**"The End of the Ice Age?": Visitor motivations to experience disappearing world heritage and the climate change communication imperative**

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**Abstract:**

*Rapid environmental change in vulnerable destinations has stimulated a new form of travel termed 'last chance tourism' (LCT). Studies have examined the risks of LCT, while leaving potential opportunities within this new tourism market largely underexplored. Results of survey (n=399) research in Jasper National Park, Canada reveal that a LCT motivation influences decisions to visit this iconic Canadian destination, and suggest that this motivation is linked to a desire to learn about the impacts of climate change on the Athabasca Glacier. Findings suggest there may be short to medium term opportunities associated with LCT, including promoting climate change ambassadorship through management interventions. This paper discusses a range of possible education, interpretive, and outreach activities that might be employed at LCT destinations. It outlines the relative merits (or what we refer to as 'uneasy benefits') of promoting the glacier and other LCT destinations within a protected areas management context.*

**Keywords:** climate change, parks and protected areas, last chance tourism, destination marketing, interpretation

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**Introduction**

Canada's national parks attract over 13 million visits per year (Bushell & Eagles 2007; Parks Canada, 2015a). Personal benefits from this visitation contribute to a high level of support for Canada's national parks and other forms of protected areas, but their effectiveness as conservation and education tools faces challenges. In addition to threats like incompatible land-use activities and declines in government funding (Eagles, 2014; Radeloff et al., 2010), climate change is placing pressure on the health and resilience of ecosystems and species (IPCC, 2014). Parks have often been established and legislated to protect, restore and provide opportunities for the public to experience rare, threatened, and/or endangered ecosystems and species (Lemieux, Beechey & Gray, 2011). Yet in conjunction with other stressors (e.g., habitat loss), climate change will alter the geographic distribution of ecologically and culturally important species and features (e.g., polar bears) (Lemieux & Scott, 2005; Dawson, Havitz & Scott, 2011a). In extreme circumstances, place-bound species and features like glaciers may be lost from protected areas altogether (Clarke, Jarosch, Anslow, Radic & Menounos, 2015; Stewart et al., in press).

Research suggests that climate impacts can alter tourist behaviours (e.g., Dawson et al. 2011a; Gössling, Scott, Hall, Ceron & Dubois, 2012). The threat that climate change poses to species and other biophysical and cultural features, for instance, has stimulated a new form of tourism known as 'last chance tourism' (LCT). Formally, LCT is defined as "tourists explicitly seeking vanishing landscapes, and/or disappearing natural and/or social heritage" (Lemelin, Dawson, Stewart, Maher & Lück, 2010: 478). This includes the desire to observe, photograph and interact with environments or individual species that may be endangered, threatened, or rare (Ballantyne, Packer & Axelsen, 2009). In Churchill, Canada the threat that polar bears face from climate change has already contributed to the desire for a last chance experience among polar bear viewing tourists, and visitors are using Churchill as a beacon to seek out likeminded travellers (Dawson, Stewart, Lemelin & Scott, 2010; Groulx, Lemieux, Dawson, Stewart & Yudina, 2016a). In warmer tropical climates, rising ocean temperatures and acidification threaten the health of coral reef systems (Hoegh-Guldberg et al., 2007). This threat may contribute to short term LCT visitation, but is a risk to long-term ecosystem integrity

and the 'enterprise resilience' of stakeholders who depend on the link between reef health, visitor satisfaction, and visitation (Biggs, Hicks, Cinner & Hall, 2015).

The growth of LCT has implications for protected area management in Canada and beyond (Lemieux & Eagles, 2012). The reliance of operators on local environmental conditions and the considerable capacity of tourists to access desired experiences in other markets reflects a growing reality wherein tourists have a relatively high adaptive capacity compared to the low adaptive capacity of most tourism operators and protected areas (Scott, 2011). This dynamic makes it important to understand consumer responses to environmental change (Gossling et al., 2012), yet only a few articles examine LCT as a unique form of tourism in protected areas (e.g., Eijgelaar, Thaper & Peeters, 2010; Lemieux & Eagles, 2012; Groulx et al., 2016a; Stewart et al., in press).

Parks are relying more than ever on visitation as a source of funding for conservation, operations, and other management initiatives (including climate change adaptation planning). This new reality makes evidence-based approaches to understanding future drivers of visitation, including motivations like LCT, critical to informing the sustainable management of parks and protected areas. The goal of this paper is to establish whether a LCT motivation exists among tourists visiting the climate vulnerable Athabasca Glacier in Jasper National Park (JNP), Canada, and to examine the role of LCT in understanding communication strategies (e.g., place branding) employed by park agencies and other stakeholders. A better understanding of motivational underpinnings, linked to communication strategies, may inform climate change action pathways that attempt to balance the 'uneasy alliance' between visitation and conservation. These goals are achieved by examining the following research questions:

1. Does a LCT motivation exist for glacier viewing tourists in Jasper National Park?
2. How does LCT relate to glacier tourists' characteristics, including their sense of *nature relatedness* and *place identity*?
3. From a park management perspective, what value is there, if any, to incorporating a LCT motivation focus within current visitor experience, marketing, management and communication efforts?

## Context

### *Last chance tourism (LCT)*

The promotion of tourism that involves the experience of vulnerable destinations has been framed under several names, including doom tourism, extinction tourism, and catastrophe tourism (Lemelin et al., 2010). The discussion of LCT here specifically references tourists seeking out vanishing landscapes, seascapes, natural heritage, or cultural heritage that they perceive to be threatened by climate change (Dawson et al., 2011b). The growth of LCT stems from human curiosity, and the fact that due to globalization, increasingly accessible transportation, and a lack of unexplored landscapes, the desire to be the first to visit a destination has been replaced with an interest in being one of the last to do so (Smith, 2012).

