear or equipment, $p = .003$. Controlling for other variables, males are more likely than females ($\text{Exp}(\beta) = .649$) to use gear to cope.

Table 10. Binary logistic regression analysis for predicting coping by purchasing new or better equipment of gear.

Coped by: Purchase new or better equipment or gear				
19% (n = 261)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			< .001	
Low*				
Moderate	.031	.327	.925	1.031
High	.871	.315	.006	2.388
Age:			< .001	
18-24	1.380	.382	<.001	3.976
25-34	1.632	.358	<.001	5.115
35-44	1.152	.350	.001	3.165
45-54	1.136	.351	.001	3.113
55-64	.722	.361	.046	2.058
65+*				
Gender:			.003	
Male*	-.433	8.814		.649

*indicates reference category | Hosmer & Lemeshow 0.823 | Classification, overall 80%

For the coping behavior ‘plan trips for other times of the year,’ visitor attributes and place meanings were also predictive of visitors’ tendency to cope temporally (see Table 11). Place meanings and age were significant ($p = .038$ and $.024$, respectively) and although the specific categories under each were not statistically different, general trends reveal that visitors with higher place meanings and those younger in age (under 35) are more likely to cope with past impacts by changing the timing of their North Shore trips. Additionally, controlling for other variables, male visitors are more likely to change the timing of their trip than female visitors ($p = .049$, $\text{Exp}(\beta) = .775$).

Table 11. Binary logistic regression analysis for predicting coping by planning trips for other times of the year.

Coped by: Plan trips for other times of the year				
25% (n = 346)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			.038	
Low*				
Moderate	.056	.260	.829	1.058
High	.377	.254	.138	1.458
Age:			.024	
18-24	.120	.270	.657	1.128
25-34	.276	.244	.257	1.318
35-44	-.222	.235	.344	.801
45-54	-.238	.236	.230	.754
55-64	-.361	.240	.132	.697
65+*				
Gender:			.049	
Male*	-.255	.130		.775

*indicates reference category | Hosmer & Lemeshow 0.646 | Classification, overall 74%

Visitor coping by ‘paying more attention to forecast prior to trips’ were significantly related to place meanings, age, and gender (see Table 12). Controlling for other variables, visitors with higher place meanings are two times (Exp(β) = 2.162) more likely to cope this way than visitors with a moderate or low level of place meanings ($p = .001$). Younger visitors, specifically between the ages of 18-24 and 35-44, are also about two times more likely than visitors over the age of 65 to pay attention forecasts prior to trips ($p = .001$ and $.016$ and Exp(β) = 2.301 and 1.708, respectively). Males are slightly more likely to pay more attention

Table 12. Binary logistic regression analysis for predicting coping by paying more attention to weather forecasts prior to trips.

Coped by: Pay more attention to weather forecasts prior to trips 36% (n = 504)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			<.000	
Low*				
Moderate	.325	.242	.180	1.384
High	.771	.238	.001	2.162
Age:			.005	
18-24	.833	.258	.001	2.301
25-34	.381	.239	.111	1.464
35-44	.535	.222	.016	1.708
45-54	.221	.223	.323	1.247
55-64	.142	.226	.530	1.153
65+*				
Gender:			.048	
Male*	-.234	.118		.791

*indicates reference category | Hosmer & Lemeshow 0.814 | Classification, overall 62%

Similar results emerged for the coping behavior ‘pay more attention to forecast during trip’ (see Table 13). Specifically, place meanings are significantly related to paying attention to weather forecasts during trips ($p = .035$). While results indicate that visitors with higher place meanings are more likely to pay attention to weather forecasts during their trips, results for significant differences between the categories of place meanings were not significant. Younger visitors, under the age of 35, are about two times more likely to pay attention to weather forecasts during their trips than visitors over 65 years of age ($p = .023$, $\text{Exp}(\beta) = 1.788$). Males are also more slightly more likely than females ($\text{Exp}(\beta) = .673$) to pay attention to weather forecasts during trips ($p = .001$).

Table 13. Binary logistic regression analysis for predicting coping by paying more attention to weather forecasts during trips.

Coped by: Pay more attention to weather forecasts during trips 29% (n = 407)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			.035	
Low*				
Moderate	.205	.252	.414	1.228
High	.477	.247	.053	1.611
Age:			.052	
18-24	.834	.274	.002	2.302
25-34	.581	.255	.023	1.788
35-44	.403	.242	.095	1.496
45-54	.331	.242	.172	1.392
55-64	.391	.243	.108	1.479
65+*				
Gender:			.001	
Male*	-.396	.124		.673

*indicates reference category | Hosmer & Lemeshow 0.871 | Classification, overall 69%

For the coping behavior ‘worry more about safety before or during trips,’ there was no significant relationship with place meanings or gender (see Table 14). However, age was predictive of having selected this coping response. Visitors between the ages of 18 and 24 were about two times more likely than visitors over 65 years of age ($\text{Exp}(\beta) = 2.044$) to worry about safety before or during trips in response to a past climate-related impact ($p = .024$).

Table 14. Binary logistic regression analysis for predicting coping by worrying about safety prior to or during trips.

Coped by: Worry about safety prior to or during trips				
16% (n = 221)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			.230	
Low*				
Moderate	.477	.333	.152	1.611
High	.559	.328	.088	1.749
Age:			.002	
18-24	.715	.317	.024	2.044
25-34	.477	.301	.113	1.612
35-44	.304	.287	.289	1.355
45-54	-.132	.299	.659	.876
55-64	-.221	.306	.471	.802
65+*				
Gender:	.202	.155	.192	1.224
Male*				

*indicates reference category | Hosmer & Lemeshow 0.983 | Classification, overall 83%

Coping by ‘seeking lodging that enhances safety’ was significantly related to two levels of place meanings: moderate and high (see Table 15). Controlling for other variables in the model, visitors are two times more likely ($p = .015$ and $.026$; $\text{Exp}(\beta) = 2.455$ and 2.277 , respectively) to seek safer lodging options in response to a past climate-related impact for each increase in place meaning value (moving up to a higher place meaning category). Younger visitors (18 to 24 age group) are also two times more likely than visitors over the age of 65 ($p = .013$, $\text{Exp}(\beta) = 2.139$) to seek out safe lodging as a result of experiencing a past impact. No significant differences emerged in regards to gender and seeking safer lodging options in response to a past climate-related impact.

Table 15. Binary logistic regression analysis for predicting coping by seeking lodging options that enhance safety.

Coped by: Seeking lodging options that enhance safety				
15% (n = 214)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			.053	
Low*				
Moderate	.898	.371	.015	2.455
High	.823	.369	.026	2.277
Age:			.002	
18-24	.761	.306	.013	2.139
25-34	.192	.300	.521	1.212
35-44	.062	.283	.828	1.063
45-54	-.286	.294	.331	.751
55-64	-.205	.295	.487	.815
65+*				
Gender:				
Male*	-.005	.154	.974	.995

*indicates reference category | Hosmer & Lemeshow 0.983 | Classification, overall 84%

There were no statistically significant relationships between place meanings, age, or gender and final two coping behaviors or either ‘visiting recreation sites that reduce risk’ or ‘participating in less risky recreational activities’ (Tables 16 and 17).

Table 16. Binary logistic regression analysis for predicting coping by visiting recreation sites that reduce risk.

Coped by: Visit recreation sites that reduce risk				
20% (n = 277)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			.069	
Low*				
Moderate	.220	.289	.446	1.246
High	.490	.283	.083	1.632
Age:			.255	
18-24	.242	.281	.389	1.274
25-34	-.095	.267	.723	.910
35-44	-.253	.251	.312	.776
45-54	-.303	.251	.227	.738
55-64	-.258	.253	.308	.773
65+*				
Gender:			.779	
Male*	-.039	.140	.779	.962

*indicates reference category | Hosmer & Lemeshow 0.559 | Classification, overall 79%

Table 17. Binary logistic regression analysis for predicting coping by participating in less risky recreational activities.

Coped by: Participate in less risky recreational activities				
20% (n = 282)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			.139	
Low*				
Moderate	.396	.295	.179	1.486
High	.544	.290	.060	1.723
Age:			.173	
18-24	.218	.281	.439	1.243
25-34	-.045	.265	.866	.956
35-44	-.386	.254	.129	.680
45-54	-.306	.251	.223	.737
55-64	-.162	.250	.518	.851
65+*				
Gender:			.232	
Male*	.168	.141	.232	1.183

*indicates reference category | Hosmer & Lemeshow 0.482 | Classification, overall 79%

Cognitive Responses

The second set of binary logistic regression analyses (five total) explored the relationship between visitors' place meaning levels, having been impacted in the past, visitors' perceptions of personal efficacy, and visitors' level of general climate change concern. For future risk perceptions to self, those visitors with less climate change concern (response categories not at all, slightly, and moderately) were more likely to think that future climate-related impacts would positively impact their personal health or safety during future North Shore trips ($p = .009, .014, \text{ and } <.000$; $\text{Exp}(\beta) = 2.539, 2.157, \text{ and } 2.924$ respectively), see Table 18. There was no significant relationship between place meanings, past impact, and perceptions of personal efficacy on perceptions of risk to one' self.

Table 18. Binary logistic regression analysis for predictive risk perception of personal health, safety, and security.

Impact self (personal health, safety security) during North Shore trips				
(n=579, 63% negatively, 37% positively)				
	β	S.E.	p value	Exp(β)
Place meanings:			.430	
Low*				
Moderate	.234	.328	.475	1.264
High	.244	.195	.209	1.277
Encountered a past climate-related impact	.225	.221	.307	1.253
Able to plan			.544	
Strongly disagree	-1.108	1.160	.339	.330
Disagree	-.608	.476	.201	.544
Neutral	-.309	.307	.204	.677
Agree	-.215	.244	.378	.807
Strongly agree*				
Climate concern			<.000	
Not at all	.932	.356	.009	2.539
Slightly	.769	.312	.014	2.157
Moderately	1.073	.273	<.000	2.924
Very	.203	.273	.456	1.225
Extremely*				

*indicates reference category | Hosmer & Lemeshow 0.386 | Classification, overall 63%

For the risk perceptions ‘impact recreation infrastructure on the North Shore,’ visitors who were *not at all* and *moderately* concerned about climate change were more likely ($p = .001$ and $.004$; $\text{Exp}(\beta) = 2.769$ and 1.964 respectively) to perceive climate change as having positive impacts on recreation resources (see Table 19). Visitors with low perceptions of personal efficacy, that is those who do not perceive that they are able to plan for climate change impacts, are slightly more likely than those with high perceptions of personal efficacy ($p = .001$, $\text{Exp}(\beta) = .113$) to believe that climate change would positively impact North Shore recreation infrastructure in the future. No significant relationships emerged between

place meanings or past impact and perceptions of risk to North Shore recreation infrastructure.

Table 19. Binary logistic regression analysis for predictive risk perception of North Shore recreation infrastructure.

Impact North Shore recreation infrastructure (campgrounds, trails, roads)				
(n=748, 57% negatively, 43% positively)				
	β	S.E.	p value	Exp(β)
Place meanings:			.845	
Low*				
Moderate	.171	.305	.574	1.187
High	.049	.165	.768	1.050
Encountered a past climate-related impact	.210	.188	.263	1.234
Able to plan			.014	
Strongly disagree	-.720	.886	.417	.487
Disagree	-2.183	.643	.001	.113
Neutral	-.086	.266	.746	.917
Agree	-.040	.216	.854	.961
Strongly agree*				
Climate concern			<.000	
Not at all	1.028	.302	.001	2.769
Slightly	.465	.266	.081	1.592
Moderately	.675	.234	.004	1.964
Very	-.034	.240	.886	.966
Extremely*				

*indicates reference category | Hosmer & Lemeshow 0.381 | Classification, overall 60%

For perceptions of ‘impacts to nature on the North Shore,’ one significant relationship emerged. Visitors with low general climate concern (*not at all*, *slightly*, and *moderately* concerned) are more likely to think future climate change impacts to nature will be positive ($p = <.000$, $.007$, and $<.000$, respectively; see Table 20). This relationship is strongest for visitors who are *not at all* concerned about climate change ($\text{Exp}(\beta) = 4.197$). Place meanings,

past impact, and visitors' perceived personal efficacy were not significantly related to perceptions of climate-related impacts to North Shore nature.

Table 20. Binary logistic regression analysis for predictive risk perceptions for nature on the North Shore.

Impact nature on the North Shore (n=863, 55% negatively, 45% positively)				
	β	S.E.	<i>p</i> value	Exp(β)
Place meanings:			.673	
Low*				
Moderate	.053	.281	.852	1.054
High	.135	.153	.375	1.145
Encountered a past climate-related impact	.298	.171	.082	1.348
Able to plan			.172	
Strongly disagree	-.676	.897	.451	.509
Disagree	-.797	.413	.053	.451
Neutral	.139	.248	.577	1.149
Agree	.094	.206	.650	1.098
Strongly agree*				
Climate concern			<.000	
Not at all	1.434	.285	<.000	4.197
Slightly	.655	.244	.007	1.925
Moderately	.870	.221	<.000	2.387
Very	.182	.221	.410	1.200
Extremely*				

*indicates reference category | Hosmer & Lemeshow 0.823 | Classification, overall 59%

For 'impacts to the North Shore tourism economy,' both perceived personal efficacy and climate concern were predictive of visitors' perceptions of climate-related impacts (see Table 21). Specifically, those visitors who do not believe they are able to plan for climate change impacts to the North Shore, have slightly greater odds of thinking that climate-related impacts to the tourism economy will be positive ($p = .011$, $\text{Exp}(\beta) = .323$) than visitors who believe they are able to plan for change. Visitors with lower general climate change concern

(*not at all, slightly or moderately*) are also more likely to perceive climate-related impacts will positively affect North Shore tourism economy ($p = < .000, .006, \text{ and } <.000$; $\text{Exp}(\beta) = 4.459, 2.120, \text{ and } 2.535$, respectively). No significant relationships were found between perceptions of impacts to the North Shore tourism economy and either visitors' place meanings or having encountered a past impact.

Table 21. Binary logistic regression analysis for predictive risk perceptions for the North Shore tourism economy.

Impact the local North Shore tourism economy (n=725, 56% negatively, 44% positively)				
	β	S.E.	p value	$\text{Exp}(\beta)$
Place meanings:			.983	
Low*				
Moderate	.059	.314	.851	1.061
High	.009	.170	.957	1.009
Encountered a past climate-related impact	.364	.192	.057	1.440
Able to plan			.096	
Strongly disagree	-1.087	.881	.217	.337
Disagree	-1.129	.446	.011	.323
Neutral	-.088	.270	.744	.916
Agree	-.136	.226	.546	.872
Strongly agree*				
Climate concern			<.000	
Not at all	1.495	.311	<.000	4.459
Slightly	.752	.271	.006	2.120
Moderately	.930	.247	<.000	2.535
Very	.210	.241	.384	1.234
Extremely*				

*indicates reference category | Hosmer & Lemeshow 0.656 | Classification, overall 60%

For the risk perception 'impact future North Shore recreational trips,' visitors with lower climate change concern (*not at all, slight, or moderate*) were more likely to perceive that climate-related impacts would positively affect their future recreational trips ($p = <.000$,

.040, and <.000, respectively), see Table 22. This odds ratio was about two times greater for those *not at all* concerned ($\text{Exp}(\beta) = 1.963$), three times greater for those who are *slightly* concerned ($\text{Exp}(\beta) = 2.936$), and a one to one increase for those *moderately* concerned ($\text{Exp}(\beta) = 1.248$). Related to perceptions of personal efficacy, visitors who do not perceive they are able to plan for climate-related impacts to the North Shore are more likely to think that climate-related impacts will positively affect their future recreational trips, $p = .023$ ($\text{Exp}(\beta) = .334$). No significant relationship emerged between visitors' place meanings or incident of past impact and their perceptions of climate change impacts to future North Shore recreational trips.

Table 22. Binary logistic regression analysis for predictive risk perceptions for visitors' future trips to the North Shore.

Impact future trips on the North Shore (n=542, 58% negatively, 42% positively)				
	β	S.E.	p value	$\text{Exp}(\beta)$
Place meanings:			.187	
Low*				
Moderate	.419	.339	.216	1.521
High	.337	.199	.091	1.401
Encountered a past climate-related impact	.314	.229	.169	1.369
Able to plan			.093	
Strongly disagree	-1.723	1.168	.140	.179
Disagree	-1.096	.482	.023	.334
Neutral	-.486	.319	.128	.615
Agree	-.187	.253	.459	.829
Strongly agree*				
Climate concern			<.000	4.144
Not at all	1.422	.374	<.000	1.963
Slightly	.674	.328	.040	2.936
Moderately	1.077	.279	<.000	1.248
Very	.222	.280	.428	
Extremely*				

*indicates reference category | Hosmer & Lemeshow 0.571 | Classification, overall 62%

Discussion

The goal of this study was to examine visitors' place meanings in relation to behavioral and cognitive responses to projected climate-related impacts to a NBT region. Specifically, this study assessed two research questions: (1) how are visitor attributes and place meanings related to how individuals have coped with past climate-related impacts? and (2) how does exposure to climate-related impacts affect future risk perceptions, while accounting for place meanings, perceptions of personal efficacy, and general climate change concern? Findings reveal that place meanings, age, and gender are typically related to coping behaviors. However, for future climate-related risk perceptions, place meanings are not significantly related to these cognitive responses. Additionally, having been impacted by climate change in the past also does not emerge as significantly related to future risk perceptions. Primarily, climate change concern and, to a lesser degree, perceived personal efficacy are typically predictive of visitors' climate change risk perceptions.

Behavioral responses

North Shore summer visitors are most often experiencing climate-related impacts due to heavy rainfall, closely followed by impacts from excessive heat, flooding, and forest fires. The most common behavioral response to past climate-related impacts is *paying more attention to weather forecasts prior to and during trips*. These may broadly be considered ways of informational coping. *Planning trip for other times of the year* and *participating in less risky recreational activities* (i.e., temporal and activity substitution, respectively) are moderately common responses for North Shore summer visitors. Abnormally cold temperatures are the least reported climate-related impact and seeking lodging options that

enhance safety is the least reported behavioral coping mechanism by North Shore summer visitors.

Visitors' level of place meanings was significantly related to five of the eight coping behaviors: technical (using new gear or equipment), temporal (changing the timing of one's trip), information (paying attention to weather forecasts both before and during trips), and spatial (seeking safer lodging choices). Visitors with increased place meanings are more likely to select these coping behaviors in response to a past climate-related impact. These findings corroborate McCarthy's (2001) sentiment that social values are a key determinant of coping (i.e., place meaning values are significantly and positively related to five of the eight coping behaviors explored here). Additionally, the strength of these relationships (i.e., the odds ratio) is high; typically greater than a one-to-one increase. This demonstrates that visitors with heightened place meanings are more likely to use gear, weather forecasts, trip timing and safe lodging options to overcome climate-related constraints. However, worrying and seeking safer recreation sites and activities was not significantly related to visitors' place meanings. This confirms, in part, that place values are not tied to spatial (site or resource) substitution (e.g., Hammit et al. 2004) and offers new insights as place meanings, at least as demonstrated in this study, are also not linked to activity substitution or cognitive (worry) coping.

Age was also found to be significantly related to technical, temporal, informational, and lodging-type coping behaviors: purchasing new gear or equipment, timing trips differently, paying more attention to weather forecasts before and during recreational trips, and seeking safer lodging options. This reveals that younger visitors are more likely to select a variety of behavioral coping behaviors than older visitors. The only variable that was

significantly related to ‘worrying’ in response to a past climate-related impact was the 18 to 24-year-old age group. Existing literature support this idea that a visitors’ response to a recreation constraint can depend on both environmental factors as well as individual characteristics (Miller and McCool 2003). This finding implies that recreation providers may communicate climate risk and potential coping strategies differently to younger visitors than older visitors. For example, younger visitors may have an increased desire (or expectation) for information or gear availability during their trips and flexibility in rescheduling trips when environmental conditions are not ideal.

Additionally, gender was significantly related to three of the coping behaviors: technical (purchasing new gear or equipment), temporal (timing of trips), and information (paying more attention to weather forecasts before and during recreational trips). Existing research shows that men may be less inclined to cope with recreation constraints (Propst and Koesler 1998); however this study reveals that, in response to climate change, that men are more likely to cope through gear or equipment purchases, trip timing, and information (weather forecasts) mechanisms. This implies that male visitors are not seeking safer activities, recreation sites, or lodging options, but rather alter how they seek out information, use gear and time their trips in order to continue pursuing their current recreation experiences in the face of climate-related constraints.

Cognitive responses

Existing literature posits that risk perceptions are related to experience and values (Leiserowitz 2006); however, this study reveals that that risk perceptions are related to climate change concern and perceptions of personal efficacy, not values (place meanings) or experience (past impact). Other studies have found that place attachment or ‘sense of place’

is related to environmental concern (Cunsolo Willox et al. 2012), which suggests that perhaps place meanings are an antecedent of climate concern, which then directly influences future risk perceptions. Future research is needed to more fully explore the paths and directional relationships between these variables. Additionally, previous research demonstrating the relationship between experiencing climate change and subsequent cognitive processing of climate change was found among residents' perceptions (Akerlof et al. 2013). However, results from this study suggest that these relationships do not apply to NBT visitors. Future research is needed to further examine the differences between NBT resident and visitors 'experiences' of climate change and how these experiences consequently influence climate change beliefs, concerns, and risk perceptions.

Specific to perceptions of personal efficacy, visitors who do not perceive they can plan for climate change impacts are more likely to view future impacts as positive in regards to future North Shore trips, recreation opportunities/experiences, and the region's tourism economy. This may be a case where "rationalization represents a process whereby recreationists reevaluate an undesirable situation in a more favorable light" (Miller and McCool 2003, p. 262). That is, visitors with perceptions of low personal efficacy may reevaluate the undesirability of climate change by perceiving future impacts to be positive, and subsequently perceive that planning and preparation are less of a necessity. Denial may also be associated with perceptions of low personal efficacy (Lorenzoni et al. 2007), which suggests that those visitors who have perceptions of low personal efficacy are coping by denying negative impacts of climate change.

Climate change concern emerged as a strong predictor of future risk perceptions. Specifically, low levels of climate change concern were predictive of increased likelihood to

perceive future impacts to all aspects of future North Shore trips as positive rather than negative. This may reflect a value (e.g., Leiserowitz's 2006 'worldviews') of visitors who are concerned about climate change globally but perceive local impacts of climate change to have positive, rather than negative consequences. This could result from guilt-related bias (Markowitz and Shariff 2012); that is, if visitors believe global climate change is of concern, then feelings of guilt may cause a cognitive response that local impacts are positive, which may relieve some of the guilt associated with climate change cognitions. Additionally, those visitors who do not appreciate the concept or weight of climate change are not likely to perceive the impacts as negative. As such, the value-beliefs systems of these visitors may be discrediting the potential negativity associated with climate change concern and future risk (e.g., denial and/or avoidance, Lorenzoni et al. 2007).

Limitations

There are limitations to the inferences of this study based on bias within the sample population. For example, participants tended to be younger than non-participants and more likely to recreate at the one site at which they were intercepted rather than multiple sites throughout the North Shore. This could skew the findings regarding younger visitors towards being more likely to behaviorally cope (as the sample was younger overall). Also, the findings that fewer visitors coped through seeking alternate sites could be influenced by the bias that most participants travel to one specific site rather than many North Shore recreational areas. As there were no significant differences between the different scenarios of future climatic and environmental conditions, it may be that potential future conditions were not influencing responses to the future risk perceptions questions. Future research is needed

that qualitatively explores the relationship between various scenarios of climate change (and fire risk) and subsequent cognitive responses.

The projected climate-related impacts to the North Shore, though selected based on IPCC projections and modeled specifically within a planning time horizon (30 years) on the North Shore, may not have reflected changes that would substantially or negatively impact future visits. For example, projected increases in temperature may be perceived within a threshold of comfort—particularly if conditions are perceived to be more favorable relative to temperatures in visitors’ place of origin—and, thus, may be viewed as favorable conditions for NBT activities. Therefore, additional research is needed to explore behavioral and cognitive responses in destinations with more substantial climate-related impacts, such as summer tourism to NBT destinations in lower latitudes.

Additionally, while the summer tourism season is the peak visitation time for the North Shore, the data collected through the research only represent those visitors who make trips during the summer sampling session and at those locations that were selected as summer sampling sites. The greatest limitation of this study, which has been pointed out by other researchers exploring recreational coping (e.g., Schneider and Wynveen 2015), is that the data collected for the analyses did not capture visitors who have already been displaced by past impacts (i.e., those visitors who experienced a climate-related impact on the North Shore and elected not to return to the region for that reason). Future research with a larger segment of the population, such as residents of a metropolitan area nearby a NBT destination, may be able to capture the opinions of those visitors employing spatial and/or temporal substitution as a coping mechanism.

Implications

Extreme weather events can create mental stress and affect coping behaviors (Hess et al. 2008). As climate-related impacts on the North Shore may be more severe in actuality, the region should regularly evaluate coping strategies visitors are selecting and consider what options are available to visitors for mitigating not only the physical impacts of climate change but also the social-psychological impacts. A mechanism for increasing visitors' capacity to cope may be facilitating discussion among visitors and recreation providers related to options for various coping behaviors. Results from other studies reveal that individuals who perceive climate change impacts as negative are more likely to share climate-related information (Yang et al. 2014). From this study's results, we glean that visitors with perceptions of low levels of personal efficacy and climate change concern are likely to perceive climate impacts as positive. Therefore, perhaps visitors with perceptions of high levels of personal efficacy and climate change concern, who may perceive impacts as negative, would be effective conduits or brokers of information regarding substitution options.

Key communicators may also be recreation providers who are concerned, but prepared to handle, potential climate-related impacts. In related environmental management issues, such as those related to common pool resources, a key coping strategy is to engage populations that are attached to a place and prepared to be stewards of that place's sustainability (Ostrom 1999). As other research demonstrates, those visitors with increased place meanings may be the champions of policy and planning that protects their recreational experience in a way that results in less need for recreational coping in the future (Hammit et al. 2004a). As group discussions are effective in enhancing coping responses within the

agricultural community (Shome and Marx 2009), future research could apply this technique to an outdoor recreation context.

Conclusion

This study contributes new insights to outdoor recreationists' responses to climate change. Specifically, this study finds that visitors to a NBT destination who are highly attached to the place are most likely to cope behaviorally through technical, temporal, safe lodging, and informational mechanisms. However, visitors with high place meanings are not likely to worry, or use activity of spatial (recreation site) substitution coping behaviors. Younger visitors are also more likely than older ones to utilize technical, temporal, safe lodging, and informational mechanisms, and are the only segment of visitors (analyzed here) to worry about their safety during future trips in response to a past climate-related impact. Finally, our results demonstrate that gender is related to coping behaviors, in that males are more likely than females to use gear and informational coping to overcome climate-related constraints.

However, while place meanings were considered to be drivers of both behavioral and cognitive responses to climate change, place values were not significantly related to visitors' future climate change risk perceptions. Instead general climate change concern, and to a lesser degree perceptions of personal efficacy, were found to be predictive of cognitive responses. Climate concern was significantly, and positively related to all five aspects of future climate change risk perceptions. These findings call for further research on the relationship between global climate change concern and perceptions that local climate-related impacts can be positive. Perhaps the North Shore presents an anomaly where climate change will have predominantly positive impacts, in particular to the summer tourism industry.

Future research is needed to test this explanation or others, in the context of additional northern latitude NBT destination (or during the winter season), as well as destinations in tropical areas.

While short-term coping can be an important foundation for adaptation to current climate impacts, it is important for recreation providers to consider how long-term impacts may present different climate-related constraints, which could avoid encouraging recreational coping now that will be unsustainable in the future (McCarthy et al. 2001). Coping is considered short-term response, while adaptation is considered a long-term response (Murphy et al. 2015). Integrating current coping strategies into place-based climate adaptation plans should consider how visitors are coping and how such coping can be integrated into future adaptation efforts. For example, as coping is related to visitors' 'limits of acceptable change' with issues such as noise pollution (Pilcher et al. 2009) and crowding (e.g., Lankford et al. 2008; Ruddy et al. 2015; Kyle et al. 2004), adaptation strategies that target the different types of coping behaviors (spatial, temporal, activity, and strategic substitution) may lessen negative, climate-related impacts to visitors' experiences and protect the tourism economy. Alternatively, considering the type of climate-related impact, such as heavy rainfall, that most frequently results in coping behaviors could help planners target adaptation strategies for reinforcing, upgrading or altering recreation infrastructure. In other words, information on current visitors' coping strategies should be used to inform the place-based adaptation strategies of tomorrow, particularly, as younger visitors are more frequently reporting increased behavioral coping in response to climate-related impacts. This underscores the importance of recreation providers' consideration of both physical thresholds and social-cultural shifts in response to climate change. Providing information, gear, and

flexibility in trip-taking endeavors will be of equal importance to resource and infrastructure adaptation in creating climate-ready NBT destinations.

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CHAPTER 4: The effect of place meanings on climate change impacted outdoor recreation substitution patterns

Introduction

In many natural resource-rich locations, communities are supplementing, or transitioning away from, resource extractive economies to economies built on nature-based tourism (NBT) (Smith et al., 2016; Smith & Krannich, 2000). Examples of NBT destinations include mountainous regions where skiing and hiking opportunities abound, forested areas that accommodate camping, hunting, hiking, and wildlife viewing, and coastal areas that provide water-based recreation experiences. As outdoor recreation and tourism provides economic livelihoods and supports the predominant environmental values of NBT community residents (Smith & Krannich, 2000), NBT is important for transitioning communities. In addition to contributing to local and regional economies and quality-of-life, NBT provides for a more eco-centric cultural norm wherein “the region’s scenic landscapes are increasingly valued more for the aesthetic and recreational amenities they provide than for their stocks of precious metals, timber, or forage” (Gosnell & Abrams, 2011, p. 306).

