



## Exploring visitor perceptions of the influence of climate change on tourism at Acadia National Park, Maine



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### ABSTRACT

This study explores the range of perceptions about the impacts of climate change on tourism in one protected area, Acadia National Park, Mount Desert Island, Maine, US. Summer visitation to this park depends strongly on favorable weather conditions. An intercept survey was used to collect data on visitor perceptions about the role of weather and possible climate change on tourism in general, and their destination selection specifically. A total of 506 visitors participated in the study.

The majority of participants expressed that climate change will affect tourism. Weather conditions are important and influence visitors' destination selection. Statistically significant differences between age groups and gender about the effects of climate change on tourism were identified. By understanding the perceptions of the visitors, suitable adaptive strategies and early preparedness actions may be developed to cope with the impacts of climate change to the nature-based tourism industry in national parks.

### MANAGEMENT IMPLICATIONS

Because nature-based tourism is highly-weather dependent, understanding visitor perceptions of destinations and their essential features will be crucial for sustainable tourism destination development. This qualitative study shows that the majority of visitors are concerned about climate change in a national park they visit, and would support agency efforts to mitigate possible climate change effects. Findings suggest public education and outreach to be relevant strategies for parks to enhance visitors' understanding of climate effects in the region and their role in reducing carbon-footprint. Management efforts, such as resource stewardship and mitigation strategies, should contemplate differences in perceptions of the effects of climate change and travel behavior according to visitor characteristics (e.g., age, gender) and market segments.

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## 1. Introduction

Climate change is one of the most pressing global environmental issues facing the world today and one that has major social, economic and environmental repercussions (Yu, Schwartz, & Walsh, 2009). Among all economic sectors, tourism is considered one of the most vulnerable industries to climate change due to its frequent reliance on natural resources as primary assets (Lépy et al., 2014). In spite of this, research on the potential effects of climate change on tourism destinations remains scarce (Dawson &

Scott, 2007). More specifically, Jones and Scott (2006) suggest that so far only few studies have assessed the implications of climate change for nature-based tourism and tourism associated with protected areas (e.g. national parks).

Changes in an area's climate conditions can have negative implications on the quality of the services provided, and may diminish the quality of climate-dependent leisure experiences (Moreno & Becken, 2009; Scott, McBoyle, & Schwartzentruber, 2004). Since it is a core goal of resource managers and suppliers of nature-based tourism opportunities to provide high quality experiences for visitors to protected areas (Brownlee, Hallo, & Krohn, 2013), it is essential to improve knowledge about visitors' perceptions about the effects of climate change on tourism, and how these relate to the quality of the tourism experience in climate-

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dependent destinations such as protected areas (Denstadli & Jacobsen, 2014; Gössling, Scott, Hall, Ceron, & Dubois, 2012). Current literature also argues that social science research on visitors' perceptions of climate change is important to inform resource managers and service providers about potential adaptation strategies needed to help destinations cope with the negative effects of climate change on visitation, and capitalize on opportunities (Fischelli, Schuurman, Monahan, & Ziesler, 2015). Consequently, understanding visitor perceptions of climate change effects on tourism will be a critical tool in effectively guiding decision-making associated with the effects of climate change on tourism in protected areas (Brownlee & Leong, 2011), and ultimately informing policy formulation (Brownlee, Hallo, Wright, Moore, & Powell, 2013).

Important as this topic is, limited studies have focused on understanding how visitors perceive the effects of climate change on tourism in protected areas (Brownlee et al., 2013). The authors of this article believe that understanding visitors' perceptions of the effects of climate change will be crucial to inform development and implementation of education, interpretation and adaptation strategies associated with tourism in protected areas.

This article presents the results of a pilot study on visitor perceptions of the effects of climate change on tourism at Acadia National Park-Mount Desert Island (MDI), a coastal tourism destination in Maine. As an exploratory study, the research was designed to generate hypotheses about particular visitor characteristics associated with visitor perceptions of the influence of climate change on a protected area tourism destination. The following sections situate our research in the growing literature on climate change and tourism in protected areas.