The tourism industry is capitalizing on this curiosity by developing marketing and place branding campaigns that generate economic opportunities through the communication of place vulnerability and rarity (Eijgelaar et al., 2010; Smith, 2012). As McGaurr, Tranter and Lester discuss, what distinguishes place branding is the media driven construction of an emotional relationship between tourists and the place brand. Marketing of LCT is becoming more common as climate change drives ecological transformations (e.g., glacial retreat) that open up new opportunities to promote landscapes, ecosystems, and flora and fauna as vulnerable (Dawson et al, 2011b). Destinations like the Maldives Islands (which are losing land area to rising sea levels), Mount Kilimanjaro (where ice is melting as a result of warmer temperatures), and Churchill, Canada (where sea-ice melt threatens to extirpate polar bears) have all experienced LCT demand linked to the marketing of place vulnerability (e.g., Groulx et al., 2016a). In 2014, Yahoo Adventure offered an example of such marketing when it released a list of "9 things you must see before they disappear forever", including the following "Fun Fact" referencing Churchill, Canada: *"With two-thirds of the world's polar bears possibly going extinct by 2050, it is high time you booked a trip to Churchill, Canada, the self-proclaimed Polar Bear Capital of the world"* (Piazza, 2014). In another example from April 2016, Australian scientists took out a full-page ad in a Queensland newspaper with a headline that reads *"Climate change is destroying our reefs: We must phase out coal"* (The Guardian, 2016). While the ad was

not an explicit appeal to visit the reef, the extent to which such campaigns might perpetuate visitation to the reef and undermine efforts to secure its ecological integrity remains unknown.

***LCT marketing and motivational influences***

Although there has been a push to widely advertise and market threatened destinations, Dawson, Stewart and Lemelin (2012) note that tourism operators are less commonly involved in LCT marketing than the broader media (e.g. travel writers, newspapers, etc.). This means that LCT marketing is often poorly rooted in the local realities of destinations. Perhaps more importantly, marketing campaigns typically fail to acknowledge that travel to often-remote LCT destinations produces disproportionately higher greenhouse gas (GHG) emissions, and exacerbates the decline of the features that LCT visitors seek (Dawson et al. 2010). This current marketing arrangement creates a disconnect between what tourists' desire and what destinations can sustainably offer. Recent findings also show that visitors who engage in high carbon intensity travel to access LCT destinations simultaneously believe (on average) that they are strongly connected to nature and are concerned about climate change (Groulx et al., 2016a). Dawson et al. (2011b) discuss this sense of cognitive dissonance as part of the core ethical dilemma of LCT.

Interestingly, research suggests that the motivation for LCT is only indirectly coupled with scientifically documented climate change impacts. The link is indirect because it is tourist's *perceptions of* climate impacts on a destination, and the communication of this by the media, that drives travel choices (Lemelin et al., 2010). As such, often unbeknownst to local stakeholders, the media's reporting of climate threats affects beliefs about destination vulnerability, and creates an urgency in potential tourists to visit a site sooner rather than later (Olsen, Koster & Yourourkos, 2012). By omitting or misrepresenting critical information, such campaigns can negatively impact the identity of destinations and can contribute to issues that are beyond the control of local stakeholders (e.g., operators, government, communities, etc.).

It is also important to recognize that a LCT motivation may be only one of many factors that stimulate an individual to plan a trip, even to a vulnerable destination. Few studies, however, have explicitly identified the multiple factors that motivate travel to LCT destinations. Dawson et al. (2011b) have argued that the LCT market is based on the intersection of place rarity and vulnerability

that is emphasized in destination marketing, as well as the sense of elitism that tourists can tap into by connecting to such places. This proposition suggests a potential link between visitor's sense of place identity and the motivation to engage in LCT, which has been documented among polar bear viewing tourists (Groulx et al., 2016a).

Within the tourism literature, place identity can be used to describe the collective identity of a destination. Here, we emphasize place identity as a dynamic process that involves individuals using physical and social environments to construct and maintain their sense of self through the promotion of self-efficacy, the exploration of past memories, and the expression of preferences (Proshansky, Fabian & Kaminoff, 1983). We also use the term place affect in this paper to describe positive or negative emotional connections that can develop between person and place (Halpenny, 2010), and the term social bonding to specifically refer to connections that emerge from and are maintained by social relationships within particular settings (Raymond, Brown & Weber, 2010).

Within the tourism and recreation literature, place identity has been linked to a range of behavioural motivations. Bricker and Kerstetter (2000) showed that whitewater recreationist's expectations for environmental conditions (i.e., river conditions) were linked to their skill level as whitewater paddlers. Paddlers also used the river as a gateway to overcome personal challenges, develop self-esteem, and express their sense of self-efficacy (Bricker & Kerstetter, 2002). Landscapes that support a particular activity can also provide opportunities for individuals to reaffirm personal values, although this use of place may diminish with increasing destination familiarity (Mlozi & Pesamaa, 2013). As a recently documented link between place identity and a LCT motivation was among a group of largely first time visitors (i.e., 95%), evidence indicates that achieving a sense of elitism through LCT may likewise be predicated on place novelty and/or the ability to collect new destinations (Dawson et al., 2011b; Groulx et al., 2016a).