However, climate change threatens the vitality of NBT communities. This can occur through the alteration of the recreation setting itself, and subsequently, the types and quality of experiences they are able to support (Coombes, Jones, & Sutherland, 2009; Dawson, Havitz, & Scott, 2011; Fisichelli, Nicholas, Schuurman, Monahan, & Ziesler, 2015; Gossling & Hall, 2006; Lise & Tol, 2002; Scott, Jones, & Konopek, 2007; Scott, McBoyle, Minogue, & Mills, 2006; Smith et al., 2016). In NBT contexts, research focuses primarily on how climate change will alter the supply and demand for outdoor recreation experiences (e.g., Dubois & Ceron, 2006;. Smith et al., 2016). Related to the supply side of NBT, impacts from

climate change will affect both destinations (e.g., extreme weather, rising temperature) and operators (e.g., water availability, insurability, pressure to reduce emissions) (Nicholls, 2014). Research on the demand side of climate change and outdoor recreation focuses on how individuals' outdoor recreation behaviors and travel decisions are influenced by the characteristics of their destinations (Smith et al., 2016), their perceptions of climate change, and their own experiences (Brody, Zahran, Vedlitz, & Grover, 2008). Climate change can alter both recreation supply and demand in NBT communities, which ultimately could impact destination loyalty (i.e., when visitors make return visits to the same site; Dawson et al., 2011) and the sustainability of NBT economies.

A first step in understanding tourism vulnerability is to explore how changing conditions might alter patterns of recreation behavior in NBT settings. Previous research has demonstrated that climate change will have complex influences on visitor behaviors. For example, increases in temperature will likely increase visitation to coastal areas but the availability of desired resources, such as miles of sandy shoreline, may be negatively impacted causing a contraction of NBT settings' most desirable assets (Coombes et al., 2009). This 'contraction' of recreation space has also been found in ski tourism, as snow patterns change and lower latitude (for the Northern Hemisphere) and lower elevation ski resorts no longer receive adequate natural snowfall or find it infeasible to manufacture sufficient snow for skiers (Dawson et al., 2011). Alternatively, moderate increases in temperature will likely extend shoulder seasons in some coastal and mountain settings, as favorable 'summer' conditions will be available earlier and later in the year (Coombes et al., 2009; Fisichelli et al., 2015; Scott et al., 2007). To date, much of the research on recreation substitution, especially in terms of recreationists' response to climate change impacts, has

focused on activity-specific destinations such as ski area tourism (e.g., Dawson, Scott, & Havitz, 2013; Ruddy et al., 2015) and water-based recreation (e.g., Aas & Onstad, 2013; Sutton & Oh, 2015).

This study expands current knowledge by focusing on broader substitution patterns of general recreationists to a NBT region who are seeking a diverse range of activities (e.g., hiking, camping, boating, swimming, nature and wildlife viewing and photography, scenic driving, visiting cultural sites, gathering wild plants, and collecting rocks). Specifically, the purpose of this study is to understand how current trip characteristics are related to recreation substitution and whether the influences of trip characteristics are mediated by place meanings. The specific inclusion of place meanings (i.e., the values individuals assign to a certain geographic locale; Davenport & Anderson, 2005) as a mediating variable is supported by literature that illustrates a relationship between recreational activity involvement (Dawson et al., 2011), experience use history (EUH, Hammitt, Backlund, & Bixler, 2004) and the recreationists' place attachment or place meanings as predictive of recreation substitution. Rather than examine the direct relationship between place meanings and visitor characteristics (e.g., involvement, EUH in previous studies) and recreation substitution, this study examines the nature of place meanings as a mediator of existing visitor characteristics and recreation substitution. Understanding this relationship is important in enhancing knowledge of how visitor characteristics and values influence future behavioral intentions in NBT communities facing climate-related impacts and uncertainty.

Review of Literature

Recreation substitution

Visitors may cope with climate-related constraints to recreation by implementing a form of behavioral substitution. The concept of recreation substitution emerged from recreation research to explain the phenomenon in which an individual cannot participate in their intended activity and must replace it with another activity (Iso-Ahola, 1986). Research on recreation substitution has advanced Iso-Ahola's (1986) original conceptualization of swapping what activity is selected by defining two additional categories: (1) temporal substitution (when recreationists choose to participate); and (2) spatial substitution (where recreationists choose to participate). Recreationists' level of involvement (i.e., commitment, operationalized through measures of activity attraction, centrality, social bonding, and identity) influences their selection of one of various types of substitutability (i.e., activity, temporal or spatial substitution). For example, highly involved skiers are more likely to change the timing of their ski trips in response to environmental changes while less involved skiers are more inclined to substitute spatially (i.e., select a different ski area) (Dawson et al., 2011). Experience use history (EUH), which is the frequency of participation in an activity and/or with a resource at one or more site, is also related to recreation substitution. 'Veteran' (i.e., high EUH on multiple rivers) and 'local' (i.e., high EUH on one river) anglers have demonstrated an increased utilization of recreation substitution, as compared to beginners and visitors with lower EUH (Hammit, Backland, & Bixler, 2004). However, other research finds that recreation commitment, which refers to affective attachments to a leisure pursuit rather than participation frequency, explains very little variance in the selection of activity substitution (Sutton & Oh, 2015).

Environmental conditions (e.g., reduced snowpack) influence the selection of substitution alternatives preferred by recreationists. Empirical studies of recreation substitution and climate change vary according to study site and prevailing recreation experiences available within the site. For example, Dawson, Scott, and Havitz (2013) found that rather than an overall reduction in the population of skiers in the US Northeast, climate change would more likely result in a market shift, or spatial substitution, to those ski areas that remain operable under changing conditions and on the days during which snowpack is adequate to provide skiing experiences. Research regarding skiers' behavioral response to climate change is mixed. Dawson and others (2011) found that less involved (i.e., committed to a particular activity) skiers have a broader limit of acceptable change and are least likely to modify their recreation behavior in response to climate change. However, Rutty and others (2015) found that beginner/infrequent skiers are most likely to dramatically change their recreation behavior in response to climate change; that is, individuals stop skiing altogether. In the context of whitewater kayakers and anglers, both groups were found to utilize spatial and temporal substitution to overcome environmental changes manifested in river conditions (Aas & Onstad, 2013). These studies demonstrate that recreation substitution related to changes in environmental conditions has complex relationships with other individual values and attitudes. Responding to this complexity, this study will contribute to the literature by exploring how current trip characteristics and values (i.e., place meanings) of visitors to a NBT destination participating in a variety of recreational activities (rather than an activity-specific study) influence specific types of recreation substitution behaviors.

Place meanings

The construct of individuals' attachment to physical spaces has been used extensively in the social sciences, particularly within studies of societal and environmental interactions. Early geographers (Tuan, 1974) conceptualized this relationship as 'sense of place' or the myriad subjective values individuals co-created with geographic space to create a *place* which has history, culture, and worth. Later the prevailing term became 'place attachment' (Altman & Low, 1992), which considers the strength of individuals' emotional ties to a physical space. Nested within the concept of place attachment, *place dependence* explained individuals' reliance on a space for specific behavioral outcomes (Stokols & Shumaker, 1981). Secondly, *place identity* was conceptualized as the emotional, symbolic, and affective attachments individuals developed in relation to a space (Proshansky, Faban, & Kaminof, 1983). These concepts were introduced in tandem, in relation to outdoor recreation, as resource dependence (functional values) and resource identity (symbolic meanings) (Williams & Roggenbuck, 1989).

On-going place attachment research further refined this theoretical framework by establishing that these two dominant dimensions of attachment— identity and dependence— are distinctly different from one another and that they relate to various aspects of outdoor recreation and natural resources management in distinctly different ways (e.g., Jorgensen & Stedman, 2001; Kyle et al., 2004). Additional theoretical refinement has resulted in *place meanings* to be considered as the foundation of place attachment (Davenport & Anderson, 2005).

Place meanings are the foundation upon which place attachment is built (Rickard & Stedman, 2015) and explain individuals' descriptive, in addition to emotional, relationships

to a space (Brehm, Eisenhauer, & Stedman, 2012; Smaldone, 2007). For example, in a study of how residents' place meanings change in response to land development along the Niobrara River, Davenport and Anderson (2005) identified four main meanings assigned to local landscape: (1) 'nature,' representing the undisturbed quality and ecology of the river; (2) 'tonic,' describing how the river provides for enjoyment, solitude, and freedom; (3) 'sustenance,' characterizing water as a scarce provisioning resource and an economic driver of adjacent NBT communities; and (4) 'identity,' tying individuals, families, and communities to the physical space. Furthering this theoretical advancement of *place meanings*, Smith, Davenport, Anderson, and Leahy (2011) documented a more comprehensive battery of seven place meaning dimensions. Individual identity, family identity, self-efficacy (i.e., place dependence), self-expression, community identity, economic meaning, and ecological meaning were established to operationalize a spectrum of place meanings individuals may assign to a place.

The multiple dimensions of place meanings have been validated in various contexts, including: the influence of place meanings on participatory planning intentions (Kil, Holland, & Stein, 2014); the influence of place meanings on individuals' perceived resiliency to climate change (Smith, Anderson, & Moore, 2012); and the influence of place meanings on individuals' preferences for natural resource management outcomes (Smith et al., 2011). These studies illustrate that place meanings can explain variation in individuals' values regarding natural resource management within the context of climate change.

Research regarding how place meanings are related to recreation substitution behaviors is sparse. For example, one study emerged from the literature review that used the terms 'place meanings' and 'recreation substitution' explicitly and presented findings that

place bonds distinguish different types of recreationists (Graefe & Dawson, 2013). Other research explores different types of place-based connections and recreation substitution. For example, one study finds that place-bonding is related to spatial substitution for recreationists who have experiences in other locations (Hammit, Backland, & Bixler, 2004). However, other research finds that emotional attachment to a place is associated with decreased likelihood to substitute spatially (Han, Noh, & Oh, 2015).

This study build on existing research focused on how place-based bonds mediate the relationship between visitor characteristics and outdoor recreation behaviors. While rare, place connections have been found to influence recreation substitution (Graefe & Dawson, 2013; Hammit et al., 2004; Han et al., 2015). Moreover, there are findings that support the exploration of the relationships between current trip characteristics and both place meanings and recreation substitution (e.g., Hamilton & Lau, 2006; Lee et al., 2007; Nyaupane et al., 2003).

Trip characteristics

Visitor attributes, such as demographics (e.g., age, gender) and experience level (e.g., beginners, experts), are commonly explored in relation to recreation substitution preferences (Hammit, Backland, Bixler, et al., 2004; Han et al., 2015; Rutty et al., 2015). Site attributes, such as crowding, safety, and delays, have also been explored as important indicators of recreation substitution (Han et al., 2015; Rutty et al., 2015), and site attributes have also been shown to be related to different dimensions of place attachment (e.g., Kyle, Mowen, & Tarrant, 2004). In this study we assessed three different components of trip characteristics: destination loyalty, visit anticipation, and distance traveled. We explored the relationship between these trip characteristics and both visitors' place meanings and their likelihood of

engaging in recreation substitution during a future visit in which site attributes are influenced by climate change. These trip characteristic variables were selected because unlike visitor characteristics (e.g., age, gender, income), they have not been thoroughly explored in relation to recreation substitution behaviors.

Destination loyalty. Destination loyalty is related to place meanings (J. Lee et al., 2007; T. H. Lee & Shen, 2013; Prayag & Ryan, 2011); however, there is some debate about whether satisfaction causes place attachment leading to destination loyalty or place attachment enhances satisfaction leading to destination loyalty (Yuksel, Yuksel, & Bilim, 2010). Researchers also distinguish between repeat visitation and destination loyalty, hypothesizing that attitudinal loyalty or place preferences impart the distinction between unattached repeat visitors and visitors who are more loyal to a site (Lee, Graefe, & Burns, 2007). Lee and others (2007) test this theory and find that behavioral place loyalty is preceded by attitudinal (attachment) and conative (intention) loyalty, as well as activity involvement and visitor satisfaction (both of which stem from service quality). Other research corroborates this finding; for example, place attachment (and visitor satisfaction) has been found to predict visitors' intention to re-visit a site (Prayag & Ryan, 2011), as well as their attitudinal and behavioral loyalty towards that site (Lee & Shen, 2013; Yuksel et al., 2010). Moreover, Lee and others (2012) found that place attachment mediates the relationship between satisfaction and loyalty.

While activity commitment or loyalty has been linked to recreation substitution (e.g., Dawson et al., 2011), destination loyalty has not been explored in relation to recreation substitution. As activity loyalty (i.e., commitment) decreases the likelihood of activity substitution (Vivian, 2011), destination loyalty may be positively related to activity or

temporal substitution but inhibit spatial substitution, as recreation behavior is tethered to a definitive space. This study hypothesizes that destination loyalty will be positively related to temporal and activity substitution but negatively related to spatial substitution. Visitors who are more loyal to a site could be more likely to modify other components of their trips (i.e., timing or activity choice) to maintain their destination loyalty. Place meanings and destination loyalty are hypothesized to be positively related, the longer visitors' history of making trips to a NBT destination could allow for increased formation and strengthening of place meanings assigned to that destination. Mediation analysis will reveal whether place meanings suppress or enhance visitors' tendency to use spatial, temporal, or activity substitution.

Visit anticipation. Visit anticipation is the initial stage of what is a widely accepted five-stage outdoor recreation experience including: (1) anticipation, (2) travel to the site, (3) on-site experience, (4) travel from the site, and (5) recollection (Knetsch & Clawson, 1966). Borrie and Roggenbuck (2001) establish that leisure states are dynamic within, as well as between, these five stages of experience. This five part continuum was adopted by the tourism discipline, as the model suited and referred directly to travel behaviors of individuals (Taylor, 2014). In-depth interviews with foreign backpackers reveals that trip anticipation is characterized by juxtaposition (of their home and place of travel), excitement, and information collection (including negotiating travel schedules and routes) (Park & Santos, 2016). Visit anticipation is influenced by external media (including recreation providers as well as broader news and marketing entities) and research demonstrates that these sources may skew visitors' perceptions of a destination (Moyle & Croy, 2009). Anticipation is also contingent on 'mindfulness' of the individual planning their trip to make trip decisions that

will be satisfying to the other stages of the recreation experience (Taylor, 2014). Climate, access to water (Hamilton & Lau, 2006), and road conditions (Gartner & Erkkila, 2004) are key attributes individuals consider when making travel decisions (e.g., the anticipation phase).

While anticipation is the initial stage of the outdoor recreation or tourist experience, the bulk of research has focused on the other phases of outdoor recreation engagement (McKay, Brownlee, & Hallo, 2012). This study hypothesizes that trip anticipation may be positively related to activity substitution but inhibit spatial or temporal substitution. That is, those visitors who plan their trip in advance have less flexibility to swap the timing or location of their recreation experience but have increased plasticity in their activity choice. The relationship between place meanings and trip anticipation is considered to be somewhat complex: individuals with increased place meanings may be more likely to both plan spur-of-the-moment (e.g., same day, same week) trips or plan their trip, securing their bond to the place well (e.g., more than a year) in advance. Examining the mediating effect of place meanings between anticipation and substitution can reveal whether the meanings visitors ascribe to a specific place enhance or suppress the relationship between trip planning and on-site experience.

Travel distance. Travel distance can be operationalized in several ways, as actual travel distance (on roads), travel cost, or cognitive distance (Nyaupane et al., 2003). Place-bonds, attachment, and meanings have been considered in travel cost studies that model recreation demand (e.g., Hailu, Boxall, & Mcfarlane, 2005; Smith et al., 2016). These studies highlight that place attachment mediates the influence of past trips on future trips (Hailu et al., 2005) and that strong place meanings—specifically, individual identity—are related to

consistent trip-taking (i.e., no change) under changing climatic conditions (Smith et al., 2016). However, Hailu and others (2005) point out the attachments to other substitute sites could further complicate the relationship between place-bonds and future recreation demand as “economists view substitutes on a continuum from non-substitutes to perfect substitutes where moving to a less than perfect site (time, or activity) represent a loss in utility” (Gentner & Sutton, 2008, p. 168).

Distance may also impact recreation behavior; for example, Nyaupane et al. (2003) found that visitors who traveled over 50 miles made fewer trips per year and those who traveled over 600 miles were less likely to participate in specific recreational activities (i.e., camping). In a study of the impact of rising gas prices on outdoor recreation demand and behaviors, researchers found that activity substitution was not considered by visitors until gas prices increased considerably (\$1.99 to \$2.78 in 2005 US\$) and spatial (site) substitution was only considered at the highest gasoline prices explored (\$4.00 2005 US\$) (Oh & Hammitt, 2011). Oh and Hammitt (2011) surmise that the increase in gas prices presented to study participants may not have been great enough to be salient and that participants, intercepted on-site, represented only those visitors who had already negotiated constraints to make the visit at which they were intercepted. With those assumptions in mind, this study will explore whether the climate change projections presented to survey participants are salient enough to influence their consideration of recreation substitution. Since travel distance is meaningfully related to place meanings and recreation behaviors, the mediating role of place meanings is warranted for exploration.

Study Overview

Climate change will impact nature based tourism communities (De Urioste-Stone, Le, Scaccia, & Wilkins, 2015; Kaenzig, Rebetez, & Serquet, 2016; S. Nicholls, 2006; Scott, Gossling, & Hall, 2012; van der Veecken et al., 2016). The problem for many NBT communities is having adequate information to strategically plan for climate-related impacts (Coombes et al., 2009; Johnson & Sieber, 2011; Scott et al., 2007), particularly changes in recreation behavior. This quantitative study examined how visitors' current trip characteristics may predict future substitution behaviors and whether place meanings mediate this relationship. Visitors to a NBT destination were surveyed to determine relationships between their current trip characteristics, place meanings, and intention to utilize five different recreation substitution alternatives.

The guiding research question for this study is: *how are the characteristics of visitors' current trip, mediated by the strength of their place meanings, related to their selection of potential recreation substitution behaviors?* This study analyzed these complex associations through a series of ordinal logistic regressions with place meanings serving as a mediating variable. Building on the understanding of mediation by Baron and Kenny (1986), there are three hypothesis tested by this study. As the literature review documented research on many of these associations is sparse or conflicting, because of this, hypotheses will be made general and exploratory, not directionally predictive.

H1: Current trip characteristics (destination loyalty, trip anticipation, and distance traveled) will be significantly related to place meanings.

H2: Current trip characteristics will be significantly related to visitors' intent to engage in different types of substitution behaviors. More specifically:

H2a: Destination loyalty will be positively related to activity or temporal substitution but negatively related to spatial substitution.

H2b: Trip anticipation will be positively related to activity substitution but negatively related to spatial or temporal substitution.

H2c: Travel distance will be positively related to activity substitution but negatively related to spatial or temporal substitution.

H3: The effect size of the relationship between current trip characteristics and visitors' intent to engage in different types of substitution behaviors will be reduced when place meanings is included in the model as a mediator.

Methods

Research design

Survey research was utilized to assess the relationship between current trip characteristics (loyalty, anticipation, and proximity), place meanings, and future recreation substitution behaviors. The survey instrument was developed to assess NBT visitors' trip-taking characteristics, place meanings, and likelihood of selecting various recreation substitution options. Specifically, the survey instrument was administered to visitors along the 'North Shore' NBT region.

The North Shore region is located along the northern edge of Lake Superior, in northeastern Minnesota (USA), from Two Harbors, Minnesota to the Canadian border (Fig. 16). Public land ownership (e.g., state parks, state forests, and national forest land) and natural resource dependent communities dominate this region. Tourism on the North Shore is characterized by small, locally-owned business, outfitters, guides, lodges, and restaurants that do not have a national affiliation. The North Shore includes eight Minnesota State Parks as

well as scenic waysides, tourism-centric shops, and historic sites. Common recreational activities for the summer tourism season include scenic driving, hiking, visiting cultural and historic sites, swimming, picnicking, wildlife viewing, rock collecting, and camping.

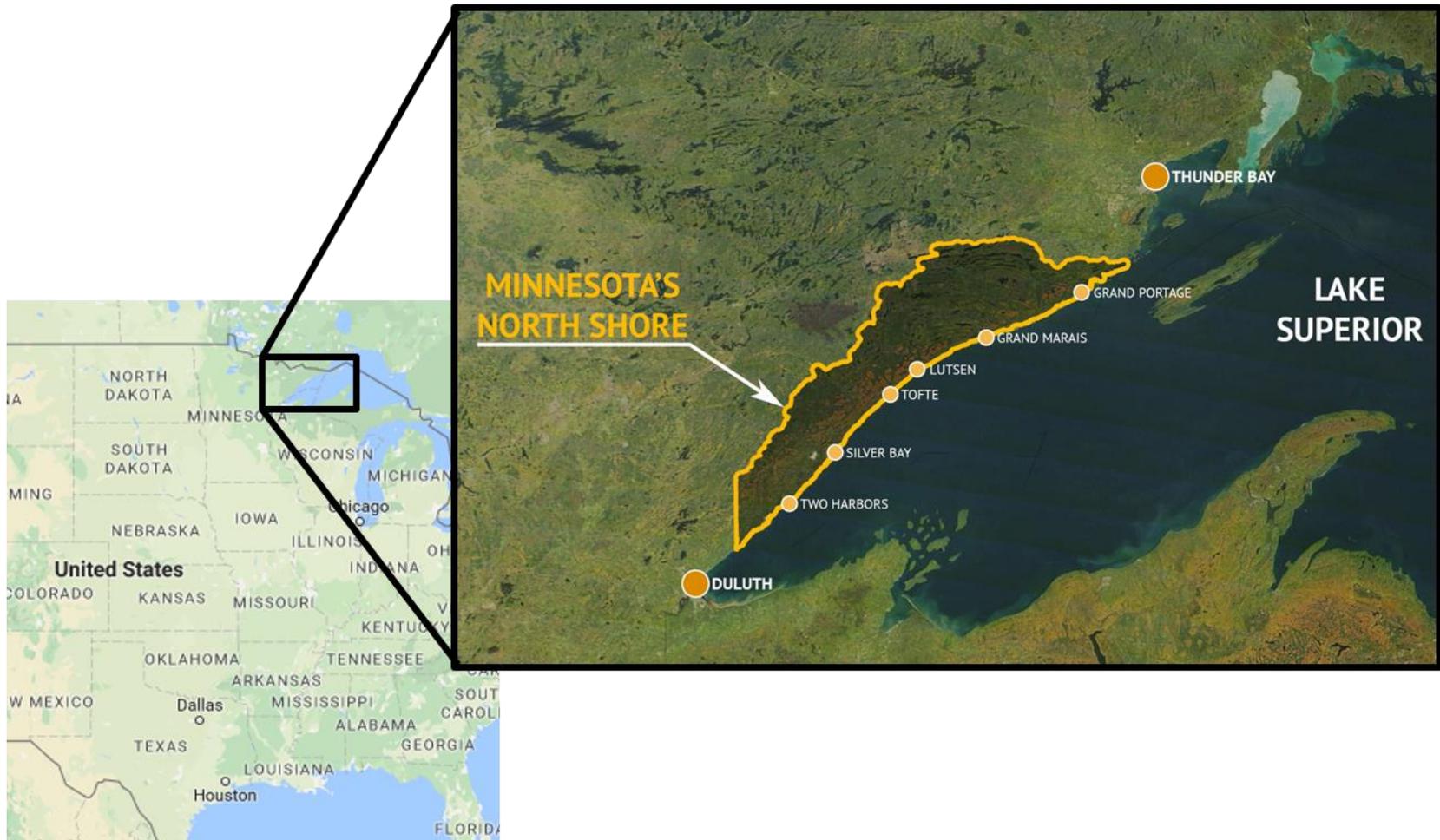


Figure 22. Study area: The North Shore nature-based tourism region along Lake Superior, Minnesota (USA).

Sampling

Sampling of visitors to the North Shore region was achieved through an on-site intercept sampling design. To randomize survey participation and minimize researcher selection bias, research assistants approached groups at 22 different sampling locations (Table 23), asking (a) if individuals within the traveling party reside outside of the study area for at least 10 months of the year (visitor) and, if so, (b) the adult, 18 years of age or older, with a birthday closest to the day of the survey intercept to participate. Additionally, sampling at each site was randomly assigned to either an AM or PM sampling block for 3-4 weekday sampling blocks and 2 weekend sampling blocks within the sampling period of July 15 through August 3, 2015. A total of 7 research assistants were trained in the sampling protocol and intercept scripts. On each sampling, 2 teams of 2 research assistants went to 2 separate sampling locations each (a total of 4 sampling locations daily).

Sampling locations were identified during preliminary visits to the region and web searches. Additional conversations with land management agencies and private tourism businesses expanded our sampling locations and verified that we would be able to intercept a diverse range of recreationist types (e.g., easily accessible and more remote sites, sites aimed at specialized outdoor recreation and more general experiences) to minimize sampling error.

Table 23. Sampling locations for on-site survey of North Shore visitors.

State parks	Tettegouche Gooseberry Falls Grand Portage Temperance River Split Rock Cascade River Crosby-Manitou Judge C.R. Magney
Hwy. 61 waysides	Beaver Bay Kadunce River Ray Berglund Cut Face Creek
Private businesses	Java Moose (coffee shop) Stone Harbor Wilderness Supply (gear & outfitter) Lake Superior Trading Post (gear & outfitter) Silver Bay Marina (bait, boat launch, amenities) Cook County Co-op (grocery store) Finland Co-op (grocery store) Big Dipper (ice cream shop)
Other	Cook County Visitor's Center/Artist's Point (public beach area) Lake County Historic Society (historic rail, homes, lighthouse tours) Sugar Loaf Cove nature preserve (operated by a non-profit association)

Nonresponse record keeping was a key component of the sampling plan. Nonresponders are those who decline participation. For those who refused participation, or quit the survey when partially complete, research assistants requested they instead answer a few short questions (i.e., the nonresponse bias check) (Vaske, 2008). These included items the research team hypothesized may be a potential sources of bias, such as the number of trips for the summer season, primary purpose of their current trip (recreation, business, visiting family, etc.), climate change concern (on a scale of 1, *not at all concerned* to 5, *extremely concerned*), home postal code, and age. Complete refusals (i.e., visitors who would not participate in the survey or nonresponse bias check) were also recorded to estimate response rate.

Instrument

Survey questionnaire items were constructed using existing literature, expert review, and a pilot testing session with North Shore visitors in the Fall of 2014. Following pilot testing, small modifications to the survey instrument and sampling procedures were made to enhance the likelihood of engaged participation by visitors. Institutional Review Board approval from the researchers' institution was obtained prior to pilot sampling and the subsequent summer sampling period. Surveys were administered to visitors on tablet computers. Visitors to the sampling locations were approached and presented with the overall concept of the study, then asked if they would be interested in participating. The data collection instrument included questionnaire items to measure substitutability preferences, visitor characteristics, and place meanings, as well as other items not reported here.

Substitution questions followed the presentation of a climate change scenario wherein participants viewed 'recent' summer season (i.e., an average of the past five summer seasons, 2009-2014) climate and environmental conditions (daily high temperature, heat index, rainfall, fire risk warning level and proportion of the regions streams with viable bass and trout populations) alongside projections of what those variables would be for a 'potential future' summer season (i.e., projections based on down-scaled climate change projections for the region; Bitsura-Meszaros et al., 2015). Although four separate survey treatments were utilized, no statistical differences were found between treatments for the questionnaire items presented below. Therefore, all survey versions were merged for the purposes of this paper.

Recreation substitution was operationalized by presenting survey participants with a future climate projection scenario (*'potential future conditions'*) in the survey instrument. Respondents were asked: "Please think about your planned outdoor recreational activities for

this trip. If summer conditions matched the *potential future conditions*, how likely would you...”. This was followed by five substitutability items modified from Dawson et al., 2011 (Table 24). Participants reported how likely they would be to cope through five possible substitution options. Potential response categories included 1= *Not at all likely*, 2 = *Slightly likely*, or 3 = *Somewhat likely*.

Table 24. Recreation substitution dimensions and items included in the North Shore Summer Visitor survey.

Substitutability dimension	Substitutability survey items
<i>Activity substitution</i>	Stay on the North Shore but do something else.
<i>Temporal substitution</i>	Cancel your trip, but reschedule during the summer season.
	Cancel your trip for the full summer season.
<i>Spatial substitution</i>	Travel elsewhere on the North Shore to participate in the planned summer activity.
	Travel outside of the North Shore to participate in the planned summer activity.

Three measures of current trip taking characteristics were also collected. Proximity of visitors was calculated by using self-reported home postal codes provided by survey participants and the postal code of the site at which visitors were intercepted and computed into categorical variables to create proportional groups coded either 1 (those who had traveled less than 240 miles), 2 (those who had traveled between 241-317 miles), and 3 (those who had traveled more than 317 miles). Destination loyalty was operationalized as the number of years participants report they had been making visits to the North Shore. This was assessed via a categorical variable where 1 = this was their first year visiting the North Shore,

2 = visitors have been making visits for 2-10 years, 3 = visitors have been making visits from 11-30 years, and 4 = visitors have been making visits for more than 30 years. Lastly, visit anticipation was operationalized through one measure of how far in advance visitors planned for their current trip; response options included eight provided categories (*the same day, 1-2 days ago, 3 days to 1 week ago, 8 days to 1 month ago, 2 to 5 months ago, 6 to 9 months ago, 9 months to 1 year ago, more than 1 year ago*).

Three dimensions of place meanings were assessed: (1) individual identity (how strongly an individual perceives a location as being ‘part of their self’); (2) family identity (values that are based on shared family memories or traditions occurring in a certain geographic space); and, (3) place centrality (the potential of a space to provide unique recreation opportunities and outcomes). Three items for each of the three dimensions were included in the instrument to operationalize the theoretical construct of place meanings (Table 25). These measures of place meanings were modified from previous research (e.g., Davenport, Baker, Leahy, & Anderson, 2010; Smith et al., 2011; Smith, Siderelis, Moore, & Anderson, 2012) that had validated the dimensional measures and scale reliability. Respondents were asked to rate their agreement with each item on a five-point Likert-type scale (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Neither Agree nor Disagree*, 4 = *Agree*, 5 = *Strongly Agree*).

Table 25. Place meaning dimensions and items included in the North Shore Summer Visitor survey.

Place meaning dimension	Place meaning survey items
<i>Individual identity</i>	I identify strongly with the North Shore.
	I feel the North Shore is a part of me.
	I am very attached to the North Shore.
<i>Place centrality</i>	I get more satisfaction out of visiting the North Shore than any other place.
	Doing what I do on the North Shore is more important to me than doing it in any other place.
	No other place can compare to the North Shore.
<i>Family identity</i>	I feel a sense of pride in my heritage when I am on the North Shore.
	The North Shore is a special for my family.
	Many special family memories are tied to the North Shore.