### 1.1. Climate change and tourism

The tourism industry is highly sensitive to weather and climate (Nyaupane & Chhetri, 2009) as these determine when, why and where tourists travel (Becken & Hay, 2007; Scott, Gössling, & Freitas, 2009), the kinds of activities they participate in, and the quality of the tourism/recreation experience (Gössling et al., 2012; Moreno, 2010). Climatic events may affect the natural resources that serve as tourism assets in a destination, and potentially reduce the attractiveness of the area if events such as natural disasters preclude visitors from travelling (Moreno & Becken, 2009). It is also possible that conditions for tourism in certain areas may be enhanced due to climate change if warmer seasons are extended, such as in high latitude regions (Yu et al., 2009), thus offering a form of comparative advantage. Projected environmental changes that may impact tourism assets positively and/or negatively include sea-level rise, ocean acidification, changes in temperature and precipitation increase, change in habitat range and species distribution. These impacts could have consequences for visitors who enjoy popular seashore sites, wildlife watching, scuba diving, and other nature-based activities that are dependent on certain weather conditions (e.g. hiking, camping, mountain biking).

Climate and weather have served as push-pull factors in visitor destination selection and activity engagement (Agnew & Palutikof, 2006; Bigano, Hamilton, Maddison, & Tol, 2006; Huebner, 2012). Several studies have demonstrated that weather is an important consideration in selecting a tourism destination (Denstadli, Jacobsen, & Lohmann, 2011; Gössling, Bredberg, Randow, Sandström, & Svensson, 2006; Maddison, 2001). Specifically, tourism and outdoor recreation activities in coastal and marine environments have shown to be highly sensitive to weather conditions and climate patterns (Moreno & Becken, 2009). For this study, we will use the Environmental Protection Agency's definitions of (1) weather as the "atmospheric condition at any given

time or place," whereas climate is defined "as the 'average weather,' or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years" (United States Environmental Protection Agency, 2013).

### 1.2. Climate change, protected areas and nature-based tourism

Climate change represents a major threat to the integrity of global protected areas (Sharp, Lemieux, Thompson, & Dawson, 2014). Changing environmental conditions resulting from climate change that are increasingly affecting protected area systems worldwide include shifting ranges of species and habitats, rising sea-levels and coastal erosion, increased habitat fragmentation, increased frequency and intensity of storms, coral bleaching, among others (Hannah, 2010; Parmesan & Yohe, 2003). Coastal and marine protected areas are of special concern, considering these spaces have historically been the least represented in the global network of protected areas, and are recognized as critical to maintain and restore conservation targets (Lockwood, Worboys, & Kothari, 2006). Moreover, changes resulting from a changing climate are starting to affect nature-based tourism's assets and the quality of visitor experience to protected areas (Brownlee, Hallo, Moore, Powell, & Wright, 2014; Sharp et al., 2014). Climate change implications to tourism in protected areas have just recently begun to be assessed (Jones & Scott, 2006; Scott, Jones, & Konopek, 2007).

In some destinations, climate is the major natural resource the tourism industry relies on (Scott et al., 2004); in these cases, visitors' travel decisions may be highly driven by their perceptions of climatic comfort level. More specifically, certain forms of tourism are particularly vulnerable to changes in climate; such as coastal and nature-based tourism. Nature-based tourism can be defined as "any form of tourism that relies primarily on the natural environment for its attractions and/or setting; (it) may include ecotourism and substantial portions of adventure tourism and 3S (Sun, Sand, and Sea) tourism" (Weaver, 2001: 660). Nature-based tourism is a segment of the industry that relies upon experiences that are directly related to environmental resources such as landscapes, geological landforms, wildlife, and biodiversity (Lockwood et al., 2006). It includes activities such as diving, bird-watching, trekking, camping, hunting, climbing, fishing, rafting, beach enjoyment, among others (Nyaupane & Chhetri, 2009; Weaver, 2001). This type of tourism has been highly associated with tourism and recreation activities occurring in protected areas.

Nature-based tourism is especially climate-sensitive as the natural resources it heavily relies on can be negatively affected by variability of climate (Nyaupane & Chhetri, 2009), particularly when associated with protected areas (Sharp, Brownlee, & Larson, 2012). It is expected that climate change impacts on protected areas will continue to increase, and these changes will continue to effect nature-based tourism and outdoor recreation (Brownlee et al., 2013; Sharp et al., 2014). It is likely that changes in the length and quality of nature-based tourism seasons prompted by climate change could have major implications for park visitation and management (Jones & Scott, 2006).

Research on global environmental concerns show that beliefs about climate change, and its potential impacts, are strongly related and vary according to worldviews, perceptions of risk, and value orientations (Brownlee et al., 2014, 2013). Therefore, understanding perceptions of global environmental issues such as climate change is essential to help inform natural resource management decisions, policy making, and communication strategies (Brownlee et al., 2013). Staff at parks and protected areas may feel that they do not have adequate tools and information to engage with visitors about climate change, or that discussing climate change is too depressing to share with visitors (Sharp et al., 2014).

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