As noted, the current marketing of LCT destinations largely ignores tourists' GHG emissions, despite the fact that climate change threatens these places. While carbon intensive travel to LCT destinations is environmentally and ethically problematic, people's experience in and resulting connection to such places can promote benefits, like motivating pro-environmental behavior. In a protected area tourism context, emotional connections to place (i.e., place affect) have been shown to

positively predict both destination satisfaction and intentions to engage in pro environmental behaviors (Halpenny, 2010; Ramkisson, Graham-Smith & Weiler, 2013; Yuksel, Yuksel & Bilim, 2010). Connections specific to the social relationships supported by a particular place (i.e., place-based social bonds) have also been linked to pro-environmental behavioral intentions, although findings here are somewhat inconsistent and further research is needed (Ramkissoon et al., 2013; Raymond et al., 2010).

Given the clear communication, ethical and environmental challenges associated with LCT, there is a push to determine whether this emerging tourism trend can contribute to broader environmental goals. Revenue captured from visitation, for instance, may contribute to improved recovery rates for threatened species (Shelton, 2012), and carefully planned environmental education and communication programs may prompt individuals to act to address climate change, and encourage others to do the same (i.e., promote climate change ambassadorship) (Lemelin et al., 2010). In the following sections we outline survey research that engaged visitors to the critically threatened Athabasca Glacier in JNP, Canada. We explore the connection between the LCT motivation, visitors' place and nature connections, and opportunities for promoting climate change ambassadorship through education, interpretation and outreach.

## Methods

### *Study site context*

Jasper National Park was established in 1907 on the eastern side of the Rocky Mountains in Alberta, Canada and is one of Canada's oldest national parks. The park is home to a community of 4,700 residents (Parks Canada, 2010b), draws more than 2 million visitors per year, and experienced an annual growth rate of 1% over the past decade (Parks Canada, 2015b). The park covers over 10,800 square kilometres and is one of 4 national parks that make up the Canadian Rocky Mountain Parks World Heritage Site (Parks Canada, 2010a). Alberta's national parks (i.e., Banff, Jasper, and Elk Island) generated nearly five times more revenue than similar highly recognized parks in other provinces (The Outspan Group, 2011, p. 19). This is significant because visitors spent $2.7 billion in Canada's National Parks in 2008/09, and 45% of this spending was from non-Canadian visitors (The Outspan Group, 2011).

***Insert Figure 1 here.***

The Athabasca Glacier in JNP was a suitable case study for this research for several reasons. First, significant climate-driven environmental change has already occurred at the site, and the glacier itself has receded approximately 1.5 km and lost about half of its thickness (Hugenholtz, Moorman, Barlow & Wainstein, 2008; Parks Canada, 2015b). The glacier is also continuing to recede and projected trends in warming and glacial decline predict a near total disappearance of the glacier by century's end (Clarke et al., 2015). Second, the park posts very obvious signs marking the location of glacial extent over the years (Figure 2), which visitors can follow along the pathway to the current terminus of the glacier. These signs are tangible indicators of the extent and rate of glacial retreat, and are an explicit attempt to educate visitors about environmental change (Figure 3). Third, recent media stories have highlighted a link between climate change and the retreat of the Athabasca Glacier. A story by the Canadian Broadcast Corporation (CBC, 2014) presented reactions of environmental experts to the decline of the glacier, which described the change as "astonishing" and "mind boggling". Frommer's has also highlighted the area in its *500 Places to See Before They Disappear* travel guide: *"The Columbia Icefields straddle the top of the North American continent like a great crystalline mother embracing her children… But the ice mother's arms seem to clutch her children ever closer, as the edges of the ice field recede an ominous 10m (33 ft) per year."* (Frommers, 2011: 199).

***Insert Figure 2 here.***

***Insert Figure 3 here.***

Within JNP the *"chief [motivations for tourists are] the desire to enjoy the scenery, experience nature and view wildlife"* (Parks Canada, 2010a p. 16). Although visitor surveys consistently identify high rates of visitor satisfaction, park managers have sought to proactively prevent declining visitation rates that are seen in U.S. national parks (see Weiler, Moore & Moyle, 2013), and are encouraging visitation among *"new Canadians, urban youth, families and less experienced park visitors"* (Parks Canada, 2010b, pg. 4). While it is difficult to accurately measure visitation specific to the Athabasca Glacier site because of informal, unrecorded visits, Parks Canada notes that with approximately 1 million annual visitors it is the most visited glacier in North America (Parks Canada, 2015b). As a

whole, the Athabasca Glacier is a key attractor for JNP, and climate-driven changes to the glacier, mingling with media messaging and private ventures[1] that promote the site's rarity and vulnerability, are expected to have significant implications for visitor experiences and management strategies (Figures 2 and 3).

***Survey design***

To support the study's goal of exploring a potential LCT motivation among glacier viewing tourists in JNP, our survey instrument was designed around an 18-item travel motivation scale adapted from the well-established Recreation Experience Preference (REP) instrument (Manfredo, Driver & Tarrant, 1996). To limit response fatigue while ensuring a robust scale, 15 of the original REP items representing eight of the original dimensions were selected, along with three additional items related to LCT. To explore relationships between motivations for glacier viewing and other visitor characteristics we also measured key demographics and tourist's connection to nature and place. Tourists' connection to nature was measured using Nisbet, Zelenski and Murphy's (2009) abbreviated nature relatedness scale (NR-6), which has known psychometric properties and accounts for emotional, cognitive and physical aspects of an individual's connection to nature, (Nisbet et al., 2009).