Statistical analyses

Data were downloaded into an Excel spreadsheet and cleaned, then uploaded into SPSS v.22 for analysis. One factor score representative of all nine place meaning measures, served as the mediating factor. One, singular factor (rather than three factors, one for each of the three dimensions of place meanings measured) was used because all nine items measuring place meanings loaded onto a one factor solution to a principal component analysis⁵ (PCA). Using a main loading greater than 0.7, convergent validity was confirmed for the set of nine place meaning items which all loaded on one component above 0.772. Convergent validity was further ascertained through a reliability analysis of the place

⁵ Pairwise deletion of missing data was used to minimize the loss of data. A Varimax rotation was used to produce simpler, and easier to interpret, factor loadings and communalities.

meanings scale (Cronbach's alpha = .943). Based on the factor score and the mean place meaning value (computed by adding all nine responses for the place meanings measures and dividing by nine), each case was classified as having high (above a factor score of 0.01 and above a mean place meanings value of 3.5), moderate (factor score between -1.49 and 0.0 and mean place meanings value between 2.1 – 3.4), or low (factor score of -1.5 and below, mean place meanings value below 2.0) place meanings.

A series of ordinal logistic regressions were utilized to assess the relationship between visitors' current trip characteristics, mediated by their place meanings, and visitors' selection of recreation substitution alternatives. Ordinal logistic regression is the best fit for an analysis wherein responses to the dependent variable(s) (i.e., likelihood to select each of the five substitution behaviors) are measured on an ordinal scale (i.e., 1 = *Not at all likely*, 2 = *Slightly likely*, 3 = *Somewhat likely*). Independent variables include current trip characteristics as operationalized by travel distance, destination loyalty, and visit anticipation measures. The place meaning factor scores were transformed from a continuous variable to categorical variable to ensure each cell (category) had an adequate number of cases. The categories were either low place meanings (a factor score below -1.5, 8% of the dataset), moderate place meanings (a factor score between 0.0 and -1.5, 42% of the dataset) and high place meanings (a factor score above 0.0, 50% of the dataset).

The analysis followed a three-step mediation analysis as outlined by Baron and Kenny (1986) and recently employed in a tourism context by Andereck & Nyaupane (2011). Step 1 included regressing the mediator (place meanings) on the predictors (three current trip characteristics). Step 2 regressed the dependent variable (substitution behaviors) on the predictors (current trip characteristics). Step 3 included regressing the dependent variable

(substitution behaviors) on both the predictors (three current trip characteristics) and the mediator (three current trip characteristics and place meanings). To determine mediation, the effect of the predictor variables was examined (i.e., reduced effect in step 3 from step 2). Although perfect mediation occurs when the predictor variables have no effect when the mediator is controlled for, there is a ‘continuum’ of mediation effect size. When the effect is reduced to zero there is evidence of a single, strong mediator, but if the effect is not reduced to zero, there is an indication of multiple mediating factors (Baron & Kenny, 1986, p. 1176). This process was iterated five times for each of the five substitution items.

Results

The on-site survey sampling resulted in 2,453 intercepts and 1,398 usable responses, for a 57% response rate. Non-response bias testing revealed that there was no significant difference between participants and non-participants in terms of number of trips per summer season and climate change concern. Independent t-tests were used to assess number of trips (participants $\bar{x} = 1.79$; non-participants $\bar{x} = 1.64$; $t = 1.62$, $p = .245$). Mann-Whitney U tests were used to assess climate change concern ($z = 1.904$, $p = .057$). Chi-square testing reveal there were differences between groups based on age and trip purpose. Participants tended to be younger and non-participants tended to be older ($\chi^2 = 32.33$, $p < .001$), with significantly more participants primary purpose to recreate solely at the site at which they were intercepted and non-participants more likely to recreate at multiple sites or to be on a business trip ($\chi^2 = 23.06$, $p < .001$). Categorical response options represent various levels of both current trip characteristics: destination loyalty, trip anticipation, and distance traveled, as well as strength of places meanings and likelihood of participating in a given recreation substitution alternative (descriptive statistics for these variables are provided in Table 26).

Table 26. Descriptive statistics for variables of interest in the ordinal regression analyses.

Variable	%
Stay on the North Shore but do something else.	
<i>Not at all likely</i>	30%
<i>Slightly likely</i>	21%
<i>Somewhat likely</i>	44%
Cancel your trip, but reschedule during the summer season.	
<i>Not at all likely</i>	67%
<i>Slightly likely</i>	15%
<i>Somewhat likely</i>	13%
Cancel your trip for the full summer season.	
<i>Not at all likely</i>	76%
<i>Slightly likely</i>	10%
<i>Somewhat likely</i>	9%
Travel elsewhere on the North Shore to participate in the planned summer activity.	
<i>Not at all likely</i>	40%
<i>Slightly likely</i>	20%
<i>Somewhat likely</i>	35%
Travel outside of the North Shore to participate in the planned summer activity.	
<i>Not at all likely</i>	48%
<i>Slightly likely</i>	20%
<i>Somewhat likely</i>	27%
Visit anticipation	
(1) Same day	4%
(2) 1-2 days ago	9%
(3) 3 days – 1 week ago	12%
(4) 8 days – 1 month ago	24%
(5) 2-5 months ago	31%
(6) 6-9 months ago	10%
(7) 9 months – 1 year ago	7%
(8) More than 1 year ago	3%
Destination loyalty	
(1) 1 st year visiting	20%
(2) Visiting for 2-10 years	34%
(3) Visiting for 11-30 years	26%
(4) Visiting for more than 30 years	20%
Travel distance	
(1) Least travel distance	30%
(2) Moderate travel distance	33%
(3) Longest travel distance	33%
Place meanings	
Low	8%
Moderate	40%
High	48%

n = 1,398 Some percentages may not equal 100 where there are missing data (never exceeds 5%)

tep 1: Regress the mediator on the predictors

Overall, the mediator variable (place meanings) was significantly related to current trip characteristics (see Table 27). Therefore, H1: *Current trip characteristics (destination loyalty, trip anticipation, and distance traveled) will be significantly related to place meanings* is supported. Specifically, controlling for other variables in the model, trip anticipation was significantly, negatively related to place meanings at: level 2 ($p = .001$, $\beta = -1.688$); level 3 ($p = .005$, $\beta = -1.409$); level 4 ($p = .001$, $\beta = -1.546$); level 5 ($p = .005$, $\beta = -1.361$); and level 6 ($p = .008$, $\beta = -1.345$), which show that visitors in these categories have lower place meanings than visitors in the highest (reference) category of trip anticipation (planned their trip more than 1 year in advance). Destination loyalty, when controlling for other variables, was also significantly and negatively related to place meanings at: level 1 ($p < .000$, $\beta = -3.255$); level 2 ($p < .000$, $\beta = -1.562$); and level 3 ($p = .003$, $\beta = -0.567$), demonstrating that loyalty levels 1, 2, and 3 are associated with lower North Shore place meanings than visitors in the highest (reference) category (those who have been visiting for more than 30 years). Distance, when controlling for other variables, was significantly and positively related to place meanings at level 2 ($p = .013$, $\beta = 0.365$), illustrating that visitors with a moderate travel distance had higher place meanings than those in the reference category (longest travel distance).

Table 27. Results from Step 1 ordinal regression of mediator on predictors.

Variables	Ordinal logistic regression 1			
	Est. β	S.E.	Wald	<i>p</i> value
Visit anticipation ^b				
(1) Same day	-.967	.571	2.866	.090
(2) 1-2 days ago	-1.688	.509	10.996	.001
(3) 3 days – 1 week ago	-1.409	.498	8.010	.005
(4) 8 days – 1 month ago	-1.546	.485	10.175	.001
(5) 2-5 months ago	-1.361	.481	8.013	.005
(6) 6-9 months ago	-1.345	.504	7.115	.008
(7) 9 months – 1 year ago	-.623	.528	1.391	.238
Destination loyalty ^c				
(1) 1 st year visiting	-3.255	.224	211.85 0	< .001
(2) Visiting for 2-10 years	-1.562	.179	76.314	< .001
(3) Visiting for 11-30 years	-.567	.189	9.016	.003
Travel distance ^d				
(1) Least travel distance	.117	.154	.579	.447
(2) Moderate travel distance	.365	.147	6.183	.013

Note: model chi-square (df = 168) = 196.245; -2 log likelihood = 427.162; Nagelkerke R-square = .305.
Reference categories used in the model:
^a High place meanings
^b Visit anticipation: planned for over a year in advance
^c Making visits for more than 30 years
^d Greatest travel distance

Steps 2 & 3: Regress the dependent variables on the predictors and mediator

Analyzing the effect of current trip characteristics on visitors' intent to "stay on the North Shore but do something else" (activity substitution) revealed no significant relationships (see Table 28). When the place meanings variable was included in the model, and controlling for other variables, destination loyalty was significantly and positively related to visitors' intent to stay on the North Shore but doing something else. Specifically, visitors who have been making trips for less than 10 years are more likely to stay on the North Shore but do something else than visitors in the reference category (visiting for more than 30 years). However the effect size of this indicator of destination loyalty increased from $\beta =$

0.211 and 0.186 for levels 1 and 2 respectively to $\beta = 0.553$ and 0.329 when place meanings were included in the model. These findings suggest that place meanings do not mediate the relationship between current trip characteristics and staying on the North Shore but doing something else.

Table 28. Results from steps 2 & 3: ordinal regression of "stay on the North Shore but do something else."

Stay on the North Shore but do something else. Variables	Step 2: Regress the dependent variable on the predictors				Step 3: Regress the dependent variables on predictors & mediator			
	Ordinal logistic regression 3A				Ordinal logistic regression 3B			
	Est. β	S.E.	Wald	<i>p</i> value	Est. β	S.E.	Wald	<i>p</i> value
Visit anticipation ^a								
(1) Same day	.133	.422	.099	.753	.179	.424	.177	.674
(2) 1-2 days ago	-.250	.363	.475	.491	-.093	.367	.064	.800
(3) 3 days – 1 week ago	.216	.349	.382	.536	.314	.352	.797	.372
(4) 8 days – 1 month ago	.179	.334	.288	.592	.290	.336	.745	.388
(5) 2-5 months ago	-.053	.330	.026	.873	.035	.332	.011	.917
(6) 6-9 months ago	.127	.357	.126	.723	.205	.360	.325	.569
(7) 9 months – 1 year ago	-.728	.375	3.763	.052	-.694	.376	3.397	.065
Destination loyalty ^b								
(1) 1 st year visiting	.211	.173	1.484	.223	.553	.195	8.052	.005
(2) Visiting for 2-10 years	.186	.148	1.588	.208	.329	.155	4.533	.033
(3) Visiting for 11-30 years	.190	.154	1.518	.218	.243	.156	2.442	.118
Travel distance ^c								
(1) Least travel distance	-.100	.139	.519	.471	-.112	.139	.650	.420
(2) Moderate travel distance	-.017	.131	.017	.897	-.050	.132	.145	.703
Place meanings ^d								
Low	-	-	-	-	-.721	.223	10.418	.001
Moderate	-	-	-	-	-.387	.123	9.938	.002
	Model chi-square (df = 12) = 22.950; <i>p</i> = .028; -2 log likelihood = 582.483; Nagelkerke -square = .020.				Model chi-square (df = 14) = 37.199; <i>p</i> = .001; -2 log likelihood = 949.745; Nagelkerke -square = .033.			
Reference categories used in the model:								
^a Visit anticipation: planned for over a year in advance			^c Greatest travel distance					
^b Making visits for more than 30 years			^d High place meanings					

For the temporal substitution item “cancel your trip, but reschedule during the summer season,” when controlling for other variables in the model, visit anticipation at level 2 and destination loyalty at levels 1 and 2 were significantly and positively related to this substitution behavior ($\beta = 0.933, 0.662, \text{ and } 0.469$ respectively), see Table 29. Visitors who planned their trip 1-2 days ago and have been making trips to the North Shore for ten years or less are more likely to cancel their trip and reschedule than visitors in the reference category for those variables (plan a trip more than a year in advance, have been making trips for more than 30 years respectively). When the place meanings variable was included in the model the effect of these predictor values was decreased ($\beta = 0.926, 0.639, \text{ and } 0.432$ respectively). This suggests a slight mediating effect of place meanings on visitors’ intent to cancel their trips, but reschedule them during the summer season.

Table 29. Results from steps 2 & 3: ordinal regression of "cancel your trip but reschedule during the summer season."

Cancel your trip, but reschedule during the summer season.	Step 2: Regress the dependent variable on the predictors				Step 3: Regress the dependent variables on predictors & mediator			
	Ordinal logistic regression 3A				Ordinal logistic regression 3B			
Variables:	Est. β	S.E.	Wald	<i>p</i> value	Est. β	S.E.	Wald	<i>p</i> value
Visit anticipation ^a								
(1) Same day	.358	.537	.444	.505	.328	.538	.370	.543
(2) 1-2 days ago	.560	.471	1.411	.235	.558	.474	1.388	.239
(3) 3 days – 1 week ago	.933	.454	4.219	.040	.926	.455	4.132	.042
(4) 8 days – 1 month ago	.591	.443	1.780	.182	.575	.444	1.677	.195
(5) 2-5 months ago	.284	.441	.416	.519	.265	.442	.358	.550
(6) 6-9 months ago	.454	.467	.941	.332	.438	.469	.875	.350
(7) 9 months – 1 year ago	-.317	.517	.376	.540	-.315	.517	.371	.542
Destination loyalty ^b								
(1) 1 st year visiting	.662	.204	10.49	.001	.639	.228	7.883	.005
(2) Visiting for 2-10 years	.469	.180	6.762	.009	.432	.188	5.297	.021
(3) Visiting for 11-30 years	.288	.190	2.305	.129	.279	.191	2.138	.144
Travel distance ^c								
(1) Least travel distance	.136	.161	.716	.397	.147	.161	.831	.362
(2) Moderate travel distance	.034	.154	.049	.825	.048	.155	.098	.754
Place meanings ^d								
Low	-	-	-	-	-.053	.255	.043	.836
Moderate	-	-	-	-	.091	.142	.408	.523
	Model chi-square = 35.530; (df = 12) , <i>p</i> < .001 -2 log likelihood = 475.464; Nagelkerke R-square = .034.				Model chi-square = 36.257, (df = 14); <i>p</i> = .001 -2 log likelihood = 751.522; Nagelkerke R-square = .035.			
Reference categories used in the model:								
^a Visit anticipation: planned for over a year in advance		^c Greatest travel distance						
^b Making visits for more than 30 years		^d High place meanings						

When controlling for other variables in the model, all levels of destination loyalty were positively and significantly related ($\beta = 0.931, 0.675, \text{ and } 0.569$ for levels 1, 2, and 3 respectively) to visitors' intent to cancel their trip for the full summer season (see Table 30). Visitors who have been making trips for less than 30 years are more likely to cancel their trip than visitors who have been making trips for more than 30 years. When place meanings were added to the model, the effect size of destination loyalty was reduced ($\beta = 0.794, 0.591, \text{ and } 0.539$ respectively). This suggests that place meanings mediate the effect of destination loyalty on predicting visitors' likelihood to engage in temporal substitution behaviors.

Table 30. Results from steps 2 & 3: ordinal regression of "cancel your trip for the full summer season."

Cancel your trip for the full summer season.	Step 2: Regress the dependent variable on the predictors				Step 3: Regress the dependent variables on predictors & mediator				
	Ordinal logistic regression 3A				Ordinal logistic regression 3B				
Variables:	Est. β	S.E.	Wald	<i>p</i> value	Est. β	S.E.	Wald	<i>p</i> value	
Visit anticipation ^a									
(1) Same day	.886	.706	1.576	.209	.832	.706	1.388	.239	
(2) 1-2 days ago	1.047	.640	2.671	.102	.990	.643	2.376	.123	
(3) 3 days – 1 week ago	1.128	.626	3.243	.072	1.083	.627	2.980	.084	
(4) 8 days – 1 month ago	1.035	.614	2.847	.092	.974	.615	2.511	.113	
(5) 2-5 months ago	.686	.612	1.256	.262	.640	.613	1.089	.297	
(6) 6-9 months ago	1.084	.633	2.934	.087	1.030	.633	2.645	.104	
(7) 9 months – 1 year ago	.131	.692	.036	.850	.112	.692	.026	.871	
Destination loyalty ^b									
(1) 1 st year visiting	.931	.244	14.56	< .001	.794	.269	8.749	.003	
(2) Visiting for 2-10 years	.675	.222	9.220	.002	.591	.230	6.599	.010	
(3) Visiting for 11-30 years	.569	.232	6.026	.014	.539	.233	5.358	.021	
Travel distance ^c									
(1) Least travel distance	-.082	.187	.191	.662	-.077	.187	.168	.682	
(2) Moderate travel distance	.066	.174	.143	.705	.081	.174	.214	.644	
Place meanings ^d									
Low	-	-	-	-				.555	
Moderate	-	-	-	-				.165	
	Model chi-square = 32.020; (df = 12), <i>p</i> = .001, -2 log likelihood = 432.004; Nagelkerke R-square = .034.				Model chi-square = 33.827; (df = 14), <i>p</i> = .002, -2 log likelihood = 664.828; Nagelkerke R-square = .036.				
Reference categories used in the model:									
^a Visit anticipation: planned for over a year in advance				^c Greatest travel distance					
^b Making visits for more than 30 years				^d High place meanings					

For the substitution behavior of “traveling elsewhere on the North Shore to participate in the planned summer activity,” when controlling for other variables in the model, visit anticipation level 7 was significantly and negatively related ($\beta = -0.837$) and destination loyalty levels 1 and 2 were significantly and positively related to the intent to substitute ($\beta = 0.588$ and 0.354 respectively), see Table 31. Visitors who planned their trip 9 months to 1 year ago are less likely to travel elsewhere on the North Shore for their planned activity than visitors in the reference category (planned more than 1 year in advance). Visitors who have been making trips to the North Shore for ten years or less are more likely to travel elsewhere on the North Shore for their planned activity. When place meanings were added to the model, the effect size of visit anticipation decreased ($\beta = -0.820$); however, the effect size of destination loyalty increased slightly (0.39 and 0.453 respectively). This indicates that place meanings mediate the relationship between visit anticipation and traveling elsewhere on the North Shore to participate in the planned summer activity.

Table 31. Results from steps 2 & 3: ordinal regression of "travel elsewhere on the North Shore to participate in the planned summer activity."

Travel elsewhere on the North Shore to participate in the planned summer activity.	Step 2: Regress the dependent variable on the predictors				Step 3: Regress the dependent variables on predictors & mediator			
	Ordinal logistic regression 3A				Ordinal logistic regression 3B			
	Est. β	S.E.	Wald	<i>p</i> value	Est. β	S.E.	Wald	<i>p</i> value
Variables:								
Visit anticipation ^a								
(1) Same day	.193	.423	.210	.647	.212	.424	.250	.617
(2) 1-2 days ago	-.016	.365	.002	.966	.096	.369	.067	.796
(3) 3 days – 1 week ago	.482	.351	1.886	.170	.559	.353	2.509	.113
(4) 8 days – 1 month ago	.238	.335	.504	.478	.319	.338	.895	.344
(5) 2-5 months ago	.091	.332	.075	.784	.159	.334	.228	.633
(6) 6-9 months ago	-.013	.359	.001	.971	.052	.361	.020	.886
(7) 9 months – 1 year ago	-.837	.388	4.648	.031	-.820	.389	4.445	.035
Destination loyalty ^b								
(1) 1 st year visiting	.588	.174	11.38	.001	.839	.196	18.30	< .001
(2) Visiting for 2-10 years	.354	.149	5.630	.018	.453	.156	8.420	.004
(3) Visiting for 11-30 years	.210	.156	1.812	.178	.243	.157	2.394	.122
Travel distance ^c								
(1) Least travel distance	.111	.139	.639	.424	.102	.139	.539	.463
(2) Moderate travel distance	-.092	.131	.494	.482	-.120	.132	.820	.365
Place meanings ^d								
Low	-	-	-	-	-.662	.226	8.553	.003
Moderate	-	-	-	-	-.225	.123	3.377	.066
	Model chi-square = 44.259; (df = 12) , <i>p</i> < .001, -2 log likelihood = 571.155; Nagelkerke R-square = .001.				Model chi-square = 53.256; (df = 14), <i>p</i> < .001, -2 log likelihood = 920.986; Nagelkerke R-square = .046.			
Reference categories used in the model:	^c Greatest travel distance							
^a Visit anticipation: planned for over a year in advance	^d High place meanings							
^b Making visits for more than 30 years								

For the final spatial substitution behavior of “traveling outside of the North Shore to participate in the planned summer activity,” when controlling for other variables in the model, level 7 of visit anticipation was significantly and negatively ($\beta = -1.087$) related and all three levels of destination loyalty were significantly and positively related to the intent to substitute ($\beta = 1.055, 0.639, \text{ and } 0.467$ for levels 1, 2, and 3 respectively), see Table 32.

Visitors who planned their trip 9 months to 1 year ago are less likely to travel outside the North Shore for their planned activity than visitors who had planned their trip more than 1 year in advance. Visitors who have been making trips to the North Shore for less than 30 years are more likely to travel outside the North Shore for their planned activity. When place meanings were included in the model, the effect size of visit anticipation decreased ($\beta = -1.078$); however, the effect size of destination loyalty increased slightly (1.166, 0.672, and 0.481 respectively). This indicates that place meanings mediate the relationship between visit anticipation and the intent to travel outside the North Shore to participate in the planned summer activity.

Table 32. Results from steps 2 & 3: ordinal regression of "travel outside of the North Shore to participate in the planned summer activity."

Travel outside of the North Shore to participate in the planned summer activity.	Step 2: Regress the dependent variable on the predictors				Step 3: Regress the dependent variables on predictors & mediator			
	Ordinal logistic regression 3A				Ordinal logistic regression 3B			
	Est. β	S.E.	Wald	<i>p</i> value	Est. β	S.E.	Wald	<i>p</i> value
Variables:								
Visit anticipation ^a								
(1) Same day	.095	.434	.048	.827	.094	.435	.047	.829
(2) 1-2 days ago	.085	.376	.052	.820	.138	.379	.133	.716
(3) 3 days – 1 week ago	.453	.361	1.575	.210	.495	.362	1.868	.172
(4) 8 days – 1 month ago	.161	.346	.215	.643	.194	.348	.311	.577
(5) 2-5 months ago	-.106	.343	.095	.758	-.073	.344	.045	.832
(6) 6-9 months ago	.268	.369	.529	.467	.294	.370	.629	.428
(7) 9 months – 1 year ago	-1.087	.415	6.867	.009	-1.078	.415	6.734	.009
Destination loyalty ^b								
(1) 1 st year visiting	1.055	.181	33.973	< .001	1.166	.202	33.179	< .001
(2) Visiting for 2-10 years	.639	.157	16.512	< .001	.672	.164	16.851	< .001
(3) Visiting for 11-30 years	.467	.164	8.116	.004	.481	.165	8.478	.004
Travel distance ^c								
(1) Least travel distance	.117	.142	.677	.411	.114	.142	.638	.424
(2) Moderate travel distance	-.045	.135	.112	.738	-.059	.136	.187	.666
Place meanings ^d								
Low	-	-	-	-	-.360	.229	2.474	.116
Moderate	-	-	-	-	-.058	.125	.213	.644
	Model chi-square = 73.936; (df = 12), <i>p</i> < .001, -2 log likelihood = 564.128; Nagelkerke R-square = .064.				Model chi-square = 76.139; (df = 14), <i>p</i> < .001 -2 log likelihood = 903.697; Nagelkerke R-square = .066.			
Reference categories used in the model:								
^a Visit anticipation: planned for over a year in advance				^c Greatest travel distance				
^b Making visits for more than 30 years				^d High place meanings				

Given these results, we partially accept H2, that *current trip characteristics will be significantly related to visitors' intent to engage in different types of substitution behaviors*. We also partially accept H3, that *the effect size of the relationship between current trip characteristics and visitors' intent to engage in different types of substitution behaviors will be reduced when place meanings is included in the model as a mediator*. The trip characteristic variables 'visit anticipation' and 'destination loyalty' were significantly related to some substitution behaviors; however, 'distance traveled' was not related to any substitution behaviors. Further, in some cases the effect size of the trip characteristic variables was reduced by the presence of place meanings in the model; yet, in other cases, place meanings suppressed, or had no effect on the relationship between trip characteristics and visitors' intent to substitute.

Discussion

This paper contributes to the methodological and theoretical understanding of place meanings as they are related to characteristics of visitors' current trip to a NBT destination and act as a mediator rather than simple predictor variable in the context of outdoor recreation behavioral intents. First, we fail to reject **H1**, that current trip characteristics (destination loyalty, trip anticipation, and distance traveled) are significantly related to place meanings. All but two levels (level 1: same day and level 7: 9 months to 1 year ago) of visit anticipation, all levels of destination loyalty, and the 'moderate' level of travel distance are all significantly related to place meanings. For **H2** (that current trip characteristics will be significantly related to visitors' intent to engage in different types of substitution behaviors) and **H3** (that place meanings will mediate this relationship), results are mixed and discussed in further detail below.

Visit anticipation

Visit anticipation is negatively related to place meanings, with the strongest negative relationship occurring at low anticipation levels (i.e., planned their trip between 1-2 days ago and planned trip between 8 days and 1 month ago) and weaker negative relationships occurring for visitors who planned their trip the same day and those who planned their trip more than 2 months or more in advance. Visitors who planned their visit less than a year in advance, overall, have lower place meanings than those visitors who planned their trip more than a year in advance. While existing literature to compare the place meaning–visit anticipation relationship is lacking, this finding may urge others to consider anticipation, and other stages of outdoor recreation experiences, in relation to place meanings. Rickard and Stedman (2015) posit that place bonds can be achieved without previously visiting a place; however, additional research is needed to delve further into the relationship between stage of recreation experience and place meaning formation, crystallization, and confirmation.

Place meanings mediate the effect of visit anticipation for visitors with moderate trip anticipation (i.e., planned their North Shore trip 3 days to 1 week in advance) for the temporal recreation substitution item: *cancel your trip, but reschedule during the summer season*. This illustrates that place meanings reduce the effect of visitors with low visit anticipation having increased likelihood to cancel and reschedule their trip in response to the potential future conditions, which partially refutes H2b that trip anticipation will be negatively related to temporal substitution. Place meanings may ‘push’ visitors to make a spur-of-the-moment recreational visit to the North Shore, even in cases where environmental conditions are atypical. This findings calls for further analysis of visit anticipation, the least studied of all phases of recreation experience (McKay et al., 2012). Specifically, research is

needed to explore the ability of individuals to temporally substitute when anticipation (or planning horizon) is short rather than far in advance.

Place meanings were also found to mediate the relationship between spatial substitution items and visit anticipation, specifically for visitors who planned their trip 9 months to 1 year in advance. This further confirms the rejection of hypothesis H2b, that trip anticipation is negatively related to spatial substitution. Visitors who planned their trip 9 months to 1 year in advance are less likely to spatially substitute; however, this effect is lessened by the presence of place meanings. Data suggest that visitors who planned their trip further in advance may have less capacity to spatially substitute but, with the presence of place meanings, their likelihood of spatially substituting increases. These findings support H3 in that place meanings mediate (some) effects of current trip characteristics on future recreation substitution behaviors.

Travel distance

Travel distance was positively related with place meanings. Visitors who traveled a moderate distance had higher place meanings than visitors who traveled the longest distance (although not significant, those who traveled the least distance also have stronger place meanings than those who traveled the furthest distance). These findings align with past research and suggest that a threshold may exist in terms of travel distance and level of place connection. While Nyaupane and others (2003) found that less than 50 miles resulted in high place attachment, this study finds that highest place meaning agreement comes from visitors traveling between about 250-300 miles to the NBT destination. The difference between these studies could be attributed to the 'reach' or increase 'pull' of various recreation sites, with those having a greater reach, also having a greater distance traveled associated with strong

place-bonds. However, travel distance was not found to be significantly related to any of the recreation substitution items and place meanings were not found to mediate a relationship. This means we reject H2c, that travel distance will be positively related to activity substitution but negatively related to spatial or temporal substitution. We also partially reject H3, that place meanings mediate the relationship between current trip characteristics and recreation substitution.

Destination loyalty

Destination loyalty was negatively related to place meanings. For example, visitors who were on their first visit to the North Shore are much less likely than visitors who have been making visits to the North Shore for over 30 years to have strong place meanings. Intuitively, visitors with increased destination loyalty have had increased time to create place-based bonds with the North Shore; first year visitors lack this depth of relationship with the region. This corroborates existing research suggesting increased place bonds are correlated with increased loyalty (Lee et al., 2007; Lee & Shen, 2013; Yuksel et al., 2010), adding that decreased loyalty is correlated with decreased place bonds or meanings.

For some forms of recreation substitution, place meanings mediated the effect of destination loyalty on visitors' intent to engage in different types of substitution behaviors. For the temporal substitution *cancel your trip, but reschedule during the summer season* place meanings mediate the effect of loyalty for newer visitors (first year visiting and visiting for 2-10 years). Place meanings mediate the relationship between all levels of destination loyalty and the second temporal substitution item *cancel your trip for the full summer season*. Visitors who are making their first trip to the North Shore are most likely to *cancel* or *cancel and reschedule*; however, place meanings reduce this effect. Since the mediation effect is

present at all levels, it may be inferred that as visitors' loyalty increases (and, consequently, increased place meanings develop) the likelihood of temporal recreation substitution (canceling trips) becomes less likely.

Our findings support hypothesis H2a that destination loyalty is positively related to temporal substitution but rejects H2b that trip anticipation is negatively related to temporal substitution. While destination loyalty has not been explored in relation to recreation substitution, activity loyalty has been found to decrease the likelihood of activity substitution for some recreationists (Dawson et al., 2011; Vivian, 2011). The findings presented here would support further exploration of the relationships between activity loyalty, destination loyalty, and recreation substitution. In particular, it will be important to explore whether or not destination loyalty is related to temporal substitution in other contexts. Previous literature establishes that temporal substitution is related to recreationists' involvement, with highly involved recreationists more likely to substitute temporally (Dawson et al., 2011) and that long-term, 'veteran,' recreationists are generally more likely to spatially substitute (Hammit, Backland, Bixler, et al., 2004). Other research finds that recreation commitment is not predictive of recreation substitution (Sutton & Oh, 2015). This study posits that less loyal (first time) visitors are most likely to temporally substitute, but that place meanings reduce the negative effect of low loyalty on intention to temporally substitute.