While an establish scale was deemed preferable for measuring visitors' connection to place, there is no clear consensus as to what dimensions constitute person-place connections, despite four decades of research (Lewicka, 2011). While some models argue that place bonding involves place affect, place identity and place dependence (Halpenny, 2010), others argue for a two-dimensional model that excludes place dependence (Rollero & de Piccoli, 2010), or include social bonding as another important element (Ramkissoon et al., 2013; Raymond, et al., 2010). We measured place bonding using a scale that includes distinct place identity, place affect, and social bonding dimensions. Steps that informed this scale included a review of 120 place studies, a qualitative content analysis, quantitative pre-test, and a final item review by multiple members of the research team. Through these steps, 261 potential scale items were extracted from 22 studies that reported item

[1] Brewster Travel's Columbia Icefield Glacier Adventure tours: http://www.brewster.ca/activities-in-the-rockies/brewster-attractions/columbia-icefield-glacier-adventure/

wordings. A content analysis organized these items into discrete, holistic themes, and 30 unique items were incorporated in a small pre-test (n=25). Pre-test results and expert judgement informed the final scale, which included four items measuring place identity, three items measuring place affect, and two items measuring social bonding. The final section of our survey contained questions drawn from the climate perception literature (e.g., concern for climate change, personal experience with climate change impacts) (Gifford, 2011), as well as questions about trip and visitor characteristics (e.g., length of trip, age of visitor, etc.).

***Data collection and analysis***

Survey data were collected from visitors during peak visitation season, July and August (2013), at the Athabasca Glacier site. Data were collected using tablet computers and iSurvey/DroidSurvey software. Potential respondents over 18 years of age were approached at the Parks Canada information kiosk located near the trailhead that provides access to the glacier. Due to the proprietary nature of tourism operators' client lists, and the high rate of incidental visitation, it was deemed unfeasible to produce a complete sample frame that would allow for a true random sample. Survey solicitation was therefore carried out on an approach basis similar to Ramkissoon et al. (2013). Respondents were surveyed after viewing the glacier on a next available basis. After a brief introduction to the survey and procedures for ensuring confidentiality, visitors were invited to participate. To promote a diverse sample, surveying occurred at a high use location during peak and off-peak times.

To reduce the threat of common method bias we collected surveys on site, varied response scales, and separated the core scales in our survey with generic questions about trip logistics (Podsakoff, MacKenzie & Podsakoff, 2003). During data cleaning 25 participants (0.06% of the sample) were removed due to missing or unengaged responses. After data cleaning all but 2 scale variables had less than 2% missing values. Given the large sample and low rate of missing values, listwise deletion was employed to address missing data. Final analyses included basic descriptive statistics, exploratory factor analysis using principle axis factoring and a direct oblimin rotation, and Pearson correlations.

## Results

### *Respondent characteristics*

The final sample of 399 respondents consisted of approximately half females (50.6%) and a majority of participants completed some post-secondary education or training (87.7%) (Table 1). The sample was evenly split between Canadian (48.9%) and non-Canadian (49.5%) tourists. Of the Canadian visitors, the most common points of origin were Alberta (33.6%), British Columbia (21.4%), and Ontario (22.4%). The age range of visitors was 18 to 83 years of age, with a median age of 40.5 years. This was the first visit to the glacier for most visitors (63.2%), and the average time since the last visit (for return visitors) was 18 years. For those who stayed more than 1 night (60.4%), the median trip length was four days. Finally, the vast majority of visitors suggested they were probably (49.1%) or definitely (35.6%) willing to go to another park to view glaciers.

***Insert Table 1 here.***

### *Motivations of tourists at the Athabasca Glacier*

*Descriptive statistics*

Figure 4 displays the percentage of respondents who selected each level of response to the Likert scale motivation questions. Table 2 provides additional descriptive statistics. In response to the study's first research question, it does appear that visitors exhibited a LCT motivation. Two of the top five motivational factors relate to the disappearance of the glacier, suggesting that visitors to the Athabasca Glacier are aware of the glacier's accelerating retreat, and are coming to visit the glacier at least in part to see the evidence of this retreat. Similar to the JNP survey (Parks Canada 2010a), a desire to be close to nature was rated as important by the highest number of visitors and had the highest average rating of any motivation (see Table 2).

***Insert Figure 4 here.***

***Insert Table 2 here.***

*Exploratory factor analysis*

Exploratory factor analysis (EFA) was used to identify clusters of motivations, and facilitated an examination of the study's second research question. After removing cross-loaded items and items

that did not load above 0.40 (Stevens, 2009), 13 visitor motivation items loaded on three separate factors. This three-factor model explained 53.8% of the variance in the original motivation data (factor 1=36.3%; factor 2 = 11.6%; factor 3 = 5.9%). For two of the factors, internal consistency was assessed using the Cronbach alpha statistic and found to be acceptable (i.e., above 0.7; Nunnally, 1978). Internal consistency of a final pairing of items was assessed using inter-item correlations and was also acceptable (between .2 and .4 - Briggs & Cheek, 1986). Factor 1 included five items and indicated that LCT includes a desire to learn about climate change and environmental change. We titled this motive *LCT motive*. Factor 2 included six motivation items related to a desire to escape, experience solitude, and connect with nature. We titled this motive as *Escape and Nature Reflection motive*. Factor 3 only included two items related to adventure and sharing an experience with others. We titled this motive *Story Telling motive.* Factor scores were calculated using a regression method and were saved to facilitate correlations with other study variables (see Table 3).

***Insert Table 3 here.***

*Correlation analysis*

Prior to conducting a correlational analysis, we assessed the internal consistency of our nature relatedness and place scales. Cronbach alpha levels for the nature relatedness (α=0.809), place identity (α= 0.773) and place affect (α=0.703) scales were all within acceptable limits, while social bonding was not (α=0.369). (Nunnally, 1978). The Cronbach alpha statistic is known to provide lower estimates for scales with few items and Eisinga, Grotenhuis and Pelzer (2012) note that the Spearman-Brown coefficient is less biased for two-item scales. We retested the reliability of our social bonding scale using the Spearman-Brown coefficient, but ultimately excluded it from our correlational analysis as the estimate (0.370) was again below an acceptable threshold.

A correlation analysis revealed several significant positive relationships between the place identity, place affect and nature relatedness constructs, and between these constructs and several visitor characteristics (see Tables 4 and 5). As expected, each motivational dimension is significantly correlated to the other motivation dimensions. The LCT motive was also moderately correlated with

nature relatedness ($r$=0.365, $n$=381, $p\leq$0.01), place affect ($r$=0.447, $n$=381, $p\leq$0.01) and place identity ($r$=0.447, $n$=381, $p\leq$0.01).

***Insert Table 4 here.***

***Insert Table 5 here.***

## Discussion

### *Last chance tourism in Jasper National Park*

Descriptive statistics show that among the top three motivations (in which more than 70% of respondents rated the item as 'very' or 'extremely important' to their decision to travel to the Athabasca Glacier), there is an LCT item indicating a desire "*to view an iconic feature that may disappear from the park in the future"*. In addition, a distinct LCT factor (i.e., LCT Motive) emerged from the exploratory factor analysis. This factor included two LCT items and three items related to environmental learning (e.g., a desire *to learn about the impacts of climate change on the glaciers)*, and was also positively related to visitor's sense of nature relatedness, place identity, and place affect. Overall, these findings provide evidence that a LCT motivation does shape tourists' decision to visit this iconic Canadian glacier, that this motivation involves a desire to learn about natural environmental processes, and that the LCT motivation is linked to visitors' connection to nature and place. These findings underscore the LCT market as a unique interaction between humans and their environment in the context of a kind of 'limited time offer' imposed by global environmental change.

### *Managing last chance tourism in Jasper National Park*

#### *Implications for marketing and market research*

The JNP *Strategic Plan* outlines several ways the management team can provide visitors with an enjoyable and productive experience in the park. One tool employed is a market research tool developed by the Canadian Tourism Commission (CTC) entitled the Explorer Quotient® (Parks Canada, 2010b, pg. 20). The Explorer Quotient® is a measure of visitor motivations and travel values that divides tourists into 9 explorer types. Canadian tourists fall into seven of the categories: Free Spirits; Cultural Explorers; Authentic Experiencers; Personal History Explorers; No Hassle Travellers; Rejuvenators; and Gentle Explorers (CTC, 2013). Specific market research on JNP visitors

indicates that the Authentic Experiencer is well represented, while some other explorer types (the Gentle Explorer and the No Hassel Travellers) are underrepresented as compared to the rest of the Canadian population (Parks Canada 2010b).

Our findings, specifically the identification of the LCT Motive, suggest that there may be motivational factors arising from climate driven environmental change that are not considered in market research tools like the Explorer Quotient. Arguably, if management decisions are to be based on a robust understanding of why visitors seek out particular destinations, these motivational factors ought to be integrated with existing market research practices. The Escape and Nature Reflection and the Story Telling factors documented in our study reflect motivations that are commonly reported in benefits based management (BBM) and ecotourism literatures (e.g., Weiler et al., 2013; Lemieux & Eagles, 2012). Parks Canada (2014) itself also notes that *"[the] breathtaking scenery and inspiring natural surroundings in national parks provide the perfect setting for tuning into nature, learning about it, appreciating it, respecting it and pledging to protect it".* At the same time, our results suggest that these motivations to visit one of the Park's most iconic features exist alongside a desire to experience a piece of disappearing natural heritage.

Related to the LCT motivation, and similar to visitors in New Zealand (Stewart et al., in press), a large proportion of participants surveyed here were willing to substitute other destinations for glacier viewing. This finding should be considered carefully in the management of the Athabasca site. While it may take until century's end (or longer) for the Athabasca Glacier to largely disappear (Clarke et al., 2015), there is no guarantee that it would take this extreme level of environmental change to bring about a shift in visitor's satisfaction at the site. Indeed, the threshold at which visitors might start to view glaciers elsewhere could occur well before the complete disappearance of the glacier. Jasper National Park has done an excellent job using the glacier to market the natural assets of the park, and this is one of the few sites in the Rocky Mountains where visitors can easily walk to the toe of a glacier within a safe and educational environment. While the Athabasca Glacier will ultimately be lost as a marketing and branding asset, understanding how to maintain the benefits of the glacier in the coming decades is a priority, and requires a clear understanding of how sensitive visitor experiences are to environmental changes at the site.