While place meanings mediate the relationship between destination loyalty and temporal substitution, the data reveal that place meanings may suppress the relationship between destination loyalty and spatial substitution items. This further confirms hypothesis H2a that destination loyalty is negatively related to spatial substitution. Effect size of destination loyalty increased with the inclusion of place meanings in the model, indicating a

suppression rather than mediation effect (Preacher & Hayes, 2008). That is, for first time visitors with the highest likelihood of spatially substituting, the presence of place meanings further increases their likelihood to spatially substitute.

Finally, place meanings also appear to suppress the effect of destination loyalty on activity substitution. For example, first time visitors are most likely to utilize activity substitution. When place meanings are also considered, first time visitors have an increased tendency to swap activities. This reflects existing research findings that ‘beginners’ are most likely to utilize activity substitution (Rutty et al., 2015) and builds on this understanding by demonstrating that the presence of place meanings could further motivate beginners or first time visitors to substitute activities rather than the timing or place of their visit. This calls for a partial rejection of H2a (that destination loyalty is related to activity substitution). The suppression effect between destination loyalty and recreation substitution also calls for a rejection of H3, as place meanings did not mediate the effect of current trip characteristics on visitors’ intent to engage in different types of substitution behaviors. Future research is needed to confirm the complexities of this relationship, with emphasis on the dynamic relationships between place meanings and activity substitution, which seems to ‘override’ the relationship between destination loyalty and activity substitution.

Limitations

Generalizability and/or transferability, the breadth of inferences that can be drawn from this study (Vaske, 2008), is limited to our survey sample population, summer visitors the North Shore region. Results from the non-response bias check reveal that respondents for this study were skewed towards a younger population and one that is most likely to recreate in one area along the North Shore rather than visit multiple areas or visit for business

purposes. While the summer tourism season is the peak visitation time for the North Shore, the data collected for this study only represent those visitors who made trips during the summer sampling session and at those locations that were selected as summer sampling sites and omits that those who already spatially or temporally substituted for climatic or other reasons (e.g., Schneider & Wynveen, 2015). Additionally, limitations pervasive to on-site survey sampling include the oversampling of avid visitors (Shaw, 1988), as well as the exclusion of non-visitors, visitors who access the North Shore through locations not sampled, and visitors who have already been displaced (temporal or spatial substitution) by environmental changes or for other reasons.

Implications

For researchers, this study enhances the understanding of place meanings as a mediating, and suppressing, variable. Place meanings and two components of visitors' current trip characteristics (destination loyalty and visit anticipation) emerged as influential to future recreation substitution behaviors. Inclusion of these variables may be emphasized in future statistical modeling regarding climate change impacts, particularly recreation substitution resulting from climate change. Our findings suggest that the role of current trip characteristics, which has not been considered a major driver of place meanings or recreation substitution by the body of literature reviewed here, should be more frequently integrated into future studies.

Many recreation providers have a firm understanding of the market they serve or can obtain data about their clientele in regards to trip anticipation (how far ahead they planned) and destination loyalty (how long they've been making visits). For NBT communities, knowing how current trip characteristics relate to future behavioral intentions can inform

marketing strategies. This study finds that temporal substitution (canceling trips) is most common among visitors with low visit anticipation and low destination loyalty. However, place meanings reduce the effect of these characteristics on visitors' likelihood to cancel trips. Informed communication, including marketing, can lead to the co-creation of place meanings between the visitors and NBT communities (Hamilton & Alexander, 2013). Such an approach can be useful in cases where recreation providers aim to mediate temporal recreation substitution; as place meanings also mediate the likelihood that visitors with low loyalty and higher anticipation will spatially substitute, marketing materials aimed at eliciting strong place values may influence visitors to stay on the North Shore rather than cancel their trip.

Dubois and Ceron (2006) suggested that an increase in knowledge regarding climate change impacts is a key component of climate readiness. NBT communities can share climate related information with guests and guide them toward preferred substitution alternatives. Spatial substitution is associated with visitors who planned their trip between 9 months and 1 year in advance and visitors who have been making trips to the North Shore for less than 30 years (traveling outside the North Shore) or less than 10 years (traveling within North Shore). Recreation providers may include information to visitors (especially those who have booked their trip far in advance and/or have less experience on the North Shore) with information about potential climate-related constraints and ways to cope with those constraints at the current location, such as alternative activity choices or flexibility with rescheduling (if the provider is able to accommodate that flexibility).

Additionally, this study finds that first time visitors, with the presence of place meanings, are most likely to swap activity choices and that activity substitution is the most

preferred or most likely substitution option by all current North Shore visitors sampled in this study. North Shore NBT providers can strategically plan and program ‘climate-proof’ activity choices (e.g., indoor programming or special events such as music or art shows) to offer visitors in lieu of those visitors canceling their trip or seeking out the activity elsewhere. Guiding visitors towards alternate sites or recreational opportunities within the North Shore will foster continued visitor spending in and/or the development of stronger place meanings with the North Shore region.

Conclusions

Assessing the concepts of visit anticipation, destination loyalty, and distance traveled in relation to place meanings builds on the current theoretical understanding of how place meanings shape individuals’ behaviors, in this case how they shape North Shore visitors’ substitution behaviors. Previous research supports that individual characteristics influence place meanings, for example place meanings are stronger for locals than for non-locals (Davenport, Baker, Leahy, & Anderson, 2010). However, the current body of literature regarding place meanings has primarily validated the measures of place meanings (e.g., Davenport et al., 2010; Smith et al., 2011) and utilized the concept of place meanings as a predictor variable with less attention given to exploring the antecedents of place meanings (e.g., Kil et al., 2014; Smith et al., 2012). This study’s finding of place meanings as a mediator of loyalty and anticipation’s effect on temporal substitution also calls for an assessment of visitors’ place meanings in future analyses of (temporal) substitution.

Similar to Dawson and others’ (2011) finding that less involved recreationists are more likely to substitute spatially, this study found less loyal (first time) visitors to be more inclined to spatially substitute their recreation setting both within and outside of the North

Shore region. Overall, spatial substitution items were among the most common options in which North Shore visitors would be *somewhat likely* to participate, which supports previous findings that visitors are less likely to cancel trips (temporally substitute) than go somewhere else (spatially substitute) to recreate (Dawson et al., 2013). This finding is further supported as temporal substitution items (canceling trips) are the most unlikely options for North Shore visitors to select. The findings presented here should be tested in other contexts to determine if anticipation of visiting an area, loyalty to a specific site, and travel distance influences the strength or significance of individuals' place meanings.

Additional studies of climate change and outdoor recreation that are conducted on a regional geographic scale, such as the one here, may include measures of current trip characteristics and place meanings to evaluate the influence of these variables on recreation substitution in different ecosystems and cultures. Future research should also assess these variables because these types of data are relatively easily acquired by NBT communities (e.g., can be acquired qualitatively through conversation with clients and guests or quantitatively through hospitality questionnaires) and have been confirmed by this study to significantly predict recreation substitution. On-site visitor surveys, in general, may emerge as a key methodological piece in understanding NBT communities' climate readiness. Sustaining NBT destinations is important for both the communities and the outdoor recreationists and tourists that depend on the beneficial outcomes of these destinations. Future research should aim to provide these groups with relevant data capable of enhancing strategic planning and adaption to climate change.

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CHAPTER 5: Conclusion

The construct of ‘place’ has helped social scientists from a variety of different disciplines understand regional identity, natural resource management preferences, and outdoor recreation behaviors (e.g., Davenport & Anderson, 2005; Kyle, Graefe, Manning, & Bacon, 2004; Relph, 1976; Stedman, 2003; Tuan, 1974). Place-based research has also been important in developing an understanding of how climate change will impact socio-cultural systems (e.g., Smith, Anderson, & Moore, 2012). Using a three-component definition of place—specifically, attributes, meanings, and activities (Relph, 1976)—can enhance how NBT managers consider adaptation to changes in natural resources and visitor behaviors. As a result, this dissertation utilized the three components of place as a framework for assessing climate change impacts to NBT on the North Shore of Lake Superior. The overarching objectives of the dissertation were to: (1) explore the *physical attributes* of a place through imagery of the NBT destination; (2) gain an understanding of how *place meanings* are related to visitors’ behavioral (i.e., recreational coping) and cognitive (i.e., risk perceptions) responses to climate change; and (3) understand how place meanings and current trip characteristics are related to future recreation *activities* (i.e., recreation substitution in response to climate change).

Summary of findings

The first manuscript exploring physical attributes of place presented results of a thematic analysis of photographs and captions of the North Shore during the 2015 summer tourism season. Findings from the analysis establish key components of the North Shore destination image: natural resources, built infrastructure, and human subjects. Recreation providers can utilize this information by enhancing management and marketing of tourism

resources on the North Shore. Opportunities for visitors' interaction with natural resources, interpreting cultural sites (and other elements of built infrastructure), and programming to facilitate spending time with family and friends will provide visitors with enhanced exposure to these key elements of the North Shore destination image. Further, these elements can be highlighted in marketing materials to cultivate or reinforce the image desired by future and repeat visitors, thereby enhancing the ability of these individuals to connect to and find meaning in the North Shore.

Methodologically, the analytical technique presented in the first manuscript contributes a novel approach to utilizing UGC. Specifically, this thematic analysis of social media data revealed a new way in which researchers and practitioners can explore this type of data. Additionally, this study makes a theoretical contribution by explicitly addressing the infrequently examined role of physical attributes within place meanings literature and describing the contribution of visitor identified attributes to place branding and destination image. Future applications of UGC may be particularly useful in situations where recreation managers and tourism providers have difficulty prioritizing attributes for climate adaptation planning in a NBT region with diverse natural and cultural resources.

In the second manuscript, two research questions were explored: (1) are place meanings, along with select visitors attributes, related to how North Shore visitors have coped with climate-related impacts affecting their desired outdoor recreational pursuits?; and (2) are place meanings, previous experience with climate-related impacts, personal efficacy to plan for climate-related impacts, and climate change concern related to future climate-related risk perceptions? This study illustrated that age, gender, and place meanings were related to some of the behavioral coping responses. Specifically, visitors with increased place

meanings and younger visitors were more likely to employ technical, temporal, and informational coping behaviors, such as purchasing new gear or equipment, changing the timing of trips, and paying more attention to weather forecasts before and during recreational trips, rather than spatially (i.e., go somewhere else, cancel trips) cope. Gender was significantly related to three of the coping behaviors; specifically, males were more likely to purchase new gear or equipment, alter the timing of trips, and pay more attention to weather forecasts before and during recreational trips. Age was the only significant predictor of cognitively coping, with younger visitors most likely to worry about their safety before or during recreational visits to the North Shore. Second, place meanings and past climate impacts were not significantly related to cognitive responses (risk perceptions). However, climate change concern and personal efficacy were significant predictors of perceptions of the direction (positive/negative) of climate impacts. Specifically, visitors with low levels of concern and low perceptions of personal efficacy were more likely to view projected climate-related impacts as positively impacting their future recreational trips.

The findings presented in the second manuscript are important in enhancing social scientists' theoretical understanding of the role of place meanings in predicting behavioral and cognitive responses to climate change. NBT providers may also benefit from these findings by ascertaining a better understanding of their market and how personal factors (age, gender, personal efficacy, climate change concern), values (place meanings), and prior experiences (past climate impacts) influence visitors' coping behaviors. For example, place meanings are associated with coping behaviors that allow visitors to remain on the North Shore, while climate change concern and personal efficacy are associated with perceptions of positive climate-related impacts. Enhancing visitors' place meanings, climate change

concern, and personal efficacy may encourage an ethic among visitors that enables them to remain loyal to the North Shore now and in the future, particularly if climate-related impacts negatively affect this recreation and tourism system.

Although the North Shore NBT region is not likely to see great changes in proximal future (the next 30 years) tourism demand (Smith et al., 2016), those who are connected to (i.e., identify with) the North Shore will cope to overcome climate-related constraints and visitors with low climate change concern and perceptions of low personal efficacy may not perceive constraints to negotiate. However, as climate change impacts may differ from conditions presented to participants in this study (i.e., unanticipated negative changes), enhancing visitors' climate change concern and personal efficacy to deal with a range of climate-related impacts may reduce unforeseen changes in tourism demand and consequent negative impacts to the North Shore tourism economy. Such efforts may be enhanced if they are coupled with messaging that enhances place meanings and includes strategies for adaptation (coping behaviors), especially among younger and male visitors.

In the third manuscript, findings revealed that current trip characteristics (trip anticipation, distance traveled, and destination loyalty) are significantly related to place meanings. This builds on the theoretical understanding of place meanings, which are typically treated as a dependent variable, and calls for further research on the antecedents of place meanings. For destination loyalty, place meanings mediate the effect of loyalty on temporal substitution (first year visitors are more likely to cancel trips; however, the presence of strong place meanings lessens this effect), but suppress the effect of loyalty on spatial and activity substitution (first year visitors are more likely to go somewhere else on the North Shore or do something else, especially with the presence of strong place meanings). Place

meanings also mediate the relationship between visit anticipation and temporal substitution (visitors who planned their trip less than a week in advance are more likely to cancel; however, the presence of place meanings mediates this effect) and spatial substitution (visitors who planned their trip more than 9 months in advance are more likely to spatially substitute; however, his effect is mediate by the presence of place meanings). Travel distance was not significantly related to any of the recreation substitution alternatives.

Theoretically, the findings presented in the third manuscript refine researchers' understanding of place meanings by establishing that place meanings play a mediating role between trip characteristics and specific types of recreation substitution. Practically, NBT providers may use this information to inform how they manage visitors with various planning horizons and levels of loyalty. For example, when environmental conditions change, highlighting alternative activity options may retain low anticipation visitors who are likely to cancel trips and high anticipation visitors who are likely to go elsewhere.

Study limitations

By utilizing a multi-method approach (Creswell, 2013), this research strives to balance the limitations and opportunities of both data collection and generation approaches. Generalizability and/or transferability (i.e., the breadth of inferences that can be drawn from this study) are limited to the sample population of North Shore summer season visitors, particularly those summer visitors who hold stronger general climate change beliefs and regularly post images on social media. As the quantitative portions of this dissertation focused on coping or substitution behaviors by visitors, it is also important to note the limitation of not intercepting visitors who have already been displaced due to a climate-related impact in the past (Schneider & Wynveen, 2015) and, therefore, no longer visit the

North Shore region during the summer season. Future research that replicates the analyses presented in the second and third manuscripts with off-site populations, such as residents of the Minneapolis-St. Paul region, is needed to identify the generalizability of the findings, particularly among individuals who have already employed spatial and temporal coping behaviors.

On-site surveys also have inherent limitations, such as constraints resulting from the presence of those collecting data. While the summer tourism season is the peak visitation time for the North Shore, the data collected through the research proposed here will only represent those visitors who make trips during the summer sampling session and at those locations that were selected as summer sampling sites. However, the variety of sampling locations selected was a specific attempt to try to avoid the latter limitation. Additionally, limitations pervasive to on-site survey sampling include the oversampling of avid visitors (Shaw, 1988), as well as the exclusion of non-visitors and visitors who access the North Shore through locations not sampled.

Ethical concerns regarding the use of social media data include data privacy and ownership, user consent, and research replicability (Di Minin, Tenkanen, & Toivonen, 2015; Girardin, Blat, Calabrese, Dal Fiore, & Ratti, 2008). Additionally, limitations of social media data include the propensity of analyzing content from self-selected users, and over sampling from those most active on social media platforms (e.g., Instagram users represent 26% of the 2014 adult US population and is more popular among non-white, college-educated adults under the age of 29). Users generating content represent a narrow cross section of an entire population, which is why researchers encourage the use of UGC to cross-validate other data sources, such as survey observations or to use UGC when survey and observational methods

are cost or time prohibitive (Metaxas & Mustafaraj, 2014; Richards & Friess, 2015). Future research is needed that employs some of the techniques to better understand the transferability of the UGC findings presented in this dissertation.

Insights for future research

Reflecting on the contribution of each manuscript has allowed me to identify areas for further research on the topic of climate change impacts to NBT, and the role of ‘place’ in assessing this relationship. First, further use of UGC in a qualitative manner will reveal key elements of destination image in other NBT destinations and comparative studies may explore differences in destination image between locales or between seasons at the same location. Additionally, thematic analysis of photographs could lead to new insights regarding how individuals perceive they are experiencing changes in environmental conditions (i.e., by posting photographs and adding narrative content of climate changes they are ‘witnessing’). UGC may also emerge as an effective medium for individuals to share their climate concerns (e.g., identify vulnerable or resilient resources) through imagery and words with natural resource or outdoor recreation managers. Future research designs utilizing UGC may consider mechanisms for two-way communication between participants and researchers so that trustworthiness of data interpretation can be ascertained.

The second manuscript revealed a need for increased exploration of the relationship between place meanings and both cognitive and behavioral responses to changing environmental conditions. While this study found that place meanings were significantly related to behavior (past coping strategies) but not cognition (future risk perceptions), there could be similar assessments conducted in other contexts (e.g., not a tourism/recreation context) to evaluate whether this same pattern emerges. For example, among residents of a

community (who own and/or invest in properties or parcels of land) place meanings may influence cognitions regarding how their property will be impacted by climate change. As risk perceptions are related to policy support for climate adaptation (e.g., Leiserowitz, 2006), there may also be interest in further exploring how general climate concern can influence risk perceptions in relation various population (e.g., visitors *and* residents) within a specific locale.

Lastly, there is a need to further explore place meanings in relation to recreation substitution. Other research has found that experience use history, involvement, and commitment are related to recreation substitution (e.g., Aas & Onstad, 2013; Dawson, Havitz, & Scott, 2011; Hammit, Backland, & Bixler, 2004). There is a need to explore these conceptually similar constructs of place meanings, use history, and recreation commitment/involvement to reveal the finer details between values and activities within a well-defined place of interest. Experience use history, recreation commitment, and recreation involvement constructs were not measured through the North Shore Summer Visitor Survey instrument, making these comparisons unattainable by this study. Findings from the final manuscript also call for increased research on the antecedents of place meanings and treating place meanings, in quantitative research, as either (or both) a dependent or mediating variable. As this study found that place meanings may either mediate or suppress recreation substitution alternatives, future research may also explore how place meanings may be formed and strengthened by resource or tourism professionals with a vested interest in mediating (or suppressing) visitors' tendency to act in a certain manner.

Concluding Remarks

Overall, the three-component definition of place, involving the attributes, meanings, and activities that define a space, yielded a relevant framework for assessing climate change impacts to a NBT region. Increased knowledge of the key components of the physical landscape can enhance resource managers and tourism providers' understanding and prioritization of the resources they know to be vulnerable and those resources that are highly valued by visitors. Understanding the relationship between place meanings and climate-related coping reveals that, while place-based values and visitor attributes are related to behavioral coping, climate change concern and personal efficacy are related to visitors' cognitive response. Lastly, it is important to understand how climate change will influence activity within, and away from, the North Shore through the assessment of recreation substitution.

Collectively, this study highlights three key findings: (1) natural resources and built infrastructure are key components of the physical landscape (manuscript 1); (2) behavioral responses to climate impacts are related to the meanings visitors have with the place (manuscript 2); and (3) visitors are most likely to engage in activity substitution, relative to both temporal and spatial substitution, as environmental conditions on the North Shore change (manuscript 3). This provides NBT regions with the information they need to strategically monitor, evaluate, and adapt to climate change. By understating key attributes of destination image, how visitors' place meanings relate to their behavioral coping, and what influences future recreation substitution, NBT providers can utilize place-based marketing and management that considers—and leverages—these nuances of the North Shore place,

which can enhance the climate readiness of the region within its recreation and tourism systems.

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APPENDICES

Appendix A: North Shore Summer Visitor Survey

Thank you for taking to time to complete this survey!

The survey should take about 10 minutes to complete. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current & future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

1. What is the length (number of nights) of your current trip?
 - 0 nights, day trip
 - ___ nights (please write in number of nights you will spend on the North Shore for this trip)

2. What is the primary purpose of your current trip? (Please mark only one.)
 - Recreation in this area (this town, ski area, state park, etc.)
 - Recreation at a different area (a different town, ski area, state park, etc.)
 - Recreation at multiple locations
 - Business trip (recreation is a secondary activity)
 - Visiting family and friends (recreation is a secondary activity)
 - Some other purpose (recreation is a secondary activity)

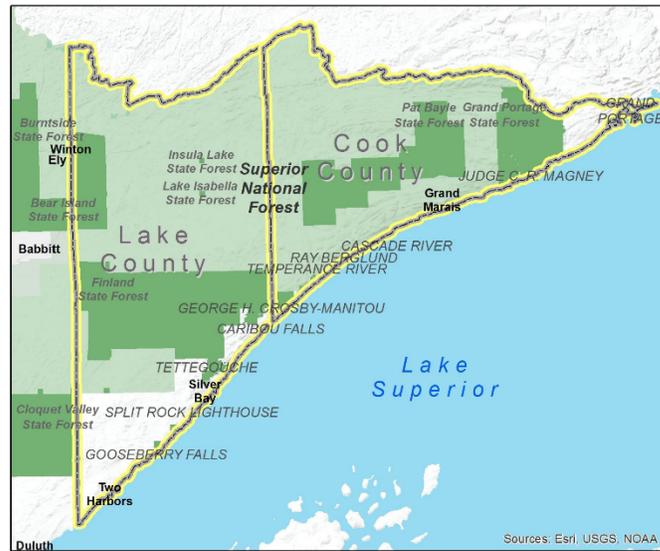
3. Which recreational activities have you, or do you plan on, participating in this trip? (Please select all that apply.)

Have or Will Participate In	Planned to Participate In But Can
<input type="radio"/> Scenic driving	<input type="radio"/> Scenic driving
<input type="radio"/> Visiting historic or cultural sites	<input type="radio"/> Visiting historic or cultural sites
<input type="radio"/> Hiking	<input type="radio"/> Hiking
<input type="radio"/> Picnicking	<input type="radio"/> Picnicking
<input type="radio"/> Swimming or wading in lake/s/river	<input type="radio"/> Swimming or wading in lake/s/river
<input type="radio"/> Biking (all types, including mountain biking)	<input type="radio"/> Biking (all types, including mountain biking)
<input type="radio"/> Camping (all types)	<input type="radio"/> Camping (all types)
<input type="radio"/> Off-road ATV driving	<input type="radio"/> Off-road ATV driving
<input type="radio"/> Horseback riding	<input type="radio"/> Horseback riding
<input type="radio"/> Lake Superior boating - motorized	<input type="radio"/> Lake Superior boating - motorized
<input type="radio"/> Lake Superior boating - non motorized	<input type="radio"/> Lake Superior boating - non motorized
<input type="radio"/> Inland boating - motorized	<input type="radio"/> Inland boating - motorized
<input type="radio"/> Inland boating - non motorized	<input type="radio"/> Inland boating - non motorized
<input type="radio"/> Fishing (all types)	<input type="radio"/> Fishing (all types)
<input type="radio"/> Rock collecting	<input type="radio"/> Rock collecting
<input type="radio"/> Creating art	<input type="radio"/> Creating art
<input type="radio"/> Gathering wild foods	<input type="radio"/> Gathering wild foods
<input type="radio"/> Hunting	<input type="radio"/> Hunting
<input type="radio"/> Wildlife viewing	<input type="radio"/> Wildlife viewing
<input type="radio"/> None - Skip to Question 14	<input type="radio"/> Other: _____
<input type="radio"/> Other: _____	

If there were one or more activities you planned to participate in but cannot, please explain why: (for example: "river water levels were too high" or "the road to the site I planned to visit was closed")



We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip.

Transportation	
Gas	\$ <input type="text"/>
Motor vehicles (rentals and parts)	\$ <input type="text"/>
ATV rentals	\$ <input type="text"/>
Boat rentals	\$ <input type="text"/>
Food and beverage	
Groceries	\$ <input type="text"/>
Restaurants, bars, etc.	\$ <input type="text"/>
Lodging	
Hotel and motel	\$ <input type="text"/>
Federal or state campground	\$ <input type="text"/>
Municipal or private campground	\$ <input type="text"/>
Other (B&B, cabin, etc.)	\$ <input type="text"/>
Sporting goods	
Private (equipment, rentals, passes)	\$ <input type="text"/>
Public rentals (e.g., water craft at state park)	\$ <input type="text"/>
Entertainment	
Performing arts	\$ <input type="text"/>
Festivals	\$ <input type="text"/>
Retail	
Clothing	\$ <input type="text"/>
Souvenirs	\$ <input type="text"/>
Other: _____	\$ <input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above? _____

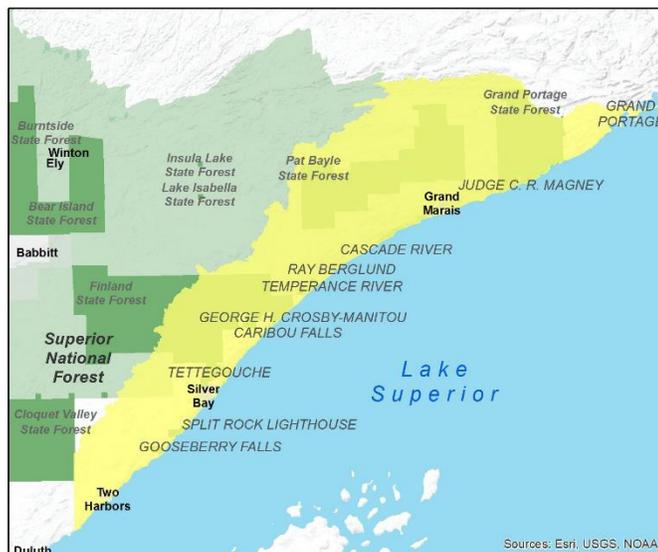
If you have been working on the survey with someone else up to this point, we now ask that only one person answer the remaining questions.

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your outdoor winter recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips do you plan on taking this summer season? _____
Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

OR

- I am only traveling through the North Shore to reach my destination - Skip to Question 14

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent averagedaily summer conditions (between June 1 and August 28).

The last column describes potential average daily conditions for a future summer season.

Please consider the conditions described in the last column in relation to the recent conditions and indicate how many winter recreational trips you would take to the North Shore given those conditions.

Environmental Variable	Current	Future
% days above avg. daily temperature (71 F)	60% (18 of 30 days)	63% (19 of 30 days)
% days above 80 F heat index	5% (2 of 30 days)	17% (5 of 30 days)
% of days with 'high,' 'very high,' or extreme fire risk	18% (6 of 30 days)	37% (11 of 30 days)
% days with a more than 1/4" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of stream reaches with brook trout	77%	20%
% of streams with small-mouth bass	53%	58%

Here is some additional information to keep in mind while making your decision:



Under High Fire Danger, unattended brush and campfires are likely to escape. Fires spread rapidly. Fires may become serious and their control difficult unless they are attacked successfully while small.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the heat index:

- Caution: 80-90 dF
- Extreme Caution: 91-103 dF
- Danger: 104-124 dF
- Extreme Danger: >125 dF

7. If the conditions for the North Shore matched the potential Future summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each condition was on your estimates of potential future trips.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with a fire risk statement	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of streams with small-mouth bass	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				

9.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore	<input type="radio"/>				

10. Please describe the influence of your origin location's temperature on your trips to the North Shore:
- I come to the North Shore to escape the heat
 - I come to the North Shore to seek out warmer weather
 - Other: _____

11. How do you think that the potential changes in summer conditions will impact the following items:
(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please think about your planned outdoor recreational activities for this trip. If winter conditions were to change according to the potential future conditions we have provided, how likely would you: (Choose one answer for each item)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

13. If you could not have visited this site today for whatever reason, what site or location would you most likely visit?

- | | |
|---|---|
| <input type="radio"/> Gooseberry Falls State Park | <input type="radio"/> Ray Berglund State Park |
| <input type="radio"/> Split Rock Lighthouse | <input type="radio"/> Cascade River State Park |
| <input type="radio"/> Tettegouche State Park | <input type="radio"/> Judge C.R. Magney State Park |
| <input type="radio"/> Caribou Falls State Park | <input type="radio"/> Grand Portage State Park |
| <input type="radio"/> George H Crosby- Manitou State Park | <input type="radio"/> Other: _____ |
| <input type="radio"/> Temperance River State Park | <input type="radio"/> I would not visit any other site or location if I couldn't visit this site. |

14. How plausible do you think it is that the winter conditions depicted in the Future column will occur within the next 50 years?

(Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, 10 = extremely plausible)

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									
Implausible	Slightly plausible								Extremely plausible

15. In the past, have winter conditions (e.g., snow depth, temperature, etc.) impacted your outdoor recreational trips to the North Shore?

Yes
 No - Skip to Question 16

15a.

Because of that experience, how often do you?	Never	Rarely	Some-times	Often	Always
Purchase new or better equipment/gear?	<input type="radio"/>				
Plan trips for other times of the year?	<input type="radio"/>				
Pay closer attention to weather forecasts prior to trips?	<input type="radio"/>				
Pay closer attention to weather forecasts during trips?	<input type="radio"/>				
Worry more about safety prior to or during trips?	<input type="radio"/>				
Seek lodging options that enhance safety?	<input type="radio"/>				
Visit recreation sites that reduce risk to your safety?	<input type="radio"/>				
Participate in recreation activities that reduce risk to your safety?	<input type="radio"/>				

16.

Thinking about your North Shore winter recreational activities, to what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Does Not Apply
Regardless of winter conditions, I can still participate in my preferred winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17.

To what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation, and/or wind patterns that occur over several decades or longer.

18. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes, I'm extremely sure
- Yes, I'm very sure
- Yes, I'm somewhat sure
- Yes, I'm not at all sure
- No, I'm extremely sure
- No, I'm very sure
- No, I'm somewhat sure
- No, I'm not at all sure
- Don't Know

19. How concerned are you about climate change?

Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned
<input type="radio"/>				

20. How serious do you believe the current impacts of climate change are around the world?

Not at all serious	Slightly serious	Moderately serious	Very serious	Extremely serious
<input type="radio"/>				

21. How often have you thought about climate change before today?

Never	Rarely	Occasionally	Frequently	Constantly
<input type="radio"/>				

22. How many of your friends do you believe share your views on climate change?

None	Few	Some	Most	All
<input type="radio"/>				

23. Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support purchase critical resource lands and improve habitat for fish, wildlife, and native plants.

Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

- Yes - Skip to Question 19a
 No - Skip to Question 20

- 23a. Please indicate the most you would be willing to pay for such a license plate.

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

- \$35
 \$40
 \$45
 \$50
 \$55
 \$60
 \$65
 \$70
 \$75

We would like to know a little more about you. Please remember that your answers are confidential.

24. I planned for this current trip:
- The same day I took it
 - 1-2 days in advance
 - 3 days to 1 week in advance
 - 8 days to 1 month in advance
 - 2 to 5 months in advance
 - 6 to 9 months in advance
 - 9 months to 1 year in advance
 - More than a year in advance
25. How many years have you been coming to the North Shore? ____ years OR This is my first year.
26. What is your gender? (Please mark only one.)
- Male
 - Female
 - Other
 - Prefer not to say
27. What is your current age? (Please mark only one.)
- 18-24
 - 25-34
 - 35-44
 - 45-55
 - 55-64
 - 65 or older
 - Prefer not to say
28. What is your current household income? (Please mark only one.)
- | | |
|---|---|
| <input type="radio"/> Under \$9,999 | <input type="radio"/> \$60,000-\$69,999 |
| <input type="radio"/> \$10,000-\$19,999 | <input type="radio"/> \$70,000-\$79,999 |
| <input type="radio"/> \$20,000-\$29,999 | <input type="radio"/> \$80,000-\$89,999 |
| <input type="radio"/> \$30,000-\$39,999 | <input type="radio"/> \$90,000-\$99,999 |
| <input type="radio"/> \$40,000-\$49,999 | <input type="radio"/> Over \$100,000 |
| <input type="radio"/> \$50,000-\$59,999 | <input type="radio"/> Prefer not to say |
29. How would you describe your level of education? (Please mark only one.)
- | | |
|--|---|
| <input type="radio"/> Less than high school | <input type="radio"/> 4-year college degree (Bachelors) |
| <input type="radio"/> High school diploma or GED | <input type="radio"/> Masters degree |
| <input type="radio"/> Some college | <input type="radio"/> Doctoral degree |
| <input type="radio"/> 2-year college degree (Associates) | <input type="radio"/> Prefer not to say |
30. Please provide the Zip Code for your primary residence: _____

To be entered into the drawing to win an iPad, please enter your email address below:

Thank you for taking time to complete this questionnaire.
Your insights have been very valuable to us.

North Shore Summer Tourism Survey

Default Question Block

Researcher Only:

Mark Location

- Artist's Point/County VC
- Beaver Bay Wayside
- Cascade River SP
- Crosby "Lake Trailhead"
- Cut Face Creek Wayside
- Finland Co-Op
- Gooseberry SP
- Grand Portage SP
- Kadunce River Wayside
- Java Moose
- Paul Van Hoven Park/Lake County Historical Society
- Ray Berglund Wayside
- Temperance River SP
- Tettegouche SP
- Silver Bay Marina
- Split Rock Lighthouse
- Superior Trading Post
- Other:

Thank you for taking the time to complete this survey. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current and future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

Thanks again for sharing your time and insights with us today.



1. What is the length (number of nights) of your current trip?

2. What is the primary purpose of your current trip?

- Recreation in this area (this town, state park, etc.)
- Recreation at a different area (a different town, state park, etc.)
- Recreation at multiple locations
- Business trip (recreation is a secondary activity)
- Visiting family and friends (recreation is a secondary activity)
- Some other purpose (recreation is a secondary activity)

3. Which recreational activities have you participated in or do you plan on participating in during this trip? (Please select all that apply.)

	Have or will participate in	Planned to participate in but cannot
Scenic driving	<input type="checkbox"/>	<input type="checkbox"/>
Picnicking	<input type="checkbox"/>	<input type="checkbox"/>
Visiting historic or cultural sites	<input type="checkbox"/>	<input type="checkbox"/>
Hiking	<input type="checkbox"/>	<input type="checkbox"/>
Swimming or wading in lakes/rivers	<input type="checkbox"/>	<input type="checkbox"/>
Biking (all types, including mountain biking)	<input type="checkbox"/>	<input type="checkbox"/>
Camping (all types)	<input type="checkbox"/>	<input type="checkbox"/>

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Off-road ATV driving	<input type="checkbox"/>	<input type="checkbox"/>
Horseback riding	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Fishing (all types, <i>please specify desired species below</i>)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
Rock collecting	<input type="checkbox"/>	<input type="checkbox"/>
Creating art	<input type="checkbox"/>	<input type="checkbox"/>
Gathering wild foods	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>
Wildlife viewing	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
None	<input type="checkbox"/>	<input type="checkbox"/>

If there were one or more activities you planned to participate in but cannot, please explain why:
(for example: "river water levels were too high" or "the road to the site I planned to visit was closed")

We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip for each item below:

(Select the value that is closest to the estimated amount you believe your group will spend during this trip. Leave it blank if you will not spend money on the item in Lake or Cook Counties during this trip.)

Transportation:

Gas

Motor vehicles (rentals and parts)

ATV rentals

Boat rentals

Food and beverage:

Groceries

Restaurants, bars, etc.

Lodging:

Hotel and motel

Federal or state campground site

Municipal or private campground	<input type="text"/>
Other (B&B, cabin, etc.)	<input type="text"/>
Sporting goods:	
Private (equipment, rentals, passes)	<input type="text"/>
Public rentals (e.g., equipment at state parks)	<input type="text"/>
Entertainment:	
Performing arts	<input type="text"/>
Festivals	<input type="text"/>
Retail:	
Clothing	<input type="text"/>
Souvenirs	<input type="text"/>
Other:	<input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above?

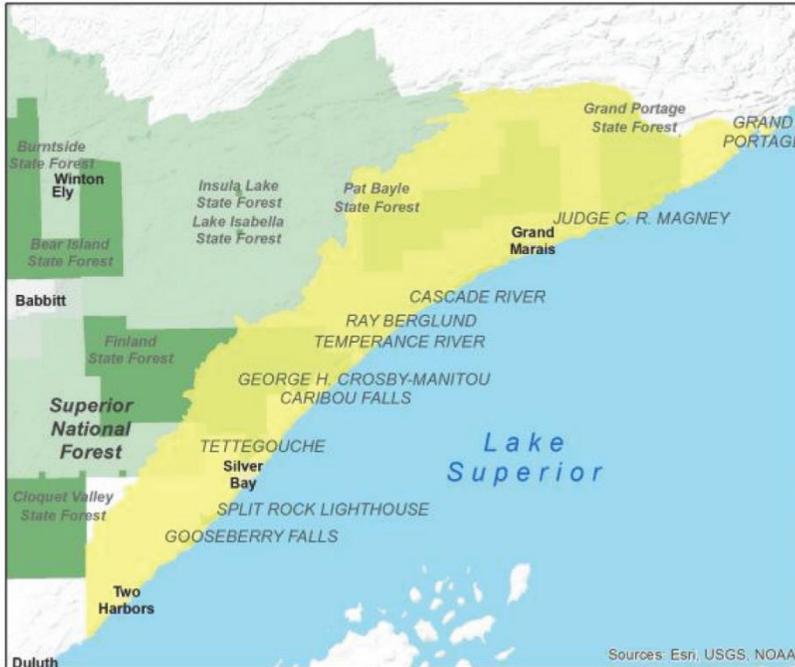
If you have been working on the survey with someone else up to this point, **we now ask that only one person answer the remaining questions.**

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your summer recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips have you taken or plan on taking **this summer season?**

Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

OR:

I am only traveling **through the North Shore** to reach my destination.

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent average daily summer conditions (between June 1 and August 31).

The last column describes *potential* average daily conditions for a future summer season.

Please consider the possible future *conditions described in the last column in relation to the recent conditions* and indicate *how many summer recreational trips* you would take on the North Shore given those conditions.

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	63% (19 of 30 days)
above 80°F heat index	5% (2 of 30 days)	17% (5 of 30 days)
with a 'high,' 'very high,' or 'extreme' fire risk	18% (6 of 30 days)	37% (11 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

Below is some additional information about fire danger and the heat index for your reference.



Under Very High Fire Danger, fires will start easily, spread rapidly, and become large and long-standing fires; no burning permits are issued to private landowners.

Under Extreme Fire Danger, fires last for several days; no burning permits are issued to private landowners; campfires are prohibited on all public and private lands.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the **HEAT INDEX**:

Caution	80°F to 91°F	Fatigue possible
Extreme Caution	91°F to 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible
Danger	103°F to 115 °F	Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Danger	> 115 °F	Heat stroke or sunstroke highly likely

7. If the conditions for the North Shore matched the *potential Future* summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each *potential Future* condition was on your estimates of future trips:

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with fire risk statement	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of inland streams with small-mouth bass	<input type="radio"/>				

9a. Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore for your CURRENT trip:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

9b. Please describe the influence of your origin location's temperature on your CURRENT trip to the North Shore:

- I come to the North Shore to escape the heat
- I come to the North Shore to seek out warmer weather
- Does not apply, the heat index at home did not influence my current trip
- Other:

10. Now, rate how influential the heat index at your origin location (home) may be on the number of FUTURE trip(s) you take:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

11. How do you think the *potential Future* conditions (see table below) would impact the following items:

(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	63% (19 of 30 days)
above 80°F heat index	5% (2 of 30 days)	17% (5 of 30 days)
with a 'high,' 'very high,' or 'extreme' fire risk	18% (6 of 30 days)	37% (11 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

12. Please think about your planned outdoor recreational activities for this trip. If summer conditions matched the *potential Future* conditions (see table below), how likely would you:

(Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North	<input type="radio"/>				

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Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	63% (19 of 30 days)
above 80°F heat index	5% (2 of 30 days)	17% (5 of 30 days)
with a 'high,' 'very high,' or 'extreme' fire risk	18% (6 of 30 days)	37% (11 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

13. How plausible do you think it is that the summer conditions depicted in the *potential Future* column will occur within the next 50 years?
 (Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, ... 10 = extremely plausible.)

Implausible Slightly plausible Extremly plausible
 0 1 2 3 4 5 6 7 8 9 10

14. If you could not have visited this site today for whatever reason, what site or location would you most likely visit? (Select one alternate location.)

- Gooseberry Falls State Park
- Split Rock Lighthouse
- Tettegouche State Park
- George H Crosby-Manitou State Park
- Temperance River State Park

- Cascade River State Park
- Judge C.R. Magney State Park
- Grand Portage State Park
- Other:
- I would not visit any other site or location if I couldn't visit this site.

15. We're curious to know if any of the following conditions have **impacted your previous summer recreational trips** on the North Shore.

If so, did you (check all that apply):

	Purchase new or better equipment or gear	Plan trips for other times of the year	Pay closer attention to weather forecasts <i>prior to</i> trips	Pay closer attention to weather forecasts <i>during</i> trips	Worry more about safety prior to or during trips	Seek lodging options that enhance safety	Visit recreation sites that reduce risk	Participate in less risky recreational activities
Heavy rainfall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flooding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excessive heat indices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abnormally cold temperatures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest fires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest blowdowns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Thinking about your North Shore summer recreational activities, to what extent do you agree or disagree with the following statements: *(Choose one answer for each item.)*

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The recreational activities that I enjoy on the North Shore would be at risk if local climate conditions were to change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. To what extent do you agree or disagree with the following statements: (Choose one answer for each item.)

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. If the following types of conditions changed on the North Shore, how likely would you go somewhere else to be in conditions similar to those found on the North Shore today? (Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
The forest (birch, spruce, fir)	<input type="radio"/>				
The wildlife (moose, lynx, snowshoe hare)	<input type="radio"/>				

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation and/or wind patterns that occur over several decades or longer.

19. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes
- No
- Don't know

19a. How sure are you about whether or not you believe climate change is happening?

- I'm extremely sure
- I'm very sure
- I'm somewhat sure
- I'm not at all sure

20. How concerned are you about climate change?

- Not at all concerned
- Slightly concerned
- Moderately concerned
- Very concerned
- Extremely concerned

21. How serious do you believe the current impacts of climate change are around the world?

- Not at all serious
- Slightly serious
- Moderately serious
- Very serious
- Extremely serious

22. How often have you thought about climate change before today?

- Never
- Rarely
- Occasionally
- Frequently
- Constantly

23. How many of your friends do you believe share your views on climate change?

- None
- Few
- Some
- Most
- All

Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support the purchase of critical resource lands and improve habitat for fish, wildlife, and native plants.

24. Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

- Yes
 No

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

24a. Please indicate the most you would be willing to pay for such a license plate.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

We would like to know a little more about you. Please remember that your answers are confidential.

25. I planned for this current trip:

26. How many years have you been coming to the North Shore?

27. What is your gender?

28. What is your age?

29. What was your annual household income for the 2014 tax year?

30. What is the highest level of education that you have received?

31. Please provide the US Zip Code or Canadian Postal Code for your primary residence:

United States Zip Code:

Canadian Postal Code:

I reside outside of the US or Canada

If you would like to be entered in a drawing to win one of four iPads, please provide your email address below:

Thank you for taking to time to complete this survey!

The survey should take about 10 minutes to complete. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current & future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

1. What is the length (number of nights) of your current trip?
 - 0 nights, day trip
 - ___ nights (please write in number of nights you will spend on the North Shore for this trip)

2. What is the primary purpose of your current trip? (Please mark only one.)
 - Recreation in this area (this town, ski area, state park, etc.)
 - Recreation at a different area (a different town, ski area, state park, etc.)
 - Recreation at multiple locations
 - Business trip (recreation is a secondary activity)
 - Visiting family and friends (recreation is a secondary activity)
 - Some other purpose (recreation is a secondary activity)

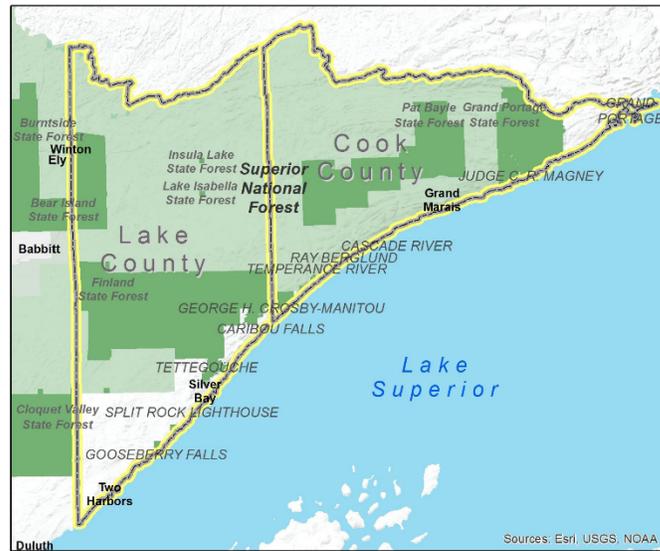
3. Which recreational activities have you, or do you plan on, participating in this trip? (Please select all that apply.)

Have or Will Participate In	Planned to Participate In But Can
<input type="radio"/> Scenic driving	<input type="radio"/> Scenic driving
<input type="radio"/> Visiting historic or cultural sites	<input type="radio"/> Visiting historic or cultural sites
<input type="radio"/> Hiking	<input type="radio"/> Hiking
<input type="radio"/> Picnicking	<input type="radio"/> Picnicking
<input type="radio"/> Swimming or wading in lake/s/river	<input type="radio"/> Swimming or wading in lake/s/river
<input type="radio"/> Biking (all types, including mountain biking)	<input type="radio"/> Biking (all types, including mountain biking)
<input type="radio"/> Camping (all types)	<input type="radio"/> Camping (all types)
<input type="radio"/> Off-road ATV driving	<input type="radio"/> Off-road ATV driving
<input type="radio"/> Horseback riding	<input type="radio"/> Horseback riding
<input type="radio"/> Lake Superior boating - motorized	<input type="radio"/> Lake Superior boating - motorized
<input type="radio"/> Lake Superior boating - non motorized	<input type="radio"/> Lake Superior boating - non motorized
<input type="radio"/> Inland boating - motorized	<input type="radio"/> Inland boating - motorized
<input type="radio"/> Inland boating - non motorized	<input type="radio"/> Inland boating - non motorized
<input type="radio"/> Fishing (all types)	<input type="radio"/> Fishing (all types)
<input type="radio"/> Rock collecting	<input type="radio"/> Rock collecting
<input type="radio"/> Creating art	<input type="radio"/> Creating art
<input type="radio"/> Gathering wild foods	<input type="radio"/> Gathering wild foods
<input type="radio"/> Hunting	<input type="radio"/> Hunting
<input type="radio"/> Wildlife viewing	<input type="radio"/> Wildlife viewing
<input type="radio"/> None - Skip to Question 14	<input type="radio"/> Other: _____
<input type="radio"/> Other: _____	

If there were one or more activities you planned to participate in but cannot, please explain why: (for example: "river water levels were too high" or "the road to the site I planned to visit was closed")



We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip.

Transportation	
Gas	\$ <input type="text"/>
Motor vehicles (rentals and parts)	\$ <input type="text"/>
ATV rentals	\$ <input type="text"/>
Boat rentals	\$ <input type="text"/>
Food and beverage	
Groceries	\$ <input type="text"/>
Restaurants, bars, etc.	\$ <input type="text"/>
Lodging	
Hotel and motel	\$ <input type="text"/>
Federal or state campground	\$ <input type="text"/>
Municipal or private campground	\$ <input type="text"/>
Other (B&B, cabin, etc.)	\$ <input type="text"/>
Sporting goods	
Private (equipment, rentals, passes)	\$ <input type="text"/>
Public rentals (e.g., water craft at state park)	\$ <input type="text"/>
Entertainment	
Performing arts	\$ <input type="text"/>
Festivals	\$ <input type="text"/>
Retail	
Clothing	\$ <input type="text"/>
Souvenirs	\$ <input type="text"/>
Other: _____	\$ <input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above? _____

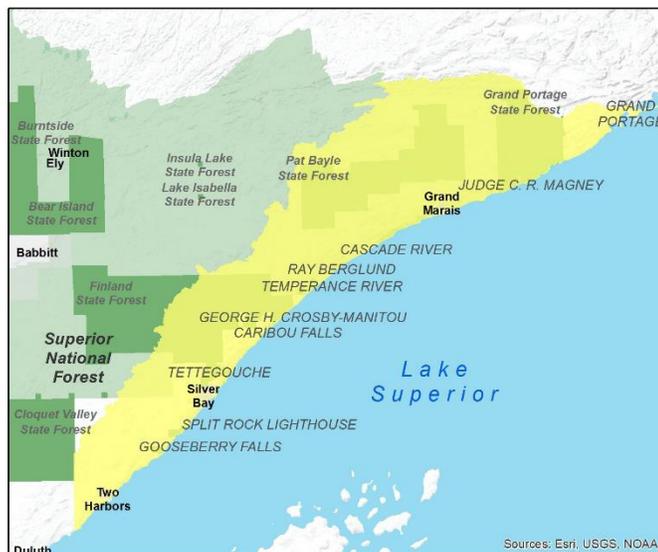
If you have been working on the survey with someone else up to this point, we now ask that only one person answer the remaining questions.

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your outdoor winter recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips do you plan on taking this summer season? _____
Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

OR

- I am only traveling through the North Shore to reach my destination - Skip to Question 14

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent averagedaily summer conditions (between June 1 and August 28).

The last column describes potential average daily conditions for a future summer season.

Please consider the conditions described in the last column in relation to the recent conditions and indicate how many winter recreational trips you would take to the North Shore given those conditions.

Environmental Variable	Current	Future
% days above avg. daily temperature (71 F)	60% (18 of 30 days)	63% (19 of 30 days)
% days above 80 F heat index	5% (2 of 30 days)	17% (5 of 30 days)
% of days with 'very high' or 'extreme' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
% days with a more than 1/4" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of stream reaches with brook trout	77%	20%
% of streams with small-mouth bass	53%	58%

Here is some additional information to keep in mind while making your decision:



Under High Fire Danger, unattended brush and campfires are likely to escape. Fires spread rapidly. Fires may become serious and their control difficult unless they are attacked successfully while small.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the heat index:

- Caution: 80-90 dF
- Extreme Caution: 91-103 dF
- Danger: 104-124 dF
- Extreme Danger: >125 dF

7. If the conditions for the North Shore matched the potential Future summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each condition was on your estimates of potential future trips.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with a fire risk statement	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of streams with small-mouth bass	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				

9.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore	<input type="radio"/>				

10. Please describe the influence of your origin location's temperature on your trips to the North Shore:
- I come to the North Shore to escape the heat
 - I come to the North Shore to seek out warmer weather
 - Other: _____

11. How do you think that the potential changes in summer conditions will impact the following items:
(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please think about your planned outdoor recreational activities for this trip. If winter conditions were to change according to the potential future conditions we have provided, how likely would you: (Choose one answer for each item)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

13. If you could not have visited this site today for whatever reason, what site or location would you most likely visit?

- Gooseberry Falls State Park
 - Split Rock Lighthouse
 - Tettegouche State Park
 - Caribou Falls State Park
 - George H Crosby- Manitou State Park
 - Temperance River State Park
- Ray Berglund State Park
 - Cascade River State Park
 - Judge C.R. Magney State Park
 - Grand Portage State Park
 - Other: _____
 - I would not visit any other site or location if I couldn't visit this site.

14. How plausible do you think it is that the winter conditions depicted in the Future column will occur within the next 50 years?

(Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, 10 = extremely plausible)

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									
Implausible	Slightly plausible								Extremely plausible

15. In the past, have winter conditions (e.g., snow depth, temperature, etc.) impacted your outdoor recreational trips to the North Shore?

- Yes
 No - Skip to Question 16

15a.

Because of that experience, how often do you?	Never	Rarely	Some-times	Often	Always
Purchase new or better equipment/gear?	<input type="radio"/>				
Plan trips for other times of the year?	<input type="radio"/>				
Pay closer attention to weather forecasts prior to trips?	<input type="radio"/>				
Pay closer attention to weather forecasts during trips?	<input type="radio"/>				
Worry more about safety prior to or during trips?	<input type="radio"/>				
Seek lodging options that enhance safety?	<input type="radio"/>				
Visit recreation sites that reduce risk to your safety?	<input type="radio"/>				
Participate in recreation activities that reduce risk to your safety?	<input type="radio"/>				

16.

Thinking about your North Shore winter recreational activities, to what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Does Not Apply
Regardless of winter conditions, I can still participate in my preferred winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17.

To what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation, and/or wind patterns that occur over several decades or longer.

18. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes, I'm extremely sure
- Yes, I'm very sure
- Yes, I'm somewhat sure
- Yes, I'm not at all sure
- No, I'm extremely sure
- No, I'm very sure
- No, I'm somewhat sure
- No, I'm not at all sure
- Don't Know

19. How concerned are you about climate change?

Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned
<input type="radio"/>				

20. How serious do you believe the current impacts of climate change are around the world?

Not at all serious	Slightly serious	Moderately serious	Very serious	Extremely serious
<input type="radio"/>				

21. How often have you thought about climate change before today?

Never	Rarely	Occasionally	Frequently	Constantly
<input type="radio"/>				

22. How many of your friends do you believe share your views on climate change?

None	Few	Some	Most	All
<input type="radio"/>				

23. Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support purchase critical resource lands and improve habitat for fish, wildlife, and native plants.

Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

- Yes - Skip to Question 19a
 No - Skip to Question 20

- 23a. Please indicate the most you would be willing to pay for such a license plate.

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

- \$35
 \$40
 \$45
 \$50
 \$55
 \$60
 \$65
 \$70
 \$75

We would like to know a little more about you. Please remember that your answers are confidential.

24. I planned for this current trip:
- The same day I took it
 - 1-2 days in advance
 - 3 days to 1 week in advance
 - 8 days to 1 month in advance
 - 2 to 5 months in advance
 - 6 to 9 months in advance
 - 9 months to 1 year in advance
 - More than a year in advance
25. How many years have you been coming to the North Shore? ____ years OR This is my first year.
26. What is your gender? (Please mark only one.)
- Male
 - Female
 - Other
 - Prefer not to say
27. What is your current age? (Please mark only one.)
- 18-24
 - 25-34
 - 35-44
 - 45-55
 - 55-64
 - 65 or older
 - Prefer not to say
28. What is your current household income? (Please mark only one.)
- | | |
|---|---|
| <input type="radio"/> Under \$9,999 | <input type="radio"/> \$60,000-\$69,999 |
| <input type="radio"/> \$10,000-\$19,999 | <input type="radio"/> \$70,000-\$79,999 |
| <input type="radio"/> \$20,000-\$29,999 | <input type="radio"/> \$80,000-\$89,999 |
| <input type="radio"/> \$30,000-\$39,999 | <input type="radio"/> \$90,000-\$99,999 |
| <input type="radio"/> \$40,000-\$49,999 | <input type="radio"/> Over \$100,000 |
| <input type="radio"/> \$50,000-\$59,999 | <input type="radio"/> Prefer not to say |
29. How would you describe your level of education? (Please mark only one.)
- | | |
|--|---|
| <input type="radio"/> Less than high school | <input type="radio"/> 4-year college degree (Bachelors) |
| <input type="radio"/> High school diploma or GED | <input type="radio"/> Masters degree |
| <input type="radio"/> Some college | <input type="radio"/> Doctoral degree |
| <input type="radio"/> 2-year college degree (Associates) | <input type="radio"/> Prefer not to say |
30. Please provide the Zip Code for your primary residence: _____

To be entered into the drawing to win an iPad, please enter your email address below:

Thank you for taking time to complete this questionnaire.
Your insights have been very valuable to us.

North Shore Summer Tourism Survey

Default Question Block

Researcher Only:

Mark Location

- Artist's Point/County VC
- Beaver Bay Wayside
- Cascade River SP
- Crosby "Lake Trailhead"
- Cut Face Creek Wayside
- Finland Co-Op
- Gooseberry SP
- Grand Portage SP
- Kadunce River Wayside
- Java Moose
- Paul Van Hoven Park/Lake County Historical Society
- Ray Berglund Wayside
- Temperance River SP
- Tettegouche SP
- Silver Bay Marina
- Split Rock Lighthouse
- Superior Trading Post
- Other:

Thank you for taking the time to complete this survey. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current and future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

Thanks again for sharing your time and insights with us today.



1. What is the length (number of nights) of your current trip?

2. What is the primary purpose of your current trip?

- Recreation in this area (this town, state park, etc.)
- Recreation at a different area (a different town, state park, etc.)
- Recreation at multiple locations
- Business trip (recreation is a secondary activity)
- Visiting family and friends (recreation is a secondary activity)
- Some other purpose (recreation is a secondary activity)

3. Which recreational activities have you participated in or do you plan on participating in during this trip? (Please select all that apply.)

	Have or will participate in	Planned to participate in but cannot
Scenic driving	<input type="checkbox"/>	<input type="checkbox"/>
Picnicking	<input type="checkbox"/>	<input type="checkbox"/>
Visiting historic or cultural sites	<input type="checkbox"/>	<input type="checkbox"/>
Hiking	<input type="checkbox"/>	<input type="checkbox"/>
Swimming or wading in lakes/rivers	<input type="checkbox"/>	<input type="checkbox"/>
Biking (all types, including mountain biking)	<input type="checkbox"/>	<input type="checkbox"/>
Camping (all types)	<input type="checkbox"/>	<input type="checkbox"/>

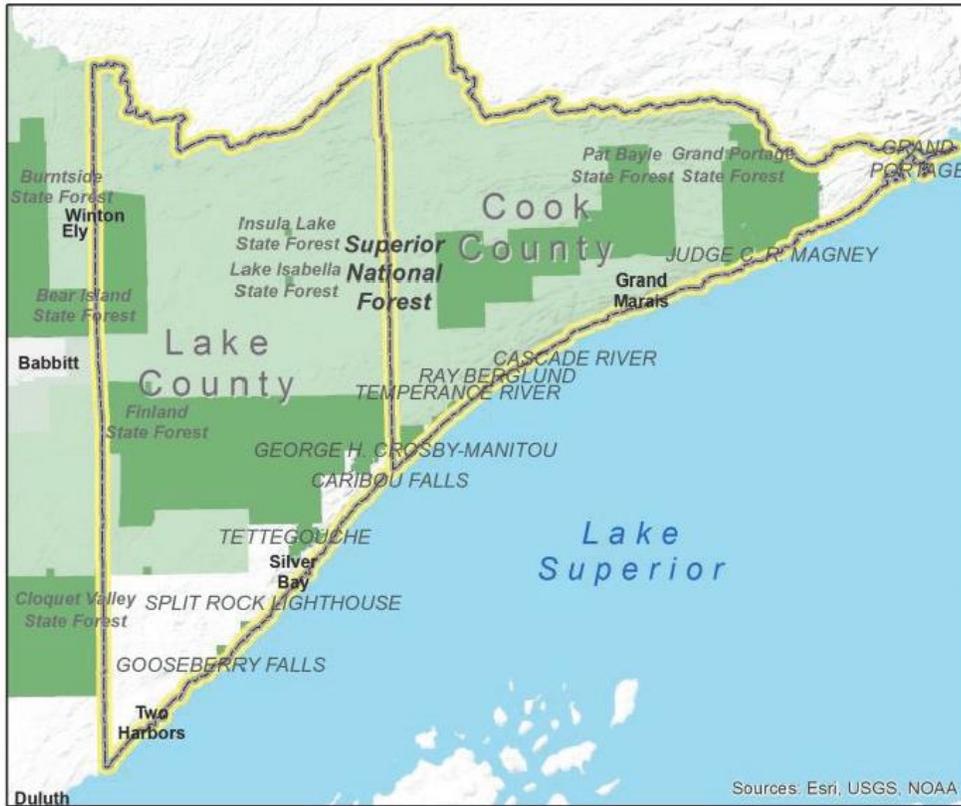
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Off-road ATV driving	<input type="checkbox"/>	<input type="checkbox"/>
Horseback riding	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Fishing (all types, <i>please specify desired species below</i>)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
Rock collecting	<input type="checkbox"/>	<input type="checkbox"/>
Creating art	<input type="checkbox"/>	<input type="checkbox"/>
Gathering wild foods	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>
Wildlife viewing	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
None	<input type="checkbox"/>	<input type="checkbox"/>

If there is one or more activities you planned to participate in but cannot, please explain why: (for example: "river water levels were too high" or "the road to the site I planned to visit was closed")

We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip for each item below:

(Select the value that is closest to the estimated amount you believe your group will spend during this trip. Leave it blank if you will not spend money on the item in Lake or Cook Counties during this trip.)