*Implications for education, Interpretation, and outreach*

Parks Canada's mandate states that they "*...protect and present nationally significant examples of Canada's natural and cultural heritage, and foster public understanding, appreciation and enjoyment in ways that ensure the ecological and commemorative integrity of these places for present and future generations"* (Parks Canada, 2002). The interest our participants expressed in learning about glaciers and climate change impacts suggests the Athabasca site is a key asset to meeting this mandate. Current signage talks about glaciers receding due to the "amounts of greenhouse gases in the atmosphere" and notes "strong scientific evidence points towards human activities as the primary cause of climate change". A "100 years from now" sign predicts that in the next century, a lake and forest will remain where the glaciers once were, and the same sign asserts the glacier's importance to North American communities, briefly mentioning the glacier's potential disappearance. The cross sectional nature of this study's design does not allow us to examine the extent to which tourist's LCT motivations were present prior to their arrival at the site, nor how they evolved during the visit. Nonetheless, as a measured LCT motive was coupled with a drive to learn about climate change and glaciers, JNP provides a unique opportunity to pursue Parks Canada's education and outreach goals through interpretive signage that discusses more deeply the evidence of tangible climate change impacts that are visible within the site and the park.

Our results suggest that while visitors' sense of nature relatedness, place identity and place affect were positively linked to the LCT Motive, visitors' connection to the dominant feature at the Athabasca site was somewhat weak. Visitor experiences that incorporate new interpretive programs should therefore seek to not only educate about climate change, but deepen visitors' connection to the site, and therein the likelihood of promoting pro-environmental behavior (Halpenny, 2010; Nisbet et al., 2009; Ramkissoon et al., 2013; Theimer & Ernst, 2012). In doing so, it should be recognized that the communication of topics that deal with emotive, challenging, or controversial content (notwithstanding the consensus about anthropogenic climate change) can be difficult in a leisure context (Melena, 2014). Uzzell and Ballantyne (1998) define hot interpretation as *"*interpretation that appreciates the need for and injects an affective component into its subject matter*"* (p. 154). This type

of interpretation "prompts visitors to re-examine their own previously held beliefs and perceptions regarding specific social, environmental, or moral issues". Strategies that promote hot interpretation in JNP (or other LCT destinations) could involve personal storytelling from multiple perspectives, messages that balance hope and negative change, a focus on education rather than persuasion, tools to promote personal reflection, and communications about the past that informs the future (Ballantyne, Packer, & Bond, 2012, p. 154).

New approaches to education, interpretation, and outreach may promote awareness and acceptance of the causal connections between human behaviours and place-based climate impacts. However, given what is known about the media's role in driving LCT, any form of communication (promotional or otherwise) that highlights experiences of glacial retreat would have to be paired with vigilant management of the potential increase in visitation. Management strategies should also recognize best practice in climate change communication. For example, while linking visitor's behaviours to impacts that they are seeing and feeling in situ may prove highly effective in prompting attitude and behaviour change, materials may be more effective if they promote self-reflection without 'turning people off '. Materials that link an experiential frame for understanding climate change to more abstract climate science could also be effective (Schweizer, Davis & Thompson, 2013; Swim & Bloodhart, 2015). For example, as markers already illustrate impacts by tracing the past extent of the glacier across the landscape, one strategy could be to supplement each marker with information about global carbon dioxide concentration for the same year.

*Considering the 'uneasy benefits' of last chance tourism*

As with all management decisions, any decision to explore the benefits of LCT in JNP would not be without trade-offs. Should JNP choose to explicitly highlight the Athabasca Glacier as a LCT destination, and seek to develop experiences for guests, careful consideration of the possible negative implications would be required. Higher visitor numbers to the site could cause crowding that would detract from visitors' experiences, thereby generating negative publicity for the glacier. Climate projections suggest that more favourable weather conditions could expand shoulder seasons and help accommodate such visitation (Scott, Jones & Konopek, 2007), but additional revenue from this visitation could be lost to the maintenance and development of infrastructure (roads, sanitation, etc.)

needed to accommodate growth (i.e., "opportunity costs") (Lemieux & Eagles, 2012). More critically, higher numbers of people in the park, during more of the year, would lead to more rapid degradation of the biophysical resources and values that the park has been entrusted to protect, and could undermine visitors' expressed desire to maintain the natural identity of the site (Groulx, Lemieux, Lewis & Brown, 2016b)

Finally, while promoting greater visitation to a national park through LCT could provide additional revenues and contribute to social awareness about climate change, concerns about the emissions intensity of LCT have been raised (see for example Eijgelaar et al., 2010; Dawson et al., 2011b; Lemieux & Eagles, 2012). These concerns are framed as the LCT paradox, where the draw to visit vanishing destinations is accompanied by a disproportionate production of GHG emissions. These concerns are typically cited in relation to polar destinations where cruise ships or long-haul flights are required for tourists to reach the destination. The Athabasca Glacier is much more accessible than polar destinations, but the ethics of promoting tourism to a destination impacted by the emissions related to travel to the destination is still an issue that JNP would have to grapple with. A related personal paradox is the potential that visitors might justify the emissions produced by their trip on the grounds that their LCT visit was motivated by a desire to learn about climate change. If not carefully planned for, this rationalization could even be bolstered by on-site interpretation that gives visitors the moral license to ignore their GHG emissions. Clearly this outcome would be contrary to the goal of promoting climate change ambassadorship, and maintaining the ecological integrity of JNP over the long term.

**Conclusions**

This research supports previous work that has discussed a new motivation for nature-based tourists that relates to climate change impacts and the marketing and place branding efforts. This research also concludes that this LCT motivation is a central part of the reason tourists visit the Athabasca Glacier in JNP. The emergence of the LCT motivation has positive and negative implications for the management of parks and protected areas. The LCT Motive in JNP appears to be coupled with a desire to learn about environmental change, and carefully planned communication and education strategies could use the reality of LCT destinations to promote climate change awareness.