Transportation:

- Gas
- Motor vehicles (rentals and parts)
- ATV rentals
- Boat rentals

Food and beverage:

- Groceries
- Restaurants, bars, etc.

Lodging:

- Hotel and motel
- Federal or state campground site

Municipal or private campground	<input type="text"/>
Other (B&B, cabin, etc.)	<input type="text"/>
Sporting goods:	
Private (equipment, rentals, passes)	<input type="text"/>
Public rentals (e.g., equipment at state parks)	<input type="text"/>
Entertainment:	
Performing arts	<input type="text"/>
Festivals	<input type="text"/>
Retail:	
Clothing	<input type="text"/>
Souvenirs	<input type="text"/>
Other:	<input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above?

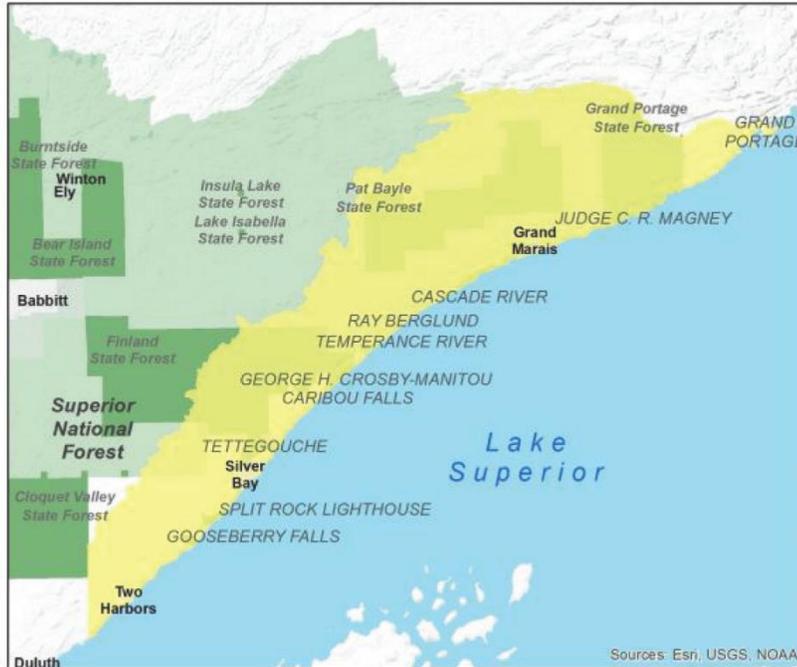
If you have been working on the survey with someone else up to this point, **we now ask that only one person answer the remaining questions.**

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your summer recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips have you taken or plan on taking this summer season?

Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

OR:

I am only traveling **through the North Shore** to reach my destination.

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent average daily summer conditions (between June 1 and August 31).

The last column describes *potential* average daily conditions for a future summer season.

Please consider the possible future conditions described in the last column in relation to the recent conditions and indicate how many summer recreational trips you would take on the North Shore given those conditions.

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	63% (19 of 30 days)
above 80°F heat index	5% (2 of 30 days)	17% (5 of 30 days)
with a 'very high' or 'extreme' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

Below is some additional information about fire danger and the heat index for your reference.



Under Very High Fire Danger, fires will start easily, spread rapidly, and become large and long-standing fires; no burning permits are issued to private landowners.

Under Extreme Fire Danger, fires last for several days; no burning permits are issued to private landowners; campfires are prohibited on all public and private lands.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the **HEAT INDEX**:

Caution	80°F to 91°F	Fatigue possible
Extreme Caution	91°F to 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible
Danger	103°F to 115 °F	Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Danger	> 115 °F	Heat stroke or sunstroke highly likely

7. If the conditions for the North Shore matched the *potential Future* summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each *potential Future* condition was on your estimates of future trips:

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with fire risk statement	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of inland streams with small-mouth bass	<input type="radio"/>				

9a. Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore for your CURRENT trip:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

9b. Please describe the influence of your origin location's temperature on your CURRENT trip to the North Shore:

- I come to the North Shore to escape the heat
- I come to the North Shore to seek out warmer weather
- Does not apply, the heat index at home did not influence my current trip
- Other:

10. Now, rate how influential the heat index at your origin location (home) may be on the number of FUTURE trip(s) you take:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

11. How do you think the *potential Future* conditions (see table below) would impact the following items:

(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	63% (19 of 30 days)
above 80°F heat index	5% (2 of 30 days)	17% (5 of 30 days)
with a ' very high ' or ' extreme ' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

12. Please think about your planned outdoor recreational activities for this trip. If summer conditions matched the *potential Future* conditions (see table below), how likely would you:

(Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North	<input type="radio"/>				

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Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	63% (19 of 30 days)
above 80°F heat index	5% (2 of 30 days)	17% (5 of 30 days)
with a 'very high' or 'extreme' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	12% (4 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

13. How plausible do you think it is that the summer conditions depicted in the *potential Future* column will occur within the next 50 years?
 (Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, ... 10 = extremely plausible.)

Implausible	0	Slightly plausible	1	2	3	4	5	6	7	8	9	Extremely plausible	10
	<input type="radio"/>		<input type="radio"/>		<input type="radio"/>								

14. If you could not have visited this site today for whatever reason, what site or location would you most likely visit? (Select one alternate location.)

- Gooseberry Falls State Park
- Split Rock Lighthouse
- Tettegouche State Park
- George H Crosby-Manitou State Park
- Temperance River State Park

- Cascade River State Park
- Judge C.R. Magney State Park
- Grand Portage State Park
- Other:
- I would not visit any other site or location if I couldn't visit this site.

15. We're curious to know if any of the following conditions have **impacted your previous summer recreational trips** on the North Shore.

If so, did you (check all that apply):

	Purchase new or better equipment or gear	Plan trips for other times of the year	Pay closer attention to weather forecasts <i>prior to</i> trips	Pay closer attention to weather forecasts <i>during</i> trips	Worry more about safety prior to or during trips	Seek lodging options that enhance safety	Visit recreation sites that reduce risk	Participate in less risky recreational activities
Heavy rainfall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flooding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excessive heat indices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abnormally cold temperatures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest fires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest blowdowns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Thinking about your North Shore summer recreational activities, to what extent do you agree or disagree with the following statements: *(Choose one answer for each item.)*

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The recreational activities that I enjoy on the North Shore would be at risk if local climate conditions were to change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. To what extent do you agree or disagree with the following statements: (Choose one answer for each item.)

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. If the following types of conditions changed on the North Shore, how likely would you go somewhere else to be in conditions similar to those found on the North Shore today? (Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
The forest (birch, spruce, fir)	<input type="radio"/>				
The wildlife (moose, lynx, snowshoe hare)	<input type="radio"/>				

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation and/or wind patterns that occur over several decades or longer.

19. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes
- No
- Don't know

19a. How sure are you about whether or not you believe climate change is happening?

- I'm extremely sure
- I'm very sure
- I'm somewhat sure
- I'm not at all sure

20. How concerned are you about climate change?

- Not at all concerned
- Slightly concerned
- Moderately concerned
- Very concerned
- Extremely concerned

21. How serious do you believe the current impacts of climate change are around the world?

- Not at all serious
- Slightly serious
- Moderately serious
- Very serious
- Extremely serious

22. How often have you thought about climate change before today?

- Never
- Rarely
- Occasionally
- Frequently
- Constantly

23. How many of your friends do you believe share your views on climate change?

- None
- Few
- Some
- Most
- All

Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support the purchase of critical resource lands and improve habitat for fish, wildlife, and native plants.

24. Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

Yes

No

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

24a. Please indicate the most you would be willing to pay for such a license plate.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

We would like to know a little more about you. Please remember that your answers are confidential.

25. I planned for this current trip:

26. How many years have you been coming to the North Shore?

27. What is your gender?

28. What is your age?

29. What was your annual household income for the 2014 tax year?

30. What is the highest level of education that you have received?

31. Please provide the US Zip Code or Canadian Postal Code for your primary residence:

United States Zip Code:

Canadian Postal Code:

I reside outside of the US or Canada

If you would like to be entered in a drawing to win one of four iPads, please provide your email address below:

Thank you for taking to time to complete this survey!

The survey should take about 10 minutes to complete. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current & future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

1. What is the length (number of nights) of your current trip?
 - 0 nights, day trip
 - ___ nights (please write in number of nights you will spend on the North Shore for this trip)

2. What is the primary purpose of your current trip? (Please mark only one.)
 - Recreation in this area (this town, ski area, state park, etc.)
 - Recreation at a different area (a different town, ski area, state park, etc.)
 - Recreation at multiple locations
 - Business trip (recreation is a secondary activity)
 - Visiting family and friends (recreation is a secondary activity)
 - Some other purpose (recreation is a secondary activity)

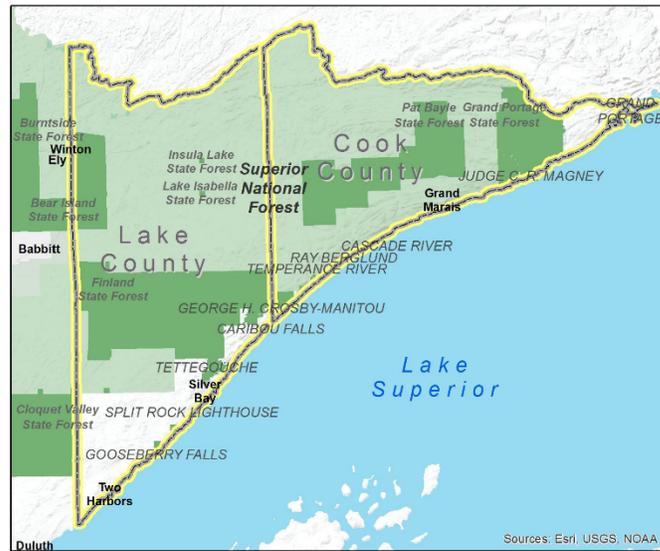
3. Which recreational activities have you, or do you plan on, participating in this trip? (Please select all that apply.)

Have or Will Participate In	Planned to Participate In But Can
<input type="radio"/> Scenic driving	<input type="radio"/> Scenic driving
<input type="radio"/> Visiting historic or cultural sites	<input type="radio"/> Visiting historic or cultural sites
<input type="radio"/> Hiking	<input type="radio"/> Hiking
<input type="radio"/> Picnicking	<input type="radio"/> Picnicking
<input type="radio"/> Swimming or wading in lake/s/river	<input type="radio"/> Swimming or wading in lake/s/river
<input type="radio"/> Biking (all types, including mountain biking)	<input type="radio"/> Biking (all types, including mountain biking)
<input type="radio"/> Camping (all types)	<input type="radio"/> Camping (all types)
<input type="radio"/> Off-road ATV driving	<input type="radio"/> Off-road ATV driving
<input type="radio"/> Horseback riding	<input type="radio"/> Horseback riding
<input type="radio"/> Lake Superior boating - motorized	<input type="radio"/> Lake Superior boating - motorized
<input type="radio"/> Lake Superior boating - non motorized	<input type="radio"/> Lake Superior boating - non motorized
<input type="radio"/> Inland boating - motorized	<input type="radio"/> Inland boating - motorized
<input type="radio"/> Inland boating - non motorized	<input type="radio"/> Inland boating - non motorized
<input type="radio"/> Fishing (all types)	<input type="radio"/> Fishing (all types)
<input type="radio"/> Rock collecting	<input type="radio"/> Rock collecting
<input type="radio"/> Creating art	<input type="radio"/> Creating art
<input type="radio"/> Gathering wild foods	<input type="radio"/> Gathering wild foods
<input type="radio"/> Hunting	<input type="radio"/> Hunting
<input type="radio"/> Wildlife viewing	<input type="radio"/> Wildlife viewing
<input type="radio"/> None - Skip to Question 14	<input type="radio"/> Other: _____
<input type="radio"/> Other: _____	

If there were one or more activities you planned to participate in but cannot, please explain why: (for example: "river water levels were too high" or "the road to the site I planned to visit was closed")



We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip.

Transportation	
Gas	\$ <input type="text"/>
Motor vehicles (rentals and parts)	\$ <input type="text"/>
ATV rentals	\$ <input type="text"/>
Boat rentals	\$ <input type="text"/>
Food and beverage	
Groceries	\$ <input type="text"/>
Restaurants, bars, etc.	\$ <input type="text"/>
Lodging	
Hotel and motel	\$ <input type="text"/>
Federal or state campground	\$ <input type="text"/>
Municipal or private campground	\$ <input type="text"/>
Other (B&B, cabin, etc.)	\$ <input type="text"/>
Sporting goods	
Private (equipment, rentals, passes)	\$ <input type="text"/>
Public rentals (e.g., water craft at state park)	\$ <input type="text"/>
Entertainment	
Performing arts	\$ <input type="text"/>
Festivals	\$ <input type="text"/>
Retail	
Clothing	\$ <input type="text"/>
Souvenirs	\$ <input type="text"/>
Other: _____	\$ <input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above? _____

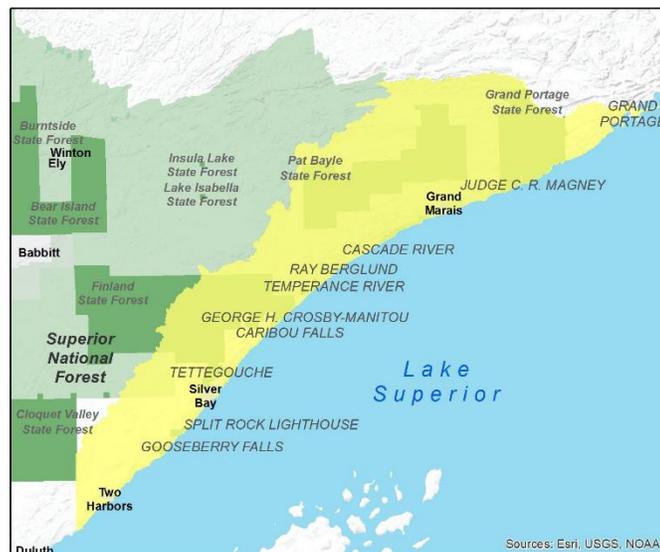
If you have been working on the survey with someone else up to this point, we now ask that only one person answer the remaining questions.

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your outdoor winter recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips do you plan on taking this summer season? _____
Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

OR

- I am only traveling through the North Shore to reach my destination - Skip to Question 14

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent averagedaily summer conditions (between June 1 and August 28).

The last column describes potential average daily conditions for a future summer season.

Please consider the conditions described in the last column in relation to the recent conditions and indicate how many winter recreational trips you would take to the North Shore given those conditions.

Environmental Variable	Current	Future
% days above avg. daily temperature (71 F)	60% (18 of 30 days)	67% (21 of 30 days)
% days above 80 F heat index	5% (2 of 30 days)	19% (6 of 30 days)
% of days with 'high,' 'very high' or 'extreme' fire risk	18% (6 of 30 days)	35% (11 of 30 days)
% days with a more than 1/4" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of streams reaches with brook trout	77%	20%
% of streams with small-mouth bass	53%	58%

Here is some additional information to keep in mind while making your decision:



Under High Fire Danger, unattended brush and campfires are likely to escape. Fires spread rapidly. Fires may become serious and their control difficult unless they are attacked successfully while small.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the heat index:

- Caution: 80-90 dF
- Extreme Caution: 91-103 dF
- Danger: 104-124 dF
- Extreme Danger: >125 dF

7. If the conditions for the North Shore matched the potential Future summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each condition was on your estimates of potential future trips.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with a fire risk statement	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of streams with small-mouth bass	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				

9.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore	<input type="radio"/>				

10. Please describe the influence of your origin location's temperature on your trips to the North Shore:
- I come to the North Shore to escape the heat
 - I come to the North Shore to seek out warmer weather
 - Other: _____

11. How do you think that the potential changes in summer conditions will impact the following items:
(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please think about your planned outdoor recreational activities for this trip. If winter conditions were to change according to the potential future conditions we have provided, how likely would you: (Choose one answer for each item)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

13. If you could not have visited this site today for whatever reason, what site or location would you most likely visit?

- Gooseberry Falls State Park
- Split Rock Lighthouse
- Tettegouche State Park
- Caribou Falls State Park
- George H Crosby- Manitou State Park
- Temperance River State Park
- Ray Berglund State Park
- Cascade River State Park
- Judge C.R. Magney State Park
- Grand Portage State Park
- Other: _____
- I would not visit any other site or location if I couldn't visit this site.

14. How plausible do you think it is that the winter conditions depicted in the Future column will occur within the next 50 years?

(Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, 10 = extremely plausible)

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									
Implausible	Slightly plausible								Extremely plausible

15. In the past, have winter conditions (e.g., snow depth, temperature, etc.) impacted your outdoor recreational trips to the North Shore?

Yes
 No - Skip to Question 16

15a.

Because of that experience, how often do you?	Never	Rarely	Some-times	Often	Always
Purchase new or better equipment/gear?	<input type="radio"/>				
Plan trips for other times of the year?	<input type="radio"/>				
Pay closer attention to weather forecasts prior to trips?	<input type="radio"/>				
Pay closer attention to weather forecasts during trips?	<input type="radio"/>				
Worry more about safety prior to or during trips?	<input type="radio"/>				
Seek lodging options that enhance safety?	<input type="radio"/>				
Visit recreation sites that reduce risk to your safety?	<input type="radio"/>				
Participate in recreation activities that reduce risk to your safety?	<input type="radio"/>				

16.

Thinking about your North Shore winter recreational activities, to what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Does Not Apply
Regardless of winter conditions, I can still participate in my preferred winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17.

To what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation, and/or wind patterns that occur over several decades or longer.

18. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes, I'm extremely sure
- Yes, I'm very sure
- Yes, I'm somewhat sure
- Yes, I'm not at all sure
- No, I'm extremely sure
- No, I'm very sure
- No, I'm somewhat sure
- No, I'm not at all sure
- Don't Know

19. How concerned are you about climate change?

Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned
<input type="radio"/>				

20. How serious do you believe the current impacts of climate change are around the world?

Not at all serious	Slightly serious	Moderately serious	Very serious	Extremely serious
<input type="radio"/>				

21. How often have you thought about climate change before today?

Never	Rarely	Occasionally	Frequently	Constantly
<input type="radio"/>				

22. How many of your friends do you believe share your views on climate change?

None	Few	Some	Most	All
<input type="radio"/>				

23. Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support purchase critical resource lands and improve habitat for fish, wildlife, and native plants.

Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

- Yes - Skip to Question 19a
 No - Skip to Question 20

- 23a. Please indicate the most you would be willing to pay for such a license plate.

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

- \$35
 \$40
 \$45
 \$50
 \$55
 \$60
 \$65
 \$70
 \$75

We would like to know a little more about you. Please remember that your answers are confidential.

24. I planned for this current trip:
- The same day I took it
 - 1-2 days in advance
 - 3 days to 1 week in advance
 - 8 days to 1 month in advance
 - 2 to 5 months in advance
 - 6 to 9 months in advance
 - 9 months to 1 year in advance
 - More than a year in advance
25. How many years have you been coming to the North Shore? ____ years OR This is my first year.
26. What is your gender? (Please mark only one.)
- Male
 - Female
 - Other
 - Prefer not to say
27. What is your current age? (Please mark only one.)
- 18-24
 - 25-34
 - 35-44
 - 45-55
 - 55-64
 - 65 or older
 - Prefer not to say
28. What is your current household income? (Please mark only one.)
- | | |
|---|---|
| <input type="radio"/> Under \$9,999 | <input type="radio"/> \$60,000-\$69,999 |
| <input type="radio"/> \$10,000-\$19,999 | <input type="radio"/> \$70,000-\$79,999 |
| <input type="radio"/> \$20,000-\$29,999 | <input type="radio"/> \$80,000-\$89,999 |
| <input type="radio"/> \$30,000-\$39,999 | <input type="radio"/> \$90,000-\$99,999 |
| <input type="radio"/> \$40,000-\$49,999 | <input type="radio"/> Over \$100,000 |
| <input type="radio"/> \$50,000-\$59,999 | <input type="radio"/> Prefer not to say |
29. How would you describe your level of education? (Please mark only one.)
- | | |
|--|---|
| <input type="radio"/> Less than high school | <input type="radio"/> 4-year college degree (Bachelors) |
| <input type="radio"/> High school diploma or GED | <input type="radio"/> Masters degree |
| <input type="radio"/> Some college | <input type="radio"/> Doctoral degree |
| <input type="radio"/> 2-year college degree (Associates) | <input type="radio"/> Prefer not to say |
30. Please provide the Zip Code for your primary residence: _____

To be entered into the drawing to win an iPad, please enter your email address below:

Thank you for taking time to complete this questionnaire.
Your insights have been very valuable to us.

North Shore Summer Tourism Survey

Default Question Block

Researcher Only:

Mark Location

- Artist's Point/County VC
- Beaver Bay Wayside
- Cascade River SP
- Crosby "Lake Trailhead"
- Cut Face Creek Wayside
- Finland Co-Op
- Gooseberry SP
- Grand Portage SP
- Kadunce River Wayside
- Java Moose
- Paul Van Hoven Park/Lake County Historical Society
- Ray Berglund Wayside
- Temperance River SP
- Tettegouche SP
- Silver Bay Marina
- Split Rock Lighthouse
- Superior Trading Post
- Other:

Thank you for taking the time to complete this survey. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current and future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

Thanks again for sharing your time and insights with us today.



1. What is the length (number of nights) of your current trip?

2. What is the primary purpose of your current trip?

- Recreation in this area (this town, state park, etc.)
- Recreation at a different area (a different town, state park, etc.)
- Recreation at multiple locations
- Business trip (recreation is a secondary activity)
- Visiting family and friends (recreation is a secondary activity)
- Some other purpose (recreation is a secondary activity)

3. Which recreational activities have you participated in or do you plan on participating in during this trip? (Please select all that apply.)

	Have or will participate in	Planned to participate in but cannot
Scenic driving	<input type="checkbox"/>	<input type="checkbox"/>
Picnicking	<input type="checkbox"/>	<input type="checkbox"/>
Visiting historic or cultural sites	<input type="checkbox"/>	<input type="checkbox"/>
Hiking	<input type="checkbox"/>	<input type="checkbox"/>
Swimming or wading in lakes/rivers	<input type="checkbox"/>	<input type="checkbox"/>
Biking (all types, including mountain biking)	<input type="checkbox"/>	<input type="checkbox"/>
Camping (all types)	<input type="checkbox"/>	<input type="checkbox"/>

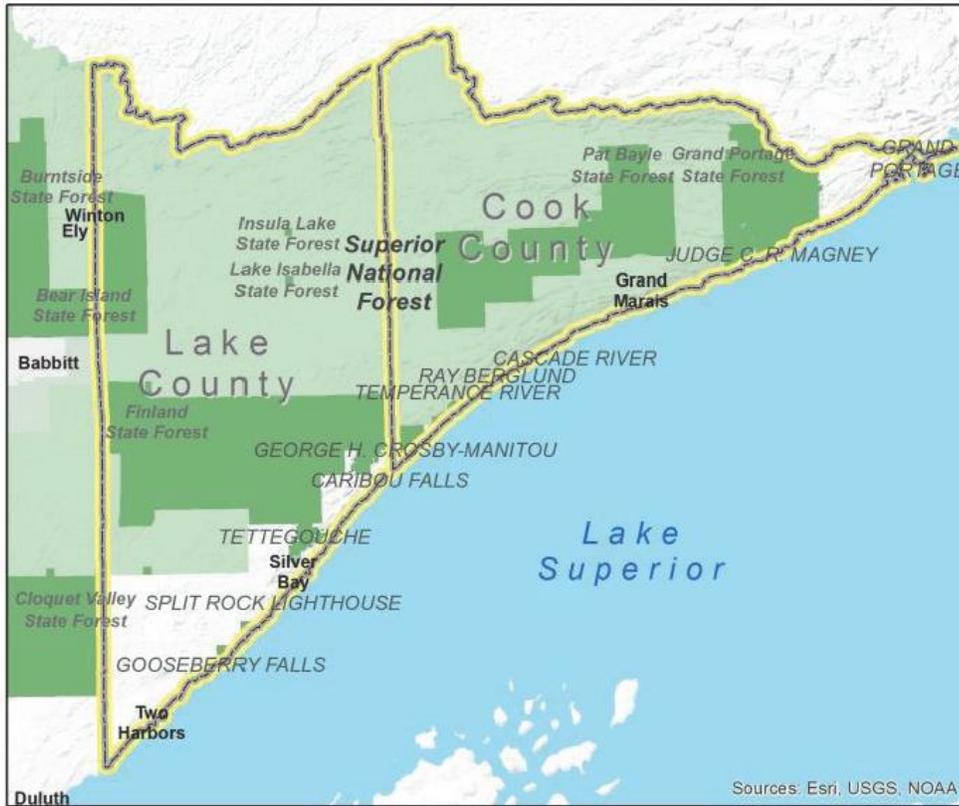
10/22/2015

Qualtrics Survey Software

Off-road ATV driving	<input type="checkbox"/>	<input type="checkbox"/>
Horseback riding	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Fishing (all types, <i>please specify desired species below</i>)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
Rock collecting	<input type="checkbox"/>	<input type="checkbox"/>
Creating art	<input type="checkbox"/>	<input type="checkbox"/>
Gathering wild foods	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>
Wildlife viewing	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
None	<input type="checkbox"/>	<input type="checkbox"/>

If there is one or more activities you planned to participate in but cannot, please explain why: (for example: "river water levels were too high" or "the road to the site I planned to visit was closed")

We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip for each item below:

(Select the value that is closest to the estimated amount you believe your group will spend during this trip. Leave it blank if you will not spend money on the item in Lake or Cook Counties during this trip.)

Transportation:

- Gas
- Motor vehicles (rentals and parts)
- ATV rentals
- Boat rentals

Food and beverage:

- Groceries
- Restaurants, bars, etc.

Lodging:

- Hotel and motel
- Federal or state campground site

Municipal or private campground	<input type="text"/>
Other (B&B, cabin, etc.)	<input type="text"/>
Sporting goods:	
Private (equipment, rentals, passes)	<input type="text"/>
Public rentals (e.g., equipment at state parks)	<input type="text"/>
Entertainment:	
Performing arts	<input type="text"/>
Festivals	<input type="text"/>
Retail:	
Clothing	<input type="text"/>
Souvenirs	<input type="text"/>
Other:	<input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above?

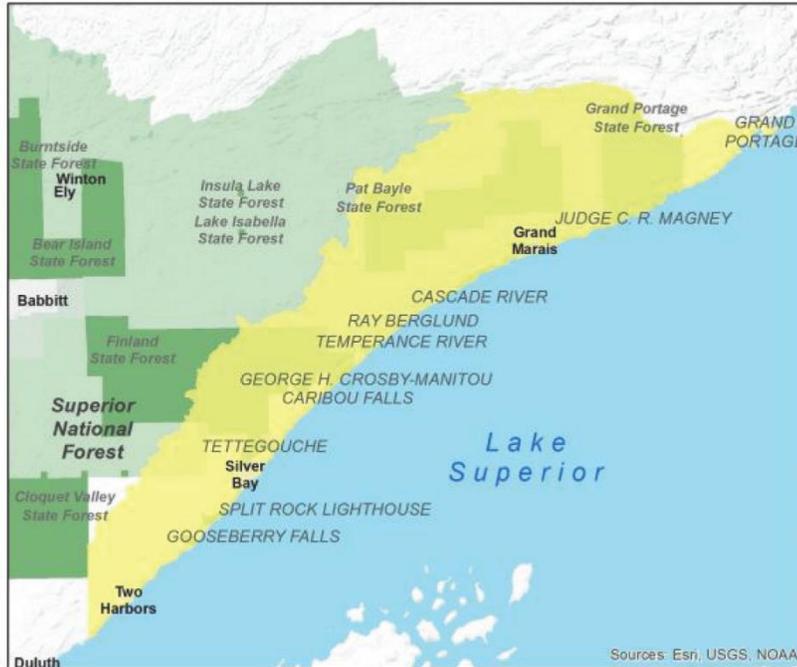
If you have been working on the survey with someone else up to this point, **we now ask that only one person answer the remaining questions.**

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your summer recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips have you taken or plan on taking this summer season?

Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

OR:

I am only traveling **through the North Shore** to reach my destination.

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent average daily summer conditions (between June 1 and August 31).

The last column describes *potential* average daily conditions for a future summer season.

Please consider the possible future *conditions described in the last column in relation to the recent conditions* and indicate *how many summer recreational trips* you would take on the North Shore given those conditions.

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	67% (21 of 30 days)
above 80°F heat index	5% (2 of 30 days)	19% (6 of 30 days)
with a 'high,' 'very high,' or 'extreme' fire risk	18% (6 of 30 days)	35% (11 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

Below is some additional information about fire danger and the heat index for your reference.



Under Very High Fire Danger, fires will start easily, spread rapidly, and become large and long-standing fires; no burning permits are issued to private landowners.

Under Extreme Fire Danger, fires last for several days; no burning permits are issued to private landowners; campfires are prohibited on all public and private lands.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the **HEAT INDEX**:

Caution	80°F to 91°F	Fatigue possible
Extreme Caution	91°F to 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible
Danger	103°F to 115 °F	Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Danger	> 115 °F	Heat stroke or sunstroke highly likely

7. If the conditions for the North Shore matched the *potential Future* summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each *potential Future* condition was on your estimates of future trips:

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with fire risk statement	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of inland streams with small-mouth bass	<input type="radio"/>				

9a. Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore for your CURRENT trip:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

9b. Please describe the influence of your origin location's temperature on your CURRENT trip to the North Shore:

- I come to the North Shore to escape the heat
- I come to the North Shore to seek out warmer weather
- Does not apply, the heat index at home did not influence my current trip
- Other:

10. Now, rate how influential the heat index at your origin location (home) may be on the number of FUTURE trip(s) you take:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

11. How do you think the *potential Future* conditions (see table below) would impact the following items:

(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	67% (21 of 30 days)
above 80°F heat index	5% (2 of 30 days)	19% (6 of 30 days)
with a 'high,' 'very high,' or 'extreme' fire risk	18% (6 of 30 days)	35% (11 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

12. Please think about your planned outdoor recreational activities for this trip. If summer conditions matched the *potential Future* conditions (see table below), how likely would you:

(Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North	<input type="radio"/>				

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Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	67% (21 of 30 days)
above 80°F heat index	5% (2 of 30 days)	19% (6 of 30 days)
with a 'high,' 'very high,' or 'extreme' fire risk	18% (6 of 30 days)	35% (11 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

13. How plausible do you think it is that the summer conditions depicted in the *potential Future* column will occur within the next 50 years?
 (Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, ... 10 = extremely plausible.)