Promoting the Athabasca Glacier as a LCT destination could also bring additional revenues to JNP and Parks Canada Agency, and stimulate further private investment from tourism operators. Although this private investment should be approached cautiously, the LCT market could offer a source of revenue to fund the broader biodiversity conservation and protection objectives of JNP and Parks Canada Agency in an era where conservation initiatives are underfunded (Eagles, 2014).

On the other hand, the LCT motivation creates a paradox, where tourists' interest in a vanishing feature creates additional pressure on an already vulnerable landscape. This tension challenges the national park management to consider how best to fulfill its mandate for the protection of ecological integrity, while also meeting the demand for a single feature within its boundaries. Research suggests that visitation, especially visitation that features effective interpretation and engaging experiences, can foster place-protective behaviours (Halpenny, 2010; Kohl, 2005; Ramkissoon et al., 2013). However, highlighting clear avenues for change through education is critical to translating a place-protective motivation into meaningful action (Groulx, Lewis, Lemieux & Dawson, 2014).

A national telephone survey conducted by Parks Canada found that Canadians who visited a one of Canada's national parks had a greater sense of connection to parks, and were more supportive of using tax dollars to maintain the parks system (Parks Canada, 2012). While greater visitation, based on LCT or not, means a greater level of disruption to flora and fauna, it also presents an opportunity to develop education and communication programs that promotes a climate conscious citizenry. The idea that parks agencies may wish to explore the 'uneasy benefits' of promoting LCT is contestable, and involves deep ethical and ecological complexities. However, given the realities of climate change and the fact that many media actors are already shaping motivations within the LCT marketplace, it is dangerous for managers to simply ignore the existence of this motivation and its implications for meeting the mandate of parks and protected areas. The implications of climate change marketing and place branding efforts, the carrying capacity of LCT sites undergoing climate-driven environmental change, and the potential benefits of linking carbon or conservation offsets to LCT are all areas that require further consideration in research and management.

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**List of Figures:**



***Supplementary text for figure 4***

*(*Measured with a 5-point scale: Not important includes "not at all important" + "slightly important"; Moderately important; important includes "very important" + "extremely important".)*

**Table 1:** Sample and visitation characteristics.

| Demographic | Categories | Sample N = 399 |
|---|---|---|
| **Sex** | | n = 391 |
| | Female | 198 (50.6%) |
| | Male | 193 (49.4%) |
| **Age** | | n = 384 |
| | Range | 18 - 83 |
| | Median | 40.5 |
| **Educational Attainment** | | n =392 |
| | No certificate, diploma or degree | 5 (1.3%) |
| | High school certificate or equivalent | 43 (11.0%) |
| | Apprenticeship or trades certificate or diploma | 25 (6.4%) |
| | College, CEGEP or other non-university certificate or diploma | 56 (14.3%) |
| | University certificate or diploma below the bachelor level | 28 (7.1%) |
| | University certificate, diploma or degree at the bachelor's level | 120 (30.6%) |
| | University certificate, diploma or degree above the bachelor's level | 115 (29.3%) |
| **Citizenship** | | n = 390 |
| | Non-Canadian | 196 (50.3%) |
| | Canadian | 194 (49.7%) |
| **First Visit** | | n= 399 |
| | Yes | 252 (63.2%) |
| | No | 147 (36.8%) |
| **Years Since Last Visit** | | n=145 |
| | Range | 1-73 |
| | Median | 18 |
| **Trip Length** | | n= 399 |
| | Half a day or less | 70 (17.5%) |
| | Full day | 39 (9.8%) |
| | One night | 47 (11.8%) |
| | More than one night | 241 (60.4%) |
| | Unsure | 2 (0.5%) |

***NB:*** *some categories tally to less than the total sample due to non-responses.*

**Table 2:** Descriptive statistics of visitor motivation, nature relatedness, place identity, place affect, social bonding and climate change perception items.

| Items | N | M | SD |
|---|---|---|---|
| **[1]Motivations** | | **3.34** | **0.698** |
| To be close to nature | 397 | 4.13 | 0.858 |
| To view an iconic feature that may disappear from the park in the future | 398 | 3.91 | 1.118 |
| To experience natural quiet | 396 | 3.64 | 1.169 |
| To experience solitude | 395 | 3.15 | 1.288 |
| To be with friends and family | 394 | 3.69 | 1.237 |
| To feel a connection with others who value nature | 395 | 2.93 | 1.291 |
| To reflect on life | 398 | 3.15 | 1.320 |
| To develop personal, spiritual values | 399 | 2.56 | 1.315 |
| To feel connected to an environment that may not exist in the future | 399 | 3.67 | 1.250 |
| To reflect on how humans are impacting the environment | 398 | 3.33 | 1.293 |
| To experience a sense of discovery | 398 | 3.95 | 0.972 |
| To learn about glaciers | 397 | 3.43 | 1.053 |
| To share what I have experienced with others | 398 | 3.32 | 1.155 |
| To learn about the impacts of climate change on the glaciers | 398 | 3.27 | 1.197 |
| To have a story to tell | 399 | 3.18 | 1.167 |
| To experience places I have read about | 399 | 3.59 | 1.218 |
| To feel like I was the one of the last people to view the glaciers here | 398 | 2.42 | 1.325 |
| To be able to view an easily accessible glacier | 398 | 3.64 | 1.176 |
| **[2]Nature Relatedness** | | **4.08** | **0.705** |
| My ideal vacation spot would be a remote, wilderness area | 398 | 4.04 | 1.026 |
| I always think about how my actions affect the environment | 399 | 4.13 | .881 |
| My connection to nature and the environment is a part of my spirituality | 398 | 3.65 | 1.253 |
| I take notice of wildlife wherever I am | 399 | 4.54 | 0.707 |
| My relationship to nature is an important part of who I am | 399 | 4.14 | 0.947 |
| I feel very connected to all living things and the earth | 399 | 4.01 | 1.026 |
| **[2]Place Identity** | | **3.22** | **0.851** |
| I identify strongly with the glaciers in Jasper National Park | 399 | 3.30 | 0.995 |
| I feel the glaciers in Jasper national park are a part of me | 398 | 2.86 | 1.087 |
| Visiting Jasper National Park and viewing the glaciers reflects the type of person I am | 399 | 3.41 | 1.106 |
| I learn a lot about myself when spending time in the natural environment in Jasper National Park | 335 | 3.30 | 1.158 |
| **[2]Place Affect** | | **3.27** | **0.891** |
| I am very attached to the glaciers in Jasper National Park | 399 | 3.19 | 1.047 |
| The glaciers in Jasper National Park mean a lot to me | 397 | 3.41 | 1.052 |
| I would feel less attached to Jasper National Park if the glaciers disappeared | 398 | 3.21 | 1.267 |
| **[2]Social Bonding** | | **3.21** | **0.983** |
| The time spent viewing glaciers in Jasper National Park allows me to bond with family and friends | 397 | 3.62 | 1.197 |
| Changes to the natural environment in Jasper National Park could disrupt chances for me to bond with my family and friends | 392 | 2.79 | 1.301 |
| **Climate Change Perceptions** | | | |
| [3]How concerned are you about the climate change issue? | 399 | 3.94 | 1.074 |

| | | | |
|---|---|---|---|
| [2]I have personally experienced the effects of climate change | 398 | 3.90 | 1.063 |
| [2]The glacier will disappear from Jasper National Park due to changes in global climate | 389 | 3.53 | 0.907 |
| [4]If you were not able to see glaciers in Jasper National Park, would you be willing to go to another park to view this feature? | 397 | 1.83 | 0.769 |

[1]Five point scale (1= Not at all important; 5 = Extremely important)
[2]Five point scale (1= Disagree strongly; 5 = Agree strongly)
[3]Five point scale (1= Not at all concerned; 5 = Extremely concerned)
[4]Four point scale (1= Definitely; 4 = No)

**Table 3:** Exploratory factor analysis of visitor motivations at the Athabasca Glacier, Jasper National Park.[a]

| | Factor loading | | |
|---|---|---|---|
| | **1** | **2** | **3** |
| | **LCT Motive** | **Escape & Reflection** | **Story Telling** |
| To feel connected to an environment that may not exist in the future | .894 | | |
| To view an iconic feature that may disappear from the park in the future | .757 | | |
| To learn about the impacts of climate change on the glaciers | .756 | | |
| To reflect on how humans are impacting the environment | .694 | | |
| To learn about glaciers | .547 | | |
| To experience solitude | | .873 | |
| To experience natural quiet | | .784 | |
| To reflect on life | | .719 | |
| To develop personal, spiritual values | | .562 | |
| To be close to nature | | .476 | |
| To feel a connection with others who value nature | | .420 | |
| To share what I have experienced with others | | | .799 |
| To have a story to tell | | | .568 |

*Extraction Method: Principal Axis Factoring.*
*Rotation Method: Oblimin with Kaiser Normalization.[a]*
*a. Rotation converged in 6 iterations.*

**Table 4:** Correlations between visitor motivations, nature relatedness, place identity, place affect, and social bonding.

| | Escape & Reflection | Story Telling | Nature Relatedness | Place Identity | Place Affect |
|---|---|---|---|---|---|
| LCT Motive | .470** | .502** | .365** | .465** | .425** |
| Escape & Reflection | | .374** | .427** | .401** | .295** |
| Story Telling | | | .125* | .328** | .265** |
| Nature Relatedness | | | | .444** | .392** |
| Place Identity | | | | | .714** |
| Place Affect | | | | | |

Note: Pearson correlation product moment coefficient used to calculate linear correlation. Correlation strength interpreted using Cohen's (1988) guidelines: r=.10 to .29 or r=-.10 to -.29 is small; r=.3 to .49 or r=-.3 to -.49 is medium; r=.50 to 1.0 or r=-.50 to -1.0 is large. *Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed).

**Table 5:** Correlations between visitor characteristics, travel motivations and place-related attitudes.

| | LCT Motive | Escape & Reflection | Story Telling | Nature Relatedness | Place Identity | Place Affect |
|---|---|---|---|---|---|---|
| [1]Time since last visit | .136 | .058 | .107 | .052 | .227** | .258** |
| Visit elsewhere | -.284** | -.077 | -.055 | -.304** | -.250** | -.329** |
| Trip length | .108* | .105* | -.040 | .037 | -.015 | .039 |
| CC concern | .439** | .226** | .071 | .321** | .239** | .283** |
| CC experience | .357** | .220** | .046 | .321** | .226** | .324** |
| Glacier disappear | .329** | .146** | .023 | .215** | .136** | .119** |

Note: Pearson correlation product moment coefficient used to calculate linear correlation Correlation strength interpreted using Cohen's (1988) guidelines: r=.10 to .29 or r=-.10 to -.29 is small; r=.3 to .49 or r=-.3 to -.49 is medium; r=.50 to 1.0 or r=-.50 to -1.0 is large. *Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed); [1]Only return visitors (n = 147) reporting.