Implausible	Slightly plausible									Extremely plausible
0	1	2	3	4	5	6	7	8	9	10
<input type="radio"/>										

14. If you could not have visited this site today for whatever reason, what site or location would you most likely visit? (Select one alternate location.)

- Gooseberry Falls State Park
- Split Rock Lighthouse
- Tettegouche State Park
- George H Crosby-Manitou State Park
- Temperance River State Park

- Cascade River State Park
- Judge C.R. Magney State Park
- Grand Portage State Park
- Other:
- I would not visit any other site or location if I couldn't visit this site.

15. We're curious to know if any of the following conditions have **impacted your previous summer recreational trips** on the North Shore.

If so, did you (check all that apply):

	Purchase new or better equipment or gear	Plan trips for other times of the year	Pay closer attention to weather forecasts <i>prior to</i> trips	Pay closer attention to weather forecasts <i>during</i> trips	Worry more about safety prior to or during trips	Seek lodging options that enhance safety	Visit recreation sites that reduce risk	Participate in less risky recreational activities
Heavy rainfall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flooding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excessive heat indices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abnormally cold temperatures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest fires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest blowdowns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Thinking about your North Shore summer recreational activities, to what extent do you agree or disagree with the following statements: *(Choose one answer for each item.)*

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The recreational activities that I enjoy on the North Shore would be at risk if local climate conditions were to change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. To what extent do you agree or disagree with the following statements: (Choose one answer for each item.)

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. If the following types of conditions changed on the North Shore, how likely would you go somewhere else to be in conditions similar to those found on the North Shore today? (Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
The forest (birch, spruce, fir)	<input type="radio"/>				
The wildlife (moose, lynx, snowshoe hare)	<input type="radio"/>				

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation and/or wind patterns that occur over several decades or longer.

19. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes
- No
- Don't know

19a. How sure are you about whether or not you believe climate change is happening?

- I'm extremely sure
- I'm very sure
- I'm somewhat sure
- I'm not at all sure

20. How concerned are you about climate change?

- Not at all concerned
- Slightly concerned
- Moderately concerned
- Very concerned
- Extremely concerned

21. How serious do you believe the current impacts of climate change are around the world?

- Not at all serious
- Slightly serious
- Moderately serious
- Very serious
- Extremely serious

22. How often have you thought about climate change before today?

- Never
- Rarely
- Occasionally
- Frequently
- Constantly

23. How many of your friends do you believe share your views on climate change?

- None
- Few
- Some
- Most
- All

Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support the purchase of critical resource lands and improve habitat for fish, wildlife, and native plants.

24. Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

- Yes
 No

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

24a. Please indicate the most you would be willing to pay for such a license plate.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

We would like to know a little more about you. Please remember that your answers are confidential.

25. I planned for this current trip:

26. How many years have you been coming to the North Shore?

27. What is your gender?

28. What is your age?

29. What was your annual household income for the 2014 tax year?

30. What is the highest level of education that you have received?

31. Please provide the US Zip Code or Canadian Postal Code for your primary residence:

United States Zip Code:

Canadian Postal Code:

I reside outside of the US or Canada

If you would like to be entered in a drawing to win one of four iPads, please provide your email address below:

Thank you for taking to time to complete this survey!

The survey should take about 10 minutes to complete. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current & future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

- What is the length (number of nights) of your current trip?
 - 0 nights, day trip
 - ___ nights (please write in number of nights you will spend on the North Shore for this trip)

- What is the primary purpose of your current trip? (Please mark only one.)
 - Recreation in this area (this town, ski area, state park, etc.)
 - Recreation at a different area (a different town, ski area, state park, etc.)
 - Recreation at multiple locations
 - Business trip (recreation is a secondary activity)
 - Visiting family and friends (recreation is a secondary activity)
 - Some other purpose (recreation is a secondary activity)

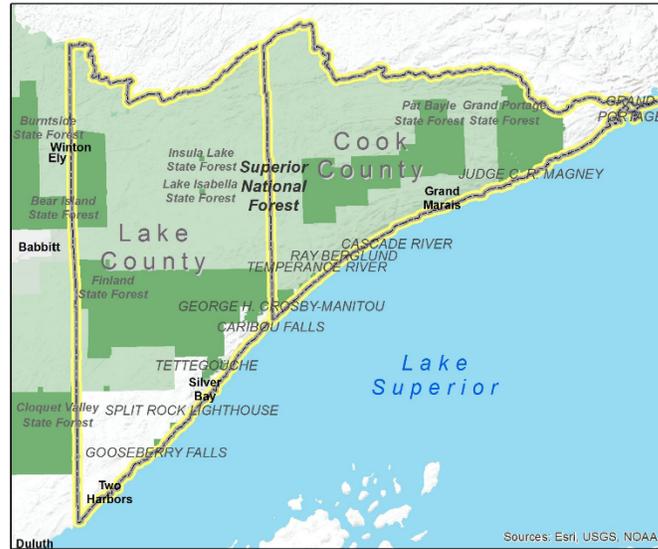
- Which recreational activities have you, or do you plan on, participating in this trip? (Please select all that apply.)

Have or Will Participate In	Planned to Participate In But Can
<input type="radio"/> Scenic driving	<input type="radio"/> Scenic driving
<input type="radio"/> Visiting historic or cultural sites	<input type="radio"/> Visiting historic or cultural sites
<input type="radio"/> Hiking	<input type="radio"/> Hiking
<input type="radio"/> Picnicking	<input type="radio"/> Picnicking
<input type="radio"/> Swimming or wading in lake/s/river	<input type="radio"/> Swimming or wading in lake/s/river
<input type="radio"/> Biking (all types, including mountain biking)	<input type="radio"/> Biking (all types, including mountain biking)
<input type="radio"/> Camping (all types)	<input type="radio"/> Camping (all types)
<input type="radio"/> Off-road ATV driving	<input type="radio"/> Off-road ATV driving
<input type="radio"/> Horseback riding	<input type="radio"/> Horseback riding
<input type="radio"/> Lake Superior boating - motorized	<input type="radio"/> Lake Superior boating - motorized
<input type="radio"/> Lake Superior boating - non motorized	<input type="radio"/> Lake Superior boating - non motorized
<input type="radio"/> Inland boating - motorized	<input type="radio"/> Inland boating - motorized
<input type="radio"/> Inland boating - non motorized	<input type="radio"/> Inland boating - non motorized
<input type="radio"/> Fishing (all types)	<input type="radio"/> Fishing (all types)
<input type="radio"/> Rock collecting	<input type="radio"/> Rock collecting
<input type="radio"/> Creating art	<input type="radio"/> Creating art
<input type="radio"/> Gathering wild foods	<input type="radio"/> Gathering wild foods
<input type="radio"/> Hunting	<input type="radio"/> Hunting
<input type="radio"/> Wildlife viewing	<input type="radio"/> Wildlife viewing
<input type="radio"/> None - Skip to Question 14	<input type="radio"/> Other: _____
<input type="radio"/> Other: _____	

If there were one or more activities you planned to participate in but cannot, please explain why: (for example: "river water levels were too high" or "the road to the site I planned to visit was closed")



We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip.

Transportation	
Gas	\$ <input type="text"/>
Motor vehicles (rentals and parts)	\$ <input type="text"/>
ATV rentals	\$ <input type="text"/>
Boat rentals	\$ <input type="text"/>
Food and beverage	
Groceries	\$ <input type="text"/>
Restaurants, bars, etc.	\$ <input type="text"/>
Lodging	
Hotel and motel	\$ <input type="text"/>
Federal or state campground	\$ <input type="text"/>
Municipal or private campground	\$ <input type="text"/>
Other (B&B, cabin, etc.)	\$ <input type="text"/>
Sporting goods	
Private (equipment, rentals, passes)	\$ <input type="text"/>
Public rentals (e.g., water craft at state park)	\$ <input type="text"/>
Entertainment	
Performing arts	\$ <input type="text"/>
Festivals	\$ <input type="text"/>
Retail	
Clothing	\$ <input type="text"/>
Souvenirs	\$ <input type="text"/>
Other: _____	\$ <input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above? _____

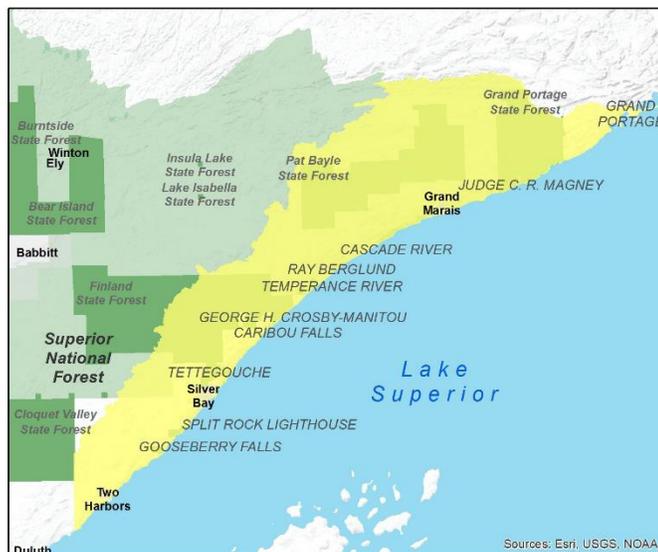
If you have been working on the survey with someone else up to this point, we now ask that only one person answer the remaining questions.

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your outdoor winter recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips do you plan on taking this summer season? _____
Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

OR

- I am only traveling through the North Shore to reach my destination - Skip to Question 14

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent averagedaily summer conditions (between June 1 and August 28).

The last column describes potential average daily conditions for a future summer season.

Please consider the conditions described in the last column in relation to the recent conditions and indicate how many winter recreational trips you would take to the North Shore given those conditions.

Environmental Variable	Current	Future
% days above avg. daily temperature (71 F)	60% (18 of 30 days)	67% (21 of 30 days)
% days above 80 F heat index	5% (2 of 30 days)	19% (6 of 30 days)
% of days with 'very high' or 'extreme' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
% days with a more than 1/4" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of stream reaches with brook trout	77%	20%
% of streams with small-mouth bass	53%	58%

Here is some additional information to keep in mind while making your decision:



Under High Fire Danger, unattended brush and campfires are likely to escape. Fires spread rapidly. Fires may become serious and their control difficult unless they are attacked successfully while small.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the heat index:

- Caution: 80-90 dF
- Extreme Caution: 91-103 dF
- Danger: 104-124 dF
- Extreme Danger: >125 dF

7. If the conditions for the North Shore matched the potential Future summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each condition was on your estimates of potential future trips.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with a fire risk statement	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of streams with small-mouth bass	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				

9.

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore	<input type="radio"/>				

10. Please describe the influence of your origin location's temperature on your trips to the North Shore:
- I come to the North Shore to escape the heat
 - I come to the North Shore to seek out warmer weather
 - Other: _____

11. How do you think that the potential changes in summer conditions will impact the following items:
(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Please think about your planned outdoor recreational activities for this trip. If winter conditions were to change according to the potential future conditions we have provided, how likely would you: (Choose one answer for each item)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

13. If you could not have visited this site today for whatever reason, what site or location would you most likely visit?

- Gooseberry Falls State Park
- Split Rock Lighthouse
- Tettegouche State Park
- Caribou Falls State Park
- George H Crosby- Manitou State Park
- Temperance River State Park
- Ray Berglund State Park
- Cascade River State Park
- Judge C.R. Magney State Park
- Grand Portage State Park
- Other: _____
- I would not visit any other site or location if I couldn't visit this site.

14. How plausible do you think it is that the winter conditions depicted in the Future column will occur within the next 50 years?

(Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, 10 = extremely plausible)

1	2	3	4	5	6	7	8	9	10
<input type="radio"/>									
Implausible	Slightly plausible								Extremely plausible

15. In the past, have winter conditions (e.g., snow depth, temperature, etc.) impacted your outdoor recreational trips to the North Shore?

Yes
 No - Skip to Question 16

15a.

Because of that experience, how often do you?	Never	Rarely	Some-times	Often	Always
Purchase new or better equipment/gear?	<input type="radio"/>				
Plan trips for other times of the year?	<input type="radio"/>				
Pay closer attention to weather forecasts prior to trips?	<input type="radio"/>				
Pay closer attention to weather forecasts during trips?	<input type="radio"/>				
Worry more about safety prior to or during trips?	<input type="radio"/>				
Seek lodging options that enhance safety?	<input type="radio"/>				
Visit recreation sites that reduce risk to your safety?	<input type="radio"/>				
Participate in recreation activities that reduce risk to your safety?	<input type="radio"/>				

16.

Thinking about your North Shore winter recreational activities, to what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Does Not Apply
Regardless of winter conditions, I can still participate in my preferred winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor winter recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17.

To what extent do you agree or disagree with the following statements: (Choose one answer for each item)	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation, and/or wind patterns that occur over several decades or longer.

18. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes, I'm extremely sure
- Yes, I'm very sure
- Yes, I'm somewhat sure
- Yes, I'm not at all sure
- No, I'm extremely sure
- No, I'm very sure
- No, I'm somewhat sure
- No, I'm not at all sure
- Don't Know

19. How concerned are you about climate change?

Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned
<input type="radio"/>				

20. How serious do you believe the current impacts of climate change are around the world?

Not at all serious	Slightly serious	Moderately serious	Very serious	Extremely serious
<input type="radio"/>				

21. How often have you thought about climate change before today?

Never	Rarely	Occasionally	Frequently	Constantly
<input type="radio"/>				

22. How many of your friends do you believe share your views on climate change?

None	Few	Some	Most	All
<input type="radio"/>				

23. Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support purchase critical resource lands and improve habitat for fish, wildlife, and native plants.

Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

- Yes - Skip to Question 19a
 No - Skip to Question 20

- 23a. Please indicate the most you would be willing to pay for such a license plate.

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

- \$35
 \$40
 \$45
 \$50
 \$55
 \$60
 \$65
 \$70
 \$75

We would like to know a little more about you. Please remember that your answers are confidential.

24. I planned for this current trip:
- The same day I took it
 - 1-2 days in advance
 - 3 days to 1 week in advance
 - 8 days to 1 month in advance
 - 2 to 5 months in advance
 - 6 to 9 months in advance
 - 9 months to 1 year in advance
 - More than a year in advance
25. How many years have you been coming to the North Shore? ____ years OR This is my first year.
26. What is your gender? (Please mark only one.)
- Male
 - Female
 - Other
 - Prefer not to say
27. What is your current age? (Please mark only one.)
- 18-24
 - 25-34
 - 35-44
 - 45-55
 - 55-64
 - 65 or older
 - Prefer not to say
28. What is your current household income? (Please mark only one.)
- | | |
|---|---|
| <input type="radio"/> Under \$9,999 | <input type="radio"/> \$60,000-\$69,999 |
| <input type="radio"/> \$10,000-\$19,999 | <input type="radio"/> \$70,000-\$79,999 |
| <input type="radio"/> \$20,000-\$29,999 | <input type="radio"/> \$80,000-\$89,999 |
| <input type="radio"/> \$30,000-\$39,999 | <input type="radio"/> \$90,000-\$99,999 |
| <input type="radio"/> \$40,000-\$49,999 | <input type="radio"/> Over \$100,000 |
| <input type="radio"/> \$50,000-\$59,999 | <input type="radio"/> Prefer not to say |
29. How would you describe your level of education? (Please mark only one.)
- | | |
|--|---|
| <input type="radio"/> Less than high school | <input type="radio"/> 4-year college degree (Bachelors) |
| <input type="radio"/> High school diploma or GED | <input type="radio"/> Masters degree |
| <input type="radio"/> Some college | <input type="radio"/> Doctoral degree |
| <input type="radio"/> 2-year college degree (Associates) | <input type="radio"/> Prefer not to say |
30. Please provide the Zip Code for your primary residence: _____

To be entered into the drawing to win an iPad, please enter your email address below:

Thank you for taking time to complete this questionnaire.
Your insights have been very valuable to us.

North Shore Summer Tourism Survey

Default Question Block

Researcher Only:

Mark Location

- Artist's Point/County VC
- Beaver Bay Wayside
- Cascade River SP
- Crosby "Lake Trailhead"
- Cut Face Creek Wayside
- Finland Co-Op
- Gooseberry SP
- Grand Portage SP
- Kadunce River Wayside
- Java Moose
- Paul Van Hoven Park/Lake County Historical Society
- Ray Berglund Wayside
- Temperance River SP
- Tettegouche SP
- Silver Bay Marina
- Split Rock Lighthouse
- Superior Trading Post
- Other:

Thank you for taking the time to complete this survey. This survey is being administered by the University of Minnesota, North Carolina State University and Carleton College with the support of the Minnesota Sea Grant program.

Your responses will help guide future planning efforts in the North Shore area, specifically, planning related to your past, current and future recreational activities. Your answers are confidential and will not be linked with any identifying information (email address or name).

Thanks again for sharing your time and insights with us today.



1. What is the length (number of nights) of your current trip?

2. What is the primary purpose of your current trip?

- Recreation in this area (this town, state park, etc.)
- Recreation at a different area (a different town, state park, etc.)
- Recreation at multiple locations
- Business trip (recreation is a secondary activity)
- Visiting family and friends (recreation is a secondary activity)
- Some other purpose (recreation is a secondary activity)

3. Which recreational activities have you participated in or do you plan on participating in during this trip? (Please select all that apply.)

	Have or will participate in	Planned to participate in but cannot
Scenic driving	<input type="checkbox"/>	<input type="checkbox"/>
Picnicking	<input type="checkbox"/>	<input type="checkbox"/>
Visiting historic or cultural sites	<input type="checkbox"/>	<input type="checkbox"/>
Hiking	<input type="checkbox"/>	<input type="checkbox"/>
Swimming or wading in lakes/rivers	<input type="checkbox"/>	<input type="checkbox"/>
Biking (all types, including mountain biking)	<input type="checkbox"/>	<input type="checkbox"/>
Camping (all types)	<input type="checkbox"/>	<input type="checkbox"/>

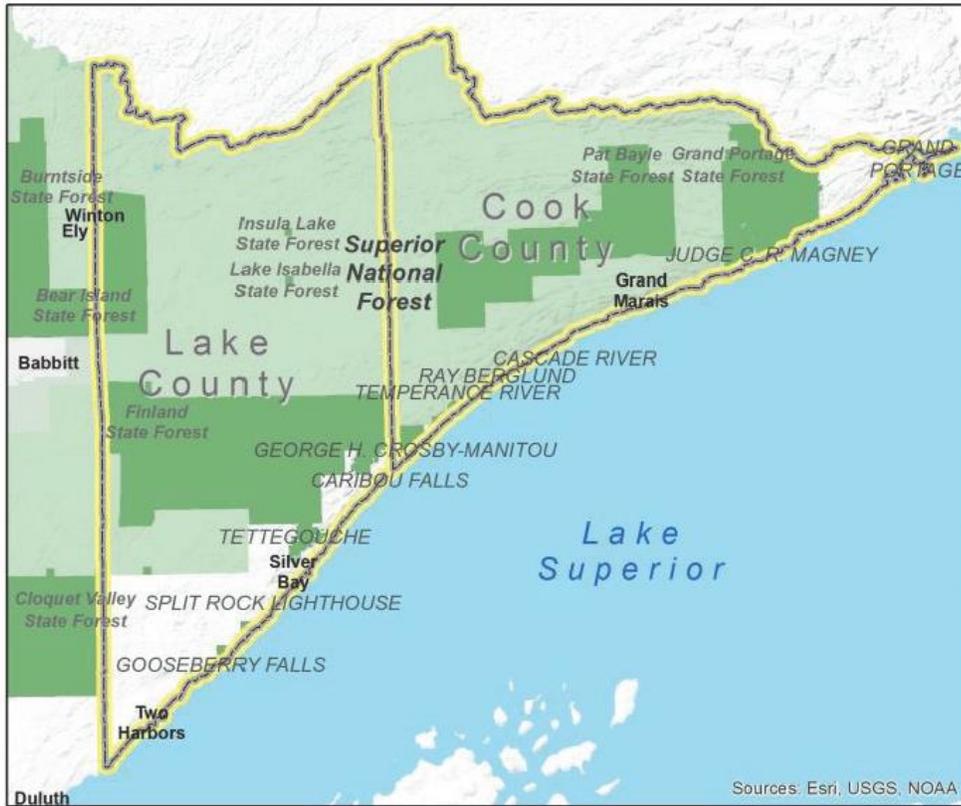
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Off-road ATV driving	<input type="checkbox"/>	<input type="checkbox"/>
Horseback riding	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Lake Superior boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - motorized	<input type="checkbox"/>	<input type="checkbox"/>
Inland boating - non motorized	<input type="checkbox"/>	<input type="checkbox"/>
Fishing (all types, <i>please specify desired species below</i>)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
Rock collecting	<input type="checkbox"/>	<input type="checkbox"/>
Creating art	<input type="checkbox"/>	<input type="checkbox"/>
Gathering wild foods	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>
Wildlife viewing	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>
<input type="text"/>		
None	<input type="checkbox"/>	<input type="checkbox"/>

If there is one or more activities you planned to participate in but cannot, please explain why: (for example: "river water levels were too high" or "the road to the site I planned to visit was closed")

We are interested in knowing the types of things you have purchased and are planning to purchase on this North Shore trip. Please refer to the map below when estimating the amount of money you and the group you are traveling with will ultimately spend within Lake and Cook counties during this trip.



4. Please estimate your group's expenditures for this trip for each item below:

(Select the value that is closest to the estimated amount you believe your group will spend during this trip. Leave it blank if you will not spend money on the item in Lake or Cook Counties during this trip.)

Transportation:

Gas

Motor vehicles (rentals and parts)

ATV rentals

Boat rentals

Food and beverage:

Groceries

Restaurants, bars, etc.

Lodging:

Hotel and motel

Federal or state campground site

Municipal or private campground	<input type="text"/>
Other (B&B, cabin, etc.)	<input type="text"/>
Sporting goods:	
Private (equipment, rentals, passes)	<input type="text"/>
Public rentals (e.g., equipment at state parks)	<input type="text"/>
Entertainment:	
Performing arts	<input type="text"/>
Festivals	<input type="text"/>
Retail:	
Clothing	<input type="text"/>
Souvenirs	<input type="text"/>
Other: <input type="text"/>	<input type="text"/>

5. How many people, including yourself, did you include in the estimates provided above?

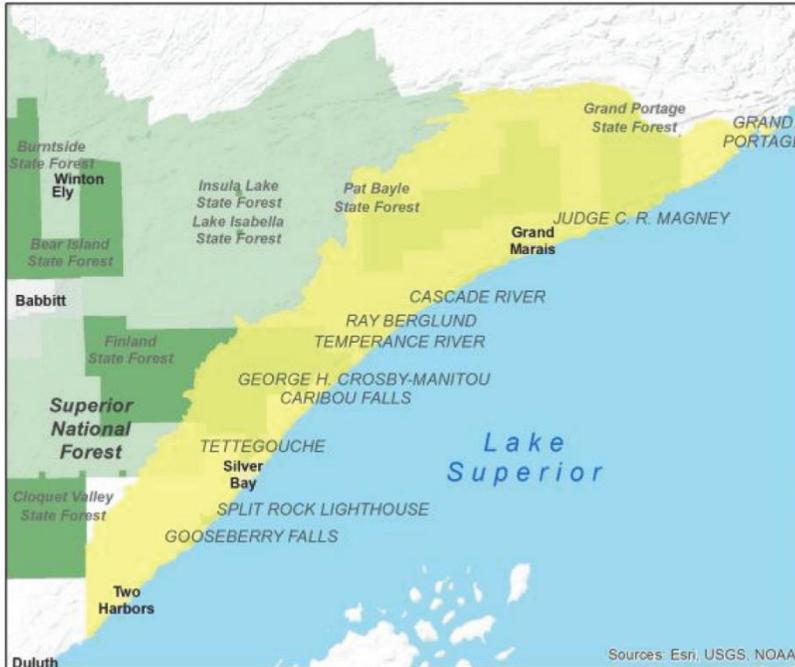
If you have been working on the survey with someone else up to this point, **we now ask that only one person answer the remaining questions.**

The rest of the questions are intended to collect the thoughts and preferences of one individual.

Thank you.

For the remainder of the survey, we would like you to consider your summer recreation experiences on the North Shore (the "North Shore" region is highlighted in yellow on the map below).

When answering the following questions we would also like you to consider only your summer season (June 1, 2015 to August 31, 2015) recreation trips to the North Shore.



6. How many North Shore recreational trips have you taken or plan on taking **this summer season?**

Please include previous, current and planned trips taken this year (June 1, 2015 - August 31, 2015).

▼

OR:

I am only traveling **through the North Shore** to reach my destination.

We are interested in understanding how changing summer conditions might affect your future trips to the North Shore region.

The middle column of the table below describes recent average daily summer conditions (between June 1 and August 31).

The last column describes *potential* average daily conditions for a future summer season.

Please consider the possible future *conditions described in the last column in relation to the recent conditions* and indicate *how many summer recreational trips* you would take on the North Shore given those conditions.

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	67% (21 of 30 days)
above 80°F heat index	5% (2 of 30 days)	19% (6 of 30 days)
with a 'very high' or 'extreme' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

Below is some additional information about fire danger and the heat index for your reference.



Under Very High Fire Danger, fires will start easily, spread rapidly, and become large and long-standing fires; no burning permits are issued to private landowners.

Under Extreme Fire Danger, fires last for several days; no burning permits are issued to private landowners; campfires are prohibited on all public and private lands.

Also, please keep in mind that the National Weather Service advises the following likelihoods of heat disorders with prolonged exposure or strenuous activity at the following ranges of the **HEAT INDEX**:

Caution	80°F to 91°F	Fatigue possible
Extreme Caution	91°F to 103°F	Sunstroke, muscle cramps, and/or heat exhaustion possible
Danger	103°F to 115 °F	Sunstroke, muscle cramps, and/or heat exhaustion likely
Extreme Danger	> 115 °F	Heat stroke or sunstroke highly likely

7. If the conditions for the North Shore matched the *potential Future* summer conditions (in the table above), how many summer recreational trips to the region would you make (between June 1 and August 31 of a future year)?

8. Please rate how influential each *potential Future* condition was on your estimates of future trips:

	No influence	Slight influence	Moderate influence	Very influential	Extremely influential
% of days above avg. temperature	<input type="radio"/>				
% of days above avg. heat index	<input type="radio"/>				
% of days with fire risk statement	<input type="radio"/>				
% of days with more than 1/4" rainfall	<input type="radio"/>				
% of streams with brook trout	<input type="radio"/>				
% of inland streams with small-mouth bass	<input type="radio"/>				

9a. Please rate how influential the heat index at your origin location (your home or primary residence before visiting the North Shore) was on your decision to visit the North Shore for your CURRENT trip:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

9b. Please describe the influence of your origin location's temperature on your CURRENT trip to the North Shore:

- I come to the North Shore to escape the heat
- I come to the North Shore to seek out warmer weather
- Does not apply, the heat index at home did not influence my current trip
- Other:

10. Now, rate how influential the heat index at your origin location (home) may be on the number of FUTURE trip(s) you take:

No influence
 Slight influence
 Moderate influence
 Very influential
 Extremely influential

11. How do you think the *potential Future* conditions (see table below) would impact the following items:

(Choose one answer for each item.)

	Negatively impact	Slight negative impact	No impact	Slight positive impact	Positively impact	Unsure
Yourself (your health, safety, and security) during North Shore trips	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your future trips recreating on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation infrastructure on the North Shore (e.g., roads, trails, campgrounds, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nature on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The local tourism economy on the North Shore	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	67% (21 of 30 days)
above 80°F heat index	5% (2 of 30 days)	19% (6 of 30 days)
with a ' very high ' or ' extreme ' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

12. Please think about your planned outdoor recreational activities for this trip. If summer conditions matched the *potential Future* conditions (see table below), how likely would you:

(Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
Keep my plans the same	<input type="radio"/>				
Stay on the North Shore but do something else	<input type="radio"/>				
Travel elsewhere on the North Shore to participate in the planned summer activity	<input type="radio"/>				
Travel outside of the North	<input type="radio"/>				

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Shore to participate in the planned summer activity	<input type="radio"/>				
Cancel your trip, but reschedule during the summer season	<input type="radio"/>				
Cancel your trip for the full summer season	<input type="radio"/>				
Visit the North Shore less often in the future	<input type="radio"/>				
Visit the North Shore more often in the future	<input type="radio"/>				

% of days in a month	Recent	Future
above the avg. high temperature (71°F)	60% (18 of 30 days)	67% (21 of 30 days)
above 80°F heat index	5% (2 of 30 days)	19% (6 of 30 days)
with a 'very high' or 'extreme' fire risk	2% (1 of 30 days)	22% (7 of 30 days)
with greater than ¼" rainfall	14% (5 of 30 days)	11% (3 of 30 days)
% of inland streams	Recent	Future
with brook trout	77%	20%
with small mouth bass	53%	58%

13. How plausible do you think it is that the summer conditions depicted in the *potential Future* column will occur within the next 50 years?
 (Please rate your response on the following scale 0 = implausible, 1 = slightly plausible, ... 10 = extremely plausible.)

Implausible	0	Slightly plausible	1	2	3	4	5	6	7	8	9	Extremely plausible	10
	<input type="radio"/>		<input type="radio"/>		<input type="radio"/>								

14. If you could not have visited this site today for whatever reason, what site or location would you most likely visit? (Select one alternate location.)

- Gooseberry Falls State Park
- Split Rock Lighthouse
- Tettegouche State Park
- George H Crosby-Manitou State Park
- Temperance River State Park

- Cascade River State Park
- Judge C.R. Magney State Park
- Grand Portage State Park
- Other:
- I would not visit any other site or location if I couldn't visit this site.

15. We're curious to know if any of the following conditions have **impacted your previous summer recreational trips** on the North Shore.

If so, did you (check all that apply):

	Purchase new or better equipment or gear	Plan trips for other times of the year	Pay closer attention to weather forecasts <i>prior to</i> trips	Pay closer attention to weather forecasts <i>during</i> trips	Worry more about safety prior to or during trips	Seek lodging options that enhance safety	Visit recreation sites that reduce risk	Participate in less risky recreational activities
Heavy rainfall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flooding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Excessive heat indices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Abnormally cold temperatures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest fires	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest blowdowns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Thinking about your North Shore summer recreational activities, to what extent do you agree or disagree with the following statements: *(Choose one answer for each item.)*

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The recreational activities that I enjoy on the North Shore would be at risk if local climate conditions were to change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand how climate change can impact outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to plan for changes to outdoor summer recreational activities on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. To what extent do you agree or disagree with the following statements: (Choose one answer for each item.)

	Strongly disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am very attached to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Many important family memories are tied to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get more satisfaction out of visiting the North Shore than any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing what I do on the North Shore is more important to me than doing it in any other place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I identify strongly with the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The North Shore is a special place for my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No other place can compare to the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the North Shore is a part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel a sense of pride in my heritage when I am on the North Shore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. If the following types of conditions changed on the North Shore, how likely would you go somewhere else to be in conditions similar to those found on the North Shore today? (Choose one answer for each item.)

	Not at all likely	Slightly likely	Somewhat likely	Very likely	Extremely likely
The forest (birch, spruce, fir)	<input type="radio"/>				
The wildlife (moose, lynx, snowshoe hare)	<input type="radio"/>				

Recently you may have noticed that climate change is in the news.

Among other things, climate change refers to increasing variation in temperature, precipitation and/or wind patterns that occur over several decades or longer.

19. We are interested in your thoughts about climate change. Do you think climate change is happening?

- Yes
- No
- Don't know

19a. How sure are you about whether or not you believe climate change is happening?

- I'm extremely sure
- I'm very sure
- I'm somewhat sure
- I'm not at all sure

20. How concerned are you about climate change?

- Not at all concerned
- Slightly concerned
- Moderately concerned
- Very concerned
- Extremely concerned

21. How serious do you believe the current impacts of climate change are around the world?

- Not at all serious
- Slightly serious
- Moderately serious
- Very serious
- Extremely serious

22. How often have you thought about climate change before today?

- Never
- Rarely
- Occasionally
- Frequently
- Constantly

23. How many of your friends do you believe share your views on climate change?

- None
- Few
- Some
- Most
- All

Consider if there were an opportunity to contribute to a fund (either public or private) for a North Shore organization to plan and adapt recreation and tourism resources to climate change. We are interested in knowing whether or not you would contribute to such a fund.

For example, the MN Department of Natural Resources has a designated license plate that can be purchased for \$30, these funds support the purchase of critical resource lands and improve habitat for fish, wildlife, and native plants.

24. Would you pay \$30 for a designated license plate to support climate change planning and adaptation efforts on the North Shore?

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible. Also note that this is not currently something being considered by the State.

- Yes
 No

Okay, so you would pay \$30 for a North Shore license plate dedicated to climate change planning and adaptation.

24a. Please indicate the most you would be willing to pay for such a license plate.

Please think about how much you can really afford and where the additional money would come from and try to be as realistic as possible.

We would like to know a little more about you. Please remember that your answers are confidential.

25. I planned for this current trip:

26. How many years have you been coming to the North Shore?

27. What is your gender?

28. What is your age?

29. What was your annual household income for the 2014 tax year?

30. What is the highest level of education that you have received?

31. Please provide the US Zip Code or Canadian Postal Code for your primary residence:

United States Zip Code:

Canadian Postal Code:

I reside outside of the US or Canada

If you would like to be entered in a drawing to win one of four iPads, please provide your email address below:

Appendix B: IRB Application & Recruitment Script

**North Carolina State University
Institutional Review Board for the Use of Human Subjects in Research
SUBMISSION FOR NEW STUDIES**

GENERAL INFORMATION

Revised January 14, 2013

1. Date Submitted: 11-06-14
2. Title of Project: Building Climate Readiness in Nature Based Tourism Dependent Communities
3. Principal Investigator: Erin Seekamp, PhD
4. Principal Investigator Email: erin_seekamp@ncsu.edu
5. Department: Parks, Recreation and Tourism Management
6. Campus Box Number: 8004
7. Phone Number: 919.513.7407
8. Faculty Sponsor Name if Student Submission:
9. Faculty Sponsor Email Address if Student Submission:
10. Source of Funding (Sponsor, Federal, External, etc): External: Federal (NOAA/Sea Grant prime; subaward from University of Minnesota). RADAR Project # (1502) 2013-2317 <i>If Externally funded, include sponsor name and university account number: University account number is pending.</i>
RANK: Faculty: <input checked="" type="checkbox"/> , Student: <input type="checkbox"/> Undergraduate <input type="checkbox"/> Masters <input type="checkbox"/> PhD; Other:

As the principal investigator, my signature testifies that I have read and understood the University Policy and Procedures for the Use of Human Subjects in Research. I assure the Committee that all procedures performed under this project will be conducted exactly as outlined in the Proposal Narrative and that any modification to this protocol will be submitted to the Committee in the form of an amendment for its approval prior to implementation.

Electronic submissions to the IRB are considered signed via an electronic signature

Principal Investigator:

Erin Seekamp 11/06/14

 (typed/printed name) (signature) (date)

As the faculty sponsor, my signature (or electronic submission) testifies that I have reviewed this application thoroughly and will oversee the research in its entirety. I hereby acknowledge my role as the principal investigator of record.

Faculty Sponsor:

 (typed/printed name) (signature) (date)

PLEASE COMPLETE AND E-MAIL TO: irb-coordinator@ncsu.edu

Please include consent forms and other study documents with your application and submit as one document. *Electronic submissions to the IRB are considered signed via an electronic signature. For student submissions this means that the faculty sponsor has reviewed the proposal prior to it being submitted and is copied on the submission.

For SPARCS office use only

Reviewer Decision (Expedited or Exempt Review)

Exempt Approved Approved pending modifications Table

Expedited Review Category: 1 2 3 4 5 6 7 8a 8b 8c 9

 Reviewer Name Signature Date

North Carolina State University
Institutional Review Board for the Use of Human Subjects in Research
GUIDELINES FOR A PROPOSAL NARRATIVE

In your narrative, address each of the topics outlined below. Every application for IRB review must contain a proposal narrative, and failure to follow these directions will result in delays in reviewing/processing the protocol.

A. INTRODUCTION

1. Briefly describe in lay language the purpose of the proposed research and why it is important.

The purpose of the research is to pilot test a survey instrument (Appendix B, attached) that will be used within a larger research study occurring along the North Shore of Lake Superior in Minnesota. The goals of the larger study are to identify assets, needs and vulnerabilities in three North Shore communities, related to recreation and tourism systems and to provide leaders in these communities with the tools they need for adaptive planning for recreation and tourism. The project will integrate economic analyses, climate science, and social science (e.g., the survey documented here) to develop and deliver decision support tools for these nature-based and tourism dependent communities.

Based on the outcomes of the pilot test, the same or modified survey instrument will be used January 8-20, 2015. The survey will be used to collect data on tourists' past, current, and potential future winter recreation behaviors in the North Shore region (e.g., their travel destinations and preferred winter recreation activities). The survey will also include measures to gauge tourists' perceptions of climate change. In summer 2015, the survey will be modified to focus on summer recreation activities and integrate summer conditions into the questionnaire.

2. If student research, indicate whether for a course, thesis, dissertation, or independent research.

Primarily, data collected during the pilot test of the survey will be used to refine our final survey instrument for winter sampling in January 2015. Some data from the pilot test may be used in thesis, dissertations, conference presentations and publications, related to the overall research project, to illustrate how the pilot enhanced the research methods and to compare outcomes of the pilot with outcomes of the January survey sample.

B. SUBJECT POPULATION

1. How many subjects will be involved in the research?

For the pilot phase, we intend to intercept 100 tourists over a two day period (i.e., November 28-29, 2014).

2. Describe how subjects will be recruited. Please provide the IRB with any recruitment materials that will be used.

Two teams of research assistants (two assistants per team) will travel to North Shore region state park sites and businesses on November 28th 29th, 2014. Research assistants will gain permission from state parks and businesses to intercept visitors/patrons at these locations. Subjects will be recruited verbally and surveys will be completed on site (i.e., possible winter survey sampling sites include two state park location and ten businesses within the North Shore region that are frequented by tourists). Visitors/patrons will be approached by research assistants and asked to voluntarily participate in the study; eligibility requirements for survey participation are outlined below. A recruitment script will allow the research assistants to assess eligibility and gain verbal informed consent to participate. Please see the attached recruitment script (Appendix A) for more details.

3. List specific eligibility requirements for subjects (or describe screening procedures), including those criteria that would exclude otherwise acceptable subjects.

Eligibility requirements include: 1) voluntary nature (i.e., time and willingness to participate), 2) place of residence (i.e., not within the North Shore regions we are studying, so as to intercept tourists only), and 3) age (i.e., over the age of 18), and 4) voluntary adult with the birthdate closest to the date of sampling (to reduce bias/increase randomization). Voluntary agreement and adequate time (i.e., 10 minutes) to participate, age of the individual (i.e., 18 and older may participate) and place of residence (i.e., individuals that live outside of Lake & Cook counties, Minnesota) ensures the appropriate sampling

population may participate in the survey.

4. Explain any sampling procedure that might exclude specific populations.

By strategically sampling on site at North Shore region state parks and businesses, there is a potential to 'miss' tourists that do not frequent North Shore businesses (e.g., tourists that stay at their lodging or go directly from lodging to recreation environment (e.g., backcountry wilderness area) without stopping at a state park visitor center or local business. Locals (residents of Cook and Lake County, Minnesota) are excluded from the study, as the goal of the survey research is to assess changes in tourists' visitation behaviors.

5. Disclose any relationship between researcher and subjects - such as, teacher/student; employer/employee.

N/A

6. Check any vulnerable populations included in study:

- minors (under age 18) - if so, have you included a line on the consent form for the parent/guardian signature
- fetuses
- pregnant women
- persons with mental, psychiatric or emotional disabilities
- persons with physical disabilities
- economically or educationally disadvantaged
- prisoners
- elderly
- students from a class taught by principal investigator
- other vulnerable population.

7. If any of the above are used, state the necessity for doing so. Please indicate the approximate age range of the minors to be involved.

It is unknown whether or not any of these individuals will participate in the study as screening questions will only be used to select adults living outside the North Shore region who voluntarily agree to participate in the study.

C. PROCEDURES TO BE FOLLOWED

1. In lay language, describe completely all procedures to be followed during the course of the experimentation. Provide sufficient detail so that the Committee is able to assess potential risks to human subjects. In order for the IRB to completely understand the experience of the subjects in your project, please provide a detailed outline of everything subjects will experience as a result of participating in your project. Please be specific and include information on all aspects of the research, through subject recruitment and ending when the subject's role in the project is complete. All descriptions should include the informed consent process, interactions between the subjects and the researcher, and any tasks, tests, etc. that involve subjects. If the project involves more than one group of subjects (e.g. teachers and students, employees and supervisors), please make sure to provide descriptions for each subject group.

Details on protocol recruitment can be found in Box B2; the recruitment script is found in Appendix A.

Participants will be asked to voluntarily complete a survey questionnaire (Appendix B) when approached by researchers. The questionnaire will be administered on tablet computers utilizing Qualtrics survey software. On the initial page, participants will see a message on the iPad screen explaining the project's purpose and the confidential nature of the study. At the completion of the survey, participants will be provided with the option to provide their email address to be entered into an iPad raffle.

Once the data are downloaded from Qualtrics, email addresses will be separated from survey responses and stored in a separate database. Four iPad winners will be randomly selected by assigning a number to each email address and using a random number generator. The winners will be asked to provide their mailing address within 14 days of receiving an emailed notice of being selected. If no reply is received,

another email will be randomly selected. This process will repeat until all three iPads are shipped. Once the iPad is shipped to the winner, the mailing address will be permanently deleted. At that point, email addresses will be deleted.

2. How much time will be required of each subject?

Each survey is expected to take 10 minutes to complete.

D. POTENTIAL RISKS

1. State the potential risks (physical, psychological, financial, social, legal or other) connected with the proposed procedures and explain the steps taken to minimize these risks.

There are no known risks for participating in this study.

2. Will there be a request for information that subjects might consider to be personal or sensitive (e.g. private behavior, economic status, sexual issues, religious beliefs, or other matters that if made public might impair their self-esteem or reputation or could reasonably place the subjects at risk of criminal or civil liability)?

Survey participants will be asked about their past, current, and potential future winter recreation behaviors in the North Shore region (e.g., destinations they visit, activities they participate in, frequency of visits, estimated expenditures during trips, etc.), their climate change perceptions, and demographic information (e.g., gender, age, education, income, etc.); see Appendix B for the full instrument. However, once email addresses are separated from the survey responses, respondents will become anonymous.

- a. If yes, please describe and explain the steps taken to minimize these risks.

Email addresses will be stored in a database on a password protected computer and will not be linked to survey answers. Once all four iPads are shipped, the email address database will be deleted. Additionally, demographic questions will not be force-choice responses.

- b. Could any of the study procedures produce stress or anxiety, or be considered offensive, threatening, or degrading? If yes, please describe why they are important and what arrangements have been made for handling an emotional reaction from the subject.

N/A

3. How will data be recorded and stored?

Answers to survey questions will be stored in a computer database through Qualtrics survey software. Once downloaded, email addresses will be filed in a separate database (i.e., Excel file) and not linked to survey responses. All electronic file documents will be stored on password-protected computers in locked offices (PI and research assistant offices, see Box C1 for further details). The email address file will be destroyed once all four iPads are shipped.

- a. How will identifiers be used in study notes and other materials?

Sequentially assigned numbers, which include a survey location id, will be used to identify individual survey questionnaires.

- b. How will reports will be written, in aggregate terms, or will individual responses be described?

Only group data will be reported.

4. If audio or videotaping is done how will the tapes be stored and how/when will the tapes be destroyed at the conclusion of the study.

N/A

5. Is there any deception of the human subjects involved in this study? If yes, please describe why it is necessary and describe the debriefing procedures that have been arranged.

N/A

E. POTENTIAL BENEFITS

This does not include any form of compensation for participation.

1. What, if any, direct benefit is to be gained by the subject? If no direct benefit is expected, but indirect benefit may be expected (knowledge may be gained that could help others), please explain.

There are no known direct benefits for participating in this study (besides the potential to receive one of the iPads). However, results from the survey will be one source of data used to develop decision support tools that may help North Shore community leaders, recreation managers, tourism planners, and local businesses adapt to climate-related changes. Ultimately, participation in the survey may help to enhance climate readiness among recreation and tourism providers on the North Shore.

F. COMPENSATION

Please keep in mind that the logistics of providing compensation to your subjects (e.g., if your business office requires names of subjects who received compensation) may compromise anonymity or complicate confidentiality protections. If, while arranging for subject compensation, you must make changes to the anonymity or confidentiality provisions for your research, you must contact the IRB office prior to implementing those changes.

1. Explain compensation provisions if the subject withdraws prior to completion of the study.

If the participant decides to withdrawal prior to completion, they will not be entered into the drawing. Participants refusing to participate in the study will be given an option to participate in a non-response bias check that consists of verbally responding to a small subset of questions (5) from the survey instrument (Appendix A). The pilot test will include an additional question asking them about whether or not they would have agreed to take the survey at home if they were emailed a survey link. Individuals agreeing to participate in the non-response bias check will be asked to write their email addresses on a sheet of paper. These email addresses will be added to the database prior to randomly selecting four recipients of the iPad incentive. The sheets of paper will be shredded once transferred to the database.

2. If class credit will be given, list the amount and alternative ways to earn the same amount of credit.

N/A

G. COLLABORATORS

1. If you anticipate that additional investigators (other than those named on **Cover Page**) may be involved in this research, list them here indicating their institution, department and phone number.

Jordan Smith, PhD, NCSU Parks, Recreation, & Tourism Management, 919-515-3437,
jordan_smith@ncsu.edu

Allie McCreary, graduate research assistant, Parks, Recreation, & Tourism Management, no phone,
amccrea@ncsu.edu.

Mae Davenport, PhD, University of Minnesota, Department of Forest Resources, [612-624-2721](tel:612-624-2721)
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Mark Kanazawa, PhD, Carleton College, Economics Department, 507-222-4106, mkanazaw@carleton.edu
Jake Kramer, undergraduate research assistant, Carleton College, no phone, kramerj@carleton.edu
Claire Willeck, undergraduate research assistant, Carleton College, no phone, willeckc@carleton.edu

2. Will anyone besides the PI or the research team have access to the data (including completed surveys) from the moment they are collected until they are destroyed.

Jordan Smith, PhD, Parks, Recreation, & Tourism Management, 919.515.3437, jordan_smith@ncsu.edu

Allie McCreary, graduate research assistant, Parks, Recreation, & Tourism Management, no phone (amccrea@ncsu.edu), other graduate students from institutions affiliated with the project will be hired on a temporary basis to assist with survey administration but these individuals will not have access to the Qualtrics database.

H. CONFLICT OF INTEREST

1. Do you have a significant financial interest or other conflict of interest in the sponsor of this project? NO
2. Does your current conflicts of interest management plan include this relationship and is it being properly followed? YES

I. ADDITIONAL INFORMATION

1. If a questionnaire, survey or interview instrument is to be used, attach a copy to this proposal. (Appendix B)
2. Attach a copy of the informed consent form to this proposal. (Appendix A)
3. Please provide any additional materials that may aid the IRB in making its decision.

J. HUMAN SUBJECT ETHICS TRAINING

*Please consider taking the [Collaborative Institutional Training Initiative](#) (CITI), a free, comprehensive ethics training program for researchers conducting research with human subjects. Just click on the underlined link.

Recruitment Script & Informed Consent

Opening Greeting:

Hello, my name is [] and I am research assistant working in partnership with Minnesota Sea Grant to better understand how seasonal conditions may change North Shore tourism. Our survey takes about 10 minutes to complete on an iPad. As an incentive, you will be given the option to enter your email address at the end of the survey to be entered in a drawing for one of four iPads. Your email address will not be linked to your answers, we will not use it for any other purposes, and will destroy it once the drawing is complete.

We are asking that the adult with the birthday closest to today's date participate. Which adult in your group has the closest birthday to this date?

[Ask that person] Would you be willing to voluntarily participate in the study?

If yes: go to tourist/local verification

If no: Ask adult with the next closest birthdate, continue until someone volunteers or if all say no:

Okay, do you have time to answer five quick questions so that you may still be entered in the drawing for the free iPad?

If yes: go to tourist/local verification

If no: That is okay. For research purposes only, do you mind voluntarily sharing the reason why you are not interested in helping? *{if share reason, document on notecard}* Thank you for your time. Have a nice day.

Tourist/Local Verification:

Do you reside in Cook or Lake County for 3 or more months of the year?

If yes: Okay, unfortunately today we are only gathering input from individuals who live outside Lake and Cook counties. Thank you anyway for your willingness to participate.

If no: go to age verification

Age Verification:

Are you 18 years of age or older?

If yes: go to verbal consent

If no: Okay, unfortunately we are only collecting survey responses from adult visitors. Thank you anyway for your willingness to participate.

Verbal Consent:

Your responses are confidential. There are no known risks for participating in this study. Do you voluntarily agree to participate?

If yes: Hand participant the iPad containing the survey

If no: Okay, thank you for your time. Have a nice day.

Closing:

Thank you for your help. Have a great day!

Additional Notes:

No more than 1 adult from each group may complete the survey (doing so would skew the economic, group expenditure, estimates).

Five items if participant is not able to participate in full survey:

1. In what year were you born? _____
2. How many trips will you take to the North Shore between December 1, 2014 and February 28, 2015? *(Please include past, current, and planned trips for that time frame.)* _____
3. What is the primary purpose of your current trip to the North Shore: *(Please choose one.)*
 - Recreation in this area (this town, ski area, state park, etc.)
 - Recreation at a different area (a different town, ski area, state park, etc.)
 - Recreation at multiple locations
 - Business trip (recreation is a secondary activity)
 - Visiting family & friends (recreation is a secondary activity)
 - Some other purpose (recreation is a secondary activity)
4. How concerned are you about climate change? *(Please choose one.)*

Not at all concerned	Slightly concerned	Moderately Concerned	Very concerned	Extremely concerned
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. What is your zip code? _____ *(Please circle one: United States / Canadian)*

Appendix C: North Shore Summer Visitor Survey Sampling Schedule

Date	Cluster	Time	Location
Wednesday, July 15	N	AM	Cut Face Wayside
		PM	Lake Co. VC
	S	AM	Gooseberry SP
		PM	Split Rock SP "Beach"
Thursday, July 16	N	AM	Artist Point/Cook Co.VC
		PM	Kadunce R. WS
	S	AM	Lake Co. Hist. Society
		PM	Gooseberry SP
Friday, July 17	N	AM	Cascade R. SP
		PM	Temperance R. SP
	S	AM	Finald Co-Op
		PM	Crosby-Manitou SP
Saturday, July 18	N	AM	Kadunce R. WS
		PM	Java Moose/Artist Pt.
	S	AM	Silver Bay Marina
		PM	Split Rock VC
Sunday, July 19	N	AM	Judge Magney SP
		PM	Grandportage SP
	S	AM	Tettegouche VC
		PM	Beaver Bay WS
Monday, July 20	N	AM	Java Moose
		PM	Cut Face WS
	S	AM	Temp. R. SP
		PM	Tettegouche SP "Falls Trailhead"
Tuesday, July 21	N	AM	Cascade R. SP
		PM	Temp. R. SP

Date	Cluster	Time	Location
Wednesday, July 22	S	AM	Tettegouch SP VC
		PM	Beaver Bay WS Big Dipper
	N	AM	Artist Point/Cook Co. VC
		PM	Kadunce R. WS
	S	AM	Silver Bay Marina Sugar Loaf Cove
		PM	Split Rock VC
Thursday, July 23	N	AM	Magney SP
		PM	Grand Portage SP
	S	AM	Gooseberry SP
		PM	Split Rock SP "Beach"
Friday, July 24	N	AM	Kad. R. WS
		PM	Sup. Trading Post
	S	AM	Temp. R. SP
Saturday, July 25	S	PM	Tettegouche SP "Falls Trailhead"
		AM	Java Moose
	N	PM	Cut Face WS
		AM	Lake Co. Hist.
	S	PM	Gooseberry SP
Sunday, July 26	N	AM	Cut Face WS
		PM	Cook Co. VC
	S	AM	Finland Co-Op
Monday, July 27	S	PM	Crosby-Manitou SP
		AM	Artist Pt/Cook Co. VC
	N	PM	Kad. River WS
		AM	Tettegouche VC
	S	PM	Beaver Bay WS Big Dipper

Date	Cluster	Time	Location
Tuesday, July 28	N	AM	Java Moose
		PM	Cut Face WS
	S	AM	Silver Bay Marina -Sugar Loaf Cove
		PM	Split Rock VC
Wednesday, July 29	N	AM	Cascade R. SP
		PM	Temp. R. SP
	S	AM	Temp. R. SP
		PM	Tettegouche SP "Falls Trailhead"
Thursday, July 30	N	AM	Judge Magney SP
		PM	Grand Portage SP
	S	AM	Finland Co Op -Sugar Loaf Cove
		PM	Crosby -Temp. R. SP
Friday, July 31	N	AM	Kad. River WS
		PM	Sup. Trading Post
	S	AM	Gooseberry SP
		PM	Split Rock VC
Saturday, Aug 1	N	AM	Cut Face WS
		PM	Cook Co. VC
	S	AM	Lake Co. Hist.
		PM	Gooseberry SP
Sunday, Aug 2	N	AM	Kad. R. Wayside
		PM	Java Moose
	S	AM	Silver Bay Marina -Sugar Loaf Cove
		PM	Split Rock VC
Monday, Aug 3	N	AM	Cascade R. SP
	S	AM	Finland Co Op Big Dipper

Appendix D: Codebook

Code	Definition
l. Outdoor Recreation	Photos depict and/or text includes a reference to participation in outdoor recreation activity listed below
a. Visiting cultural and historic sites	Image or text of cultural/historic site (e.g., Lighthouse)
b. Swimming	Image or text of swimming/wading
c. Scenic Driving	Photo or text reference to leisurely driving
d. Rock collecting	Text the refers to collecting rocks
e. Recreation Constraint	Text or image reference that they were unable to participate in a planned activity
f. Substitution	Text reference to changing recreation plans
g. Picnicking	Image or text of picnicking
h. Leisure at home	Photos/text the refer to time spent at home
i. Interpretation	Photos or text of interpretive (outdoor/environmental education) programming or experience
j. Visitor's Center	Photos or text references to visitor's center
k. Signs	Photo or mention of signs
l. Museum	Photo are mention of museum
m. Hunting	Image or text of hunting
n. Hiking	Image or text of hiking
o. Gathering wild plants (foods)	Image or text of gathering wild foods
p. Fishing	Image or text of fishing: lake, or river
i. River	
ii. Lake	
q. Creating art	Image or text of creating art
r. Contemplation	Photo or text of human subject(s) passively recreating (sitting/viewing nature)
s. Climbing	Photo or text mention of rock climbing
t. Camping	Image or text of camping, RV, front country tent pad or back country campsite
i. Front-country tent	
ii. Front-country RV	
iii. Back-country tent	
u. Campfires	Photos or text reference to a campfire
v. Boating	Image or text of boating: motorized or non-motorized

i. Non motorized	
ii. Motorized	
w. Bicycling	Image or text of bicycling, on paved or unpaved surface
i. Trail	Unpaved surface
ii. Road	Paved surface
x. ATV	Image or text of ATV
II. Natural Resources	Photo includes imagery of natural resources, text refers to a natural resource listed below
a. Wildlife	Image or text of fauna
i. Regionally significant species	Image or text of moose, wolf
b. Weather	Text reference to the weather
c. Waterfalls	Photo or text reference to waterfall
d. Rocks	Image or text of rocks
e. Plants	Photo or mention of plants (non-tree vegetation is a man focus)
i. Wildflowers	
ii. Edibles, foraging	E.g., berries
f. Open Water	Image or text of water body
i. River	
ii. Lake Superior	
iii. Inland Lake	
g. Landscape	Photos are of landscape-level views of the coast, water body, forest, or sunrise/sunset, etc.
i. Sky	
ii. Open Water	
iii. Land	
iv. Forest	
v. Coast	
h. Insects	Photo or text of an insect
i. Forests	Image or text of a forest
j. Coastline	Image or text of coast
III. Human Subjects	Image or text containing a person
a. Self	“Selfies,” text includes “I... “ statements: of an adult or of a youth
i. Youth	
ii. Adult	
b. Recreation provider	Photo or text that refers to an interpreter, outfitter, guide or other recreation provider

c. Pets	E.g., dogs
d. Other(s)	Some other human subject not captured by codes here
e. Number in photo	Capture the number of human subjects in a photo image
i. More than 5	
ii. 5	
iii. 4	
iv. 3	
v. 2	
vi. 1	
f. Non-tourist	Mention that human subject is not a tourist
g. Family and friends	Photos include/ mention of family and/or friends in text: youths, adults, or mixed generations
i. Youths	
ii. Mixed generation	
iii. Adults	
IV. Culture	Photo includes images and/or text references a cultural component listed below
a. Native american	Photo or text of native American symbology, place, person, etc.
b. Food and drink	Photo or text of food/drink
c. Art	Photo or text of art
V. Built infrastructure	Photos includes element of built infrastructure, text references a road, building, facility, or business
a. Roads	Image or text of roadway
i. Wayside	area where vehicles can pull off of the road for scenic view or trail, river, or coastal access
ii. Transportation	major corridor e.g., Hwy 61
iii. Streetscape	e.g., 'downtown' Grand Marais
b. Recreation infrastructure	Photo or text reference to recreation resources that are not natural resources or buildings, but are human-made recreation resources
i. Ski lift	
ii. Signs	
iii. Scenic overlook	
iv. Playground	

v. Paved trail	
vi. Dirt trail	
vii. Bridges	
viii. Boat ramp	
ix. Bench	
x. Bathrooms	
xi. Alpine slide	
c. Historic Site	Photo or text reference to a historic building (lighthouse, 3M factory, rail station/train, etc.)
d. Buildings	Human-made structures
i. Visitor's Center	
ii. Ski chalet	
iii. Retail shop	
iv. Restaurant	
v. Private recreation amenity	
vi. Museum	
vii. Lighthouses	
viii. Hotel	
ix. Cabin or lodge	
VI. Affect	Text containing, "awe," "epic," "best," etc. or "horrible," "worst," "lame" etc.
a. Positive	
b. Negative	

Appendix E: Python Script

Created on Thu May 28 10:10:15 2015

@author: Boris

```
import csv
import pandas as pd
import os
import glob
```

```
## MATCHING CSV FILE
```

```
class excel_semicolon(csv.excel):
    delimiter = ';'
    headings = ['latitude', 'link', 'longitude', 'post_id', 'tags', 'text', 'time_stamp', 'user', 'user_id', 'tags_n_text']
```

```
### SET ENVIRONMENT ###
```

```
os.chdir("C:/Users/amccrea/mynorthshore/output")
```

```
### CREATE INSTAGRAM DATAFRAME ###
```

```
allFiles = glob.glob('C:/Users/amccrea/mynorthshore/insta_full*.csv')
insta_files = []
for file_ in allFiles:
    df = pd.read_csv(file_, index_col=None, sep=';')
    insta_files.append(df)
dataset = pd.concat(insta_files, ignore_index=True)
```

```
### MERGE TAGS & TEXT
```

```
dataset['tags_n_text'] = dataset['tags'] + dataset['text']
```

```
# filter
```

```
keyword = ['mynorthshore']
```

```
mynorthshore_insta = dataset[dataset['tags_n_text'].str.contains('|'.join(keyword)) == True]
```

```
### EXPORT CSV
```

```
mynorthshore_insta.to_csv('mynorthshore_insta.csv', index_col=None, sep=';', columns = headings)
print 'great success'